

# Michiel Straat

## Curriculum Vitae

Inspiration 1  
33619 Bielefeld  
Germany

✉ [michielstraat@gmail.com](mailto:michielstraat@gmail.com)

🌐 [michielstraat.com](http://michielstraat.com)



## Current position

01/2023-current **Postdoctoral researcher, Junior research group leader on robust life-long machine learning**, Faculty of Technology, Bielefeld University, Germany  
Project: Robust life-long machine learning (part of the [SAIL research network](#))

## Previous Positions and Experience

- 07/2022-12/2022 **Guest researcher**, Faculty of Technology, Bielefeld University, Germany  
Life-long machine learning
- 10/2018-06/2022 **PhD researcher (aio)**, Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence, University of Groningen, The Netherlands  
Thesis: [Machine Learning: Statistical physics based theory and smart industry applications](#)  
Supervisors: Prof. Dr. Michael Biehl, Prof Dr. Kerstin Bunte, Prof. Dr. Nicolai Petkov  
Grade: Doctorate obtained with *highest distinction*
- 12/2020-01/2022 **Research Partner**, Philips Innovation Center, Drachten, The Netherlands  
Project: Real-time quality control in high-throughput production lines
- 06/2017-12/2017 **Intern**, Philips Innovation Center, Drachten, The Netherlands  
Project: Predicting material properties from Eddy Current measurements  
Supervisors: Nick Goet and Jan Siegersma  
Grade: 9
- 07/2010-06/2014 **Software consultant**, Self-employed, Leeuwarden, The Netherlands

## Education

- 09/2016-09/2018 **Master's Degree in Computing Science (Specialization: Intelligent Systems and Visualization)**, Faculty of Science and Engineering, University of Groningen, Distinction: Cum Laude  
Thesis: [On-line Learning in Neural Networks with ReLU Activations](#)  
Supervisors: Prof. Dr. Michael Biehl and Dr. Kerstin Bunte  
Grade: 9.5
- 09/2013-08/2016 **Bachelor's Degree (Dutch Dipl.- Inform.) in Computing Science**, Faculty of Science and Engineering, University of Groningen  
Thesis: [Time Series Classification in Complex Fourier Space](#)  
Supervisors: Prof. Dr. Michael Biehl and MSc. Friedrich Melchert  
Grade: 9
- 08/2007-07/2013 **High School degree**, Stedelijk Gymnasium (Grammar school), Leeuwarden, The Netherlands, Degree: Nature and Technology + Health (Dutch: Natuur en Techniek + Gezondheid (NT/NG))  
Additional courses: Computer Science and Economics

## Publications

- 2024 Markmann, Thorben, **Straat, Michiel**, and Hammer, Barbara. 2024. "Koopman-Based Surrogate Modelling of Turbulent Rayleigh-Bénard Convection". In: *International Joint*

- Conference on Neural Networks*. IEEE. URL: <https://arxiv.org/abs/2405.06425>.
- 2023 Richert, Frederieke, **Straat, Michiel**, Oostwal, Elisa, and Biehl, Michael. **2023**. "Layered Neural Networks with GELU Activation, a Statistical Mechanics Analysis". In: *Proceedings ESANN 2023*. Ed. by Michel Verleysen. European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning : ESANN 2023 ; Conference date: 04-10-2023 Through 06-10-2023. i6doc.com publication, pp. 435–440. ISBN: 978-2-87587-088-9. URL: <https://www.esann.org/sites/default/files/proceedings/2023/ES2023-72.pdf>.
- 2022 **Straat, Michiel**, Koster, Kevin, Goet, Nick, and Bunte, Kerstin. **2022**. "An Industry 4.0 example: real-time quality control for steel-based mass production using Machine Learning on non-invasive sensor data". In: *2022 International Joint Conference on Neural Networks (IJCNN)*. IEEE, pp. 01–08. DOI: [10.1109/IJCNN55064.2022.9892432](https://doi.org/10.1109/IJCNN55064.2022.9892432). URL: <https://ieeexplore.ieee.org/document/9892432>.
- 2021 Münch, M., **Straat, M.**, Biehl, M., and Schleif, F-M. **Apr. 2021**. "Complex-valued embeddings of generic proximity data". In: *Structural, Syntactic, and Statistical Pattern Recognition*. Vol. 12644. Springer International Publishing, pp. 14–23. DOI: [10.1007/978-3-030-73973-7](https://doi.org/10.1007/978-3-030-73973-7). URL: <https://arxiv.org/abs/2008.13454>.
- Straat, M.**, Abadi, F., Kan, Z., Göpfert, C., Hammer, B., and Biehl, M. **Apr. 2021**. "Supervised learning in the presence of concept drift: a modelling framework". In: *Neural Computing and Applications*. ISSN: 1433-3058. DOI: [10.1007/s00521-021-06035-1](https://doi.org/10.1007/s00521-021-06035-1).
- Oostwal, E., **Straat, M.**, and Biehl, M. **Feb. 2021**. "Hidden unit specialization in layered neural networks: ReLU vs. sigmoidal activation". In: *Physica A: Statistical Mechanics and its Applications* 564, p. 125517. ISSN: 0378-4371. DOI: [10.1016/j.physa.2020.125517](https://doi.org/10.1016/j.physa.2020.125517).
- 2019 **Straat, M.** and Biehl, M. **Apr. 2019**. "On-line learning dynamics of ReLU neural networks using statistical physics techniques". In: *Proc. European Symposium on Artificial Neural Networks (ESANN) 2019, Bruges/Belgium*. Ed. by M. Verleysen.
- Straat, M.**, Kaden, M., Gay, M., Villmann, T., Lampe, A., Seiffert, U., Biehl, M., and Melchert, F. **Mar. 2019**. "Learning vector quantization and relevances in complex coefficient space". In: *Neural Computing and Applications*. ISSN: 1433-3058. DOI: [10.1007/s00521-019-04080-5](https://doi.org/10.1007/s00521-019-04080-5). URL: <https://doi.org/10.1007/s00521-019-04080-5>.
- 2018 **Straat, M.**, Abadi, F., Göpfert, C., Hammer, B., and Biehl, M. **Oct. 2018**. "Statistical Mechanics of On-Line Learning Under Concept Drift". In: *Entropy* 20.10. ISSN: 1099-4300. DOI: [10.3390/e20100775](https://doi.org/10.3390/e20100775). URL: <http://www.mdpi.com/1099-4300/20/10/775>.
- 2017 **Straat, M.**, Kaden, M., Gay, M., Villmann, T., Lampe, A., Seiffert, U., Biehl, M., and Melchert, F. **July 2017**. "Prototypes and matrix relevance learning in complex fourier space". In: *2017 12th International Workshop on Self-Organizing Maps and Learning Vector Quantization, Clustering and Data Visualization (WSOM)*, pp. 1–6. DOI: [10.1109/WSOM.2017.8020019](https://doi.org/10.1109/WSOM.2017.8020019).

---

## Awards and accomplishments

- 2022 **PhD awarded with highest distinction**, *University of Groningen*, The Netherlands  
 Thesis: [Machine learning: statistical physics based theory and smart industry applications](#)  
 Grade: Highest distinction
- 2017 **Best Paper Award**, *Computer Science Student Colloquium*, University of Groningen  
 Paper: [Segmentation of Blood Vessels in Retinal Fundus Images](#)  
 Expert grade: 9.5

2016 **Best Presentation Award**, *BSc. Theses Symposium*, University of Groningen  
Title: Time Series Classification in Complex Fourier Space  
Experts grade: 9.0

---

## Talks

- 22/01/2024 **Koopman-based Modeling of Rayleigh-Bénard Convection**, *Applications of Intelligent Systems (APPIS)*, Las Palmas de Gran Canaria, Spain  
[Slides](#)
- 24/03/2023 **Modelling adversarial training**, *Workshop on Intelligent Systems and Computational Intelligence (WISCI)*, Groningen, The Netherlands  
[Slides](#)
- 23/08/2022 **An Industry 4.0 example: real-time quality control for steel-based mass production using Machine Learning on non-invasive sensor data**, *The 14th Mittweida Workshop on Computational Intelligence*, Mittweida, Germany  
[Slides](#)
- 20/07/2022 **An Industry 4.0 example: real-time quality control for steel-based mass production using Machine Learning on non-invasive sensor data**, *World Congress on Computational Intelligence (WCCI), International Joint Conference on Neural Networks (IJCNN) 2022*, Padua, Italy  
[Slides](#)
- 03/03/2021 **Feedback Alignment methods for training neural networks**, *Intelligent Systems March Seminar*, Groningen, The Netherlands  
[Slides](#)
- 12/08/2020 **Dynamics of on-line learning in two-layer neural networks in the presence of concept drift**, *Summer Workshop on Statistical Physics and Machine Learning*, École de physique des Houches, Les Houches, France  
[Recording and Slides](#)
- 02/07/2020 **Dynamics of on-line learning in two-layer neural networks in the presence of concept drift**, *The 12th Mittweida Workshop on Computational Intelligence*, Mittweida, Germany (online)  
[Abstract](#)
- 12/09/2019 **Towards a statistical physics analysis of multilayer ReLU neural networks**, *The 11th Mittweida Workshop on Computational Intelligence*, Hochschule Mittweida, Germany  
[Slides](#), [Abstract](#)
- 26/04/2019 **On-line learning dynamics of ReLU neural networks using statistical physics techniques**, *European Symposium on Artificial Neural Networks, Computational Intelligence and Machine Learning - ESANN 2019*, Bruges, Belgium  
[Slides](#)
- 29/06/2017 **Prototypes and matrix relevance learning in complex Fourier space**, *12th International Workshop on Self-Organizing Maps and Learning Vector Quantization, Clustering and Data Visualization*, Laboratoire Lorrain de Recherche en Informatique et ses Applications (Loria), Nancy, France  
[Slides](#)
- 04/2017 **Segmentation of blood vessels in retinal fundus images**, *SC@RUG2017*, University of Groningen, The Netherlands  
[Slides](#)

---

## Organization and Leadership

- 23/2023 **Organization of workshop Limitations of Large Language Models**, *Center for Cognitive Interaction Technology*, Bielefeld University, <https://sites.google.com/view/sail-ws-llms/home>
- 01/2023- **Head of junior research group on robust life-long machine learning, research network SAIL**, *Center for Cognitive Interaction Technology*, Bielefeld University
- 01/2021-05/2022 **Organization of the Intelligent Systems seminars**, *Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence*, University of Groningen
- 11/2019-03/2020 **Head of Teaching Assistants of the Advanced Algorithms and Data Structures course**, *Faculty of Science and Engineering*, University of Groningen, 5 TAs, 120 students
- 01/2017-04/2017 **Head of the organization of the 14th Student Colloquium**, *Faculty of Science and Engineering*, University of Groningen

## Reviewing and committees

I have been a reviewer for several conferences and journals, including:

- Technical Program Committee International Joint Conference on Artificial Neural Networks (IJCNN) 2024
- European Symposium on Artificial Neural Networks (ESANN)
- International Joint Conference on Artificial Neural Networks (IJCNN)
- Neurocomputing
- Neural Processing Letters

I have also served as a committee member in PhD defenses at the following universities:

- Bielefeld University, 2023

## Teaching

### Teaching Assistant

- 11/2020-02/2021 **Neural Networks and Computational Intelligence**, *Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence*, University of Groningen
- 09/2020-11/2020 **Modelling and Simulation**, *Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence*, University of Groningen
- 11/2019-01/2020 **Advanced Algorithms and Data Structures**, *Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence*, University of Groningen
- 09/2019-11/2019 **Modelling and Simulation**, *Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence*, University of Groningen
- 09/2017-11/2017 **Information Security**, *Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence*, University of Groningen
- 09/2016-11/2016 **Information Security**, *Bernoulli Institute for Mathematics, Computer Science and Artificial Intelligence*, University of Groningen

### (Co-)Supervision

- 2021 **MSc. Thesis**, *P. Eilers*, University of Groningen
- 2020 **MSc. Internship**, *P. Eilers*, University of Groningen
- 2020 **MSc. Internship**, *N. Tamboli*, University of Groningen
- 2020 **MSc. Thesis**, *E. Oostwal*, University of Groningen
- 2019 **MSc. Internship**, *E. Oostwal*, University of Groningen
- 2019 **MSc. Thesis**, *Z. Kan*, University of Groningen

---

## Programming languages

- Python
- Mathematica
- Matlab
- C/C++

---

## Schools attended

- 09/2021-09/2021 **Gaussian Process and Uncertainty Quantification Summer School 2021**, University of Sheffield (online)
- 08/2020-08/2020 **Summer Workshop on Statistical Physics and Machine Learning**, *École de physique des Houches*, Les Houches, France
- 09/2014-04/2015 **C/C++**, *Institute for Mathematics and Informatics*, University of Groningen  
Lecturer: Prof. Dr. F.B. Brokken ([Course website](#))

---

## Session chairing

- International Joint Conference on Artificial Neural Networks 2022

---

## Languages

Dutch	Mother tongue
English	Fluent
German	B2
Russian	B1

---

## References

- Prof. Dr. Barbara Hammer ([Website](#), e-mail: [bhammer@techfak.uni-bielefeld.de](mailto:bhammer@techfak.uni-bielefeld.de))
- Prof. Dr. Michael Biehl ([Website](#), e-mail: [m.biehl@rug.nl](mailto:m.biehl@rug.nl))
- Prof. Dr. Kerstin Bunte ([Website](#), e-mail: [k.bunte@rug.nl](mailto:k.bunte@rug.nl))
- MSc. Nick Goet (e-mail: [nick.goet@philips.com](mailto:nick.goet@philips.com))