

# MORITZ HAAS

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🌐 [Personal Website](#) —  [Google Scholar](#) —  [GitHub](#)

## RESEARCH INTERESTS

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- Principled practical improvements in deep learning from first principles, Science of Scale, Tensor Program Theory, Deep Learning Theory, High-dimensional Statistics.
- ML in Science, ML in Climate Science, Graphs.

## RESEARCH & WORK EXPERIENCE

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### Amazon AGI Foundations

*Applied Scientist II*

Tübingen, DE

August 2025 – Present

- Focused on the science of scale, foundation model pretraining, and continual learning.

### Amazon Research and Development Center

*Applied Scientist Intern, AGI Foundations*

Tübingen, DE

Nov 2023 – Apr 2024

## EDUCATION

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### Ph.D. in Computer Science

*University of Tübingen, International Max Planck Research School for Intelligent Systems*

Tübingen, DE

May 2021 – July 2025

- **Advisor:** Prof. Ulrike von Luxburg (Theory of Machine Learning).
- **Main subjects:** Deep Learning Theory, Width scaling, Benign overfitting, ML in Climate Science.

### M.Sc. in Mathematics

*Universität Heidelberg (Grade: 1.1; 1.0 is best possible)*

Heidelberg, DE

Apr 2019 – Dec 2020

- **Minor:** Scientific Computing.
- **Thesis:** *Theoretical Properties of Wasserstein Generative Adversarial Networks.*

### B.Sc. in Mathematics

*Universität Heidelberg (Grade: 1.2; 1.0 is best possible)*

Heidelberg, DE

Oct 2014 – Apr 2019

- **Minor:** Physics. Includes Exchange Semester at Universitat de Barcelona.
- **Thesis:** *Fréchet Analysis of Variance for Random Objects.*

### Abitur

*Adolf-Reichwein-Schule (Grade: 1.1; 1.0 is best possible)*

Neu-Anspach, DE

June 2014

### Year Abroad

*Youth For Understanding Exchange Program*

Solymar, Uruguay

Aug 2011 – July 2012

## SELECTED PUBLICATIONS

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- [1] **M. Haas.** "How Width Scaling Affects Neural Networks: Generalization, Optimal Hyperparameters, Feature Learning and Beyond." **PhD Thesis, University of Tübingen.** [\[PDF\]](#)
- [2] **M. Haas, S. Bordt, U. von Luxburg, L. C. Vankadara.** "On the Surprising Effectiveness of Large Learning Rates under Standard Width Scaling." **NeurIPS 2025 (Spotlight).** [\[PDF\]](#)
- [3] **M. Haas, J. Xu, V. Cevher, L. C. Vankadara.** " $\mu P^2$ : Effective Sharpness Aware Minimization Requires Layerwise Perturbation Scaling." **NeurIPS 2024.** [\[PDF\]](#)
- [4] **L. C. Vankadara\*, J. Xu\*, M. Haas, V. Cevher.** "On Feature Learning in Structured State Space Models." **NeurIPS 2024.** [\[PDF\]](#)

- [5] **M. Haas\***, D. Holzmüller\*, U. von Luxburg, I. Steinwart. "Mind the Spikes: Benign Overfitting of Kernels and Neural Networks in Fixed Dimension." **NeurIPS 2023**. [\[PDF\]](#)
- [6] **M. Haas**, B. Goswami, U. von Luxburg. "Pitfalls of Climate Network Construction: A Statistical Perspective." **Journal of Climate**, 2023. [\[PDF\]](#)

## SELECTED CONFERENCE PRESENTATIONS

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- **Talk:** *Beyond  $\mu P$ : Scaling Insights from Infinite-width Theory for Non-standard Architectures and Learning Paradigms* @ "2nd Workshop on Learning Under Weakly Structured Information and Uncertainty in Machine Learning", Tübingen AI Center, 2025. [\[Website\]](#)
- **Talk:** *Mind the spikes: Benign overfitting of kernels and neural networks* @ Workshop "Overparametrization, Regularization, Identifiability and Uncertainty in Machine Learning", MFO Oberwolfach, 2025. [\[Website\]](#)
- **Poster:** *Mind the spikes: Benign overfitting of kernels and neural networks in fixed dimension* @ Workshop "Statistical Physics and Machine Learning back together again", IESC Cargese, 2023. [\[Website\]](#)
- **Poster:** *Pitfalls of Climate Network Construction: A Statistical Perspective* @ Conference "Machine Learning and Signal Processing on Graphs", CIRM Marseille, 2022. [\[Website\]](#)
- **Talk:** *Spurious Behaviour in Networks from Spatio-temporal Data*, EGU General Assembly Vienna, 2022. [\[Website\]](#)

## TEACHING

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<b>University of Tübingen</b>	Tübingen, DE
<i>Supervision of Bachelor and Master Students</i>	Jan 2022 – July 2025

<b>University of Tübingen</b>	Tübingen, DE
<i>Lecture Coordinator, "Statistical Machine Learning" <a href="#">[Website]</a></i>	Apr 2022 – Oct 2022

- The lecture was awarded the **Faculty's Teaching Award**.

<b>Universität Heidelberg</b>	Heidelberg, DE
<i>Teaching Assistant, "Probability Theory 1"</i>	Apr 2020 – Sep 2020

<b>Universität Heidelberg</b>	Heidelberg, DE
<i>Teaching Assistant, "Introduction to Probability Theory"</i>	Apr 2018 – Sep 2018

<b>Universität Heidelberg</b>	Heidelberg, DE
<i>Teaching Assistant, "Analysis 1"</i>	Oct 2016 – Mar 2017

## SERVICE & AWARDS

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- **Reviewer:** [Top Reviewer NeurIPS 2024](#), [Notable Reviewer ICLR 2025](#), [ICML](#), [Biometrika](#).
- **Fellowships:** Exchange Semester Scholarship by the "Baden-Württemberg Stiftung" (Barcelona).

## TECHNICAL SKILLS

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- **Programming & Tools:** Python, R, C++, Git,  $\text{\LaTeX}$ .
- **Languages:** German (Native), English (Fluent), Spanish (Fluent).

## ACTIVITIES

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I enjoy reading, being in nature, and various kinds of sports, especially bouldering.