

# Jan Philipp Bauer

🏠 [japhba.github.io](https://japhba.github.io)

## EDUCATION

- Ph.D. student** in computational neuroscience 10/2022–  
Edmond and Lily Safra Center for the Brain Sciences, The Hebrew University of Jerusalem, Israel  
*Working on kernel descriptions of chaos in recurrent models of the brain.*  
**Advisor:** Dr. Jonathan Kadmon
- M.Sc. in physics** GPA 1.0/1.0, with distinction 2019–2022  
RWTH Aachen University, Germany  
*Focussed coursework on Statistical Mechanics of Neural Networks, Theoretical Neuroscience, Deep Learning in Physics Research, Quantum Information, and Computational Physics*
- Master's thesis** 09/2021–08/2022  
Juelich Research Center, Germany  
*Analysis of computation in cortical networks by Gaussian process regression.*  
**Advisors:** Prof. Moritz Helias, Dr. Christian Keup (now EPFL Switzerland)
- Bilateral graduate exchange program** 09/2019–03/2020  
The University of Tokyo  
*Focussed coursework on Tensor Networks and Universal Biology, which investigates stem cell differentiation and evolution by a mathematical, complex systems approach. Member of Japanese university choir "The White Rose"*
- B.Sc. in physics** GPA 1.3/1.0, with distinction 10/2016–09/2019  
RWTH Aachen University, Germany
- Bachelor's thesis** 03/2019–09/2019  
Juelich Research Center, Germany  
*Description of unsupervised learning in Boltzmann machines via Feynman diagrams.*  
**Advisors:** Prof. Moritz Helias, Dr. Tobias Kuehn (now ENS Paris)
- 4x **teaching assistant** in theoretical physics and lab courses, mentoring 1<sup>st</sup> to 10<sup>th</sup> semester students

## PROFESSIONAL EXPERIENCE

- Research Internship** 03/2021–06/2021  
Bosch Center for Artificial Intelligence, Renningen, Germany  
*Co-developed and implemented architectural extensions of Bayesian version of the Neural Process model.*

## HONOURS

<b>HUJI International PhD Talent Scholarship</b>	since 2023
<b>Scholarship fellow of the Konrad Adenauer Foundation</b> (one of 13 academic talent promoters established by the Federal Ministry of Education and Research)	2016-2022
Fellow of RWTH Aachen University's <b>Dean's List</b> of top 5% students	since 2019
<b>Valedictorian</b> in Abitur A-Levels	2016

## PRESENTATIONS

Talk <b>Can discrete neurons be useful?</b> , ELSC Annual Retreat, Nahsholim, Israel	06/2023
Poster <b>Discrete communication mediates effective regularization in chaotic recurrent networks</b> , COSYNE 2023, Montréal, Canada	03/2023
<b>Random Matrix Theory for Machine Learning</b> , Parallel Sessions of INM-6 Annual Retreat	05/2022
<b>Inference with Graphical Models</b> , Book Club of Institute for Neuroscience and Medicine, Juelich Research Center	10/2021
<b>Proof-read and advised high school textbook</b> together with teacher Dr. Bardo Diehl at didactics congress MNU Aachen in front of 40 participants ( <i>"Zentrale Experimente für das Abitur"</i> , Cornelsen 2017)	04/2017

## SCHOOLS ATTENDED

<b>5-day Workshop</b> "Recent advances in understanding artificial and biological neural networks" Les Houches School of Physics, France	02/2023
<b>5-day Summer school</b> "Reinforcement Learning" Vrije Universiteit Amsterdam	06/2022

## TEACHING EXPERIENCE

Statistical Physics and Field Theory	summer 2022
Theory of Electromagnetism	winter 2022
Preparatory math course for computer scientists	10/2020

Theory of Thermodynamics	winter 2020
Introductory lab course for physicists	09/2018
Introduction to Theoretical Physics (1 <sup>st</sup> year B.Sc.)	winter 2018

## LEADERSHIP AND OUTREACH

### Social commitment

Volunteer at the City of Aachen, supporting Egyptian family with homework and administrative tasks 2017–2020

Co-organisation of “LernFair”-AI lessons, part of a project aimed at high school students during the pandemic winter 2021

### Full-time scholarship by the Konrad Adenauer Foundation 2016–2022

Elected **spokesperson** of local group of 25 students 2019–2020

Increased participation of students by bundling proposals for engaging and meaningful group activities, such as a volunteer week in kindergarten in socially deprived suburb of Aachen

Initiated and organized **4-day seminar on the scientific voice in democracies**, with invited speakers on the philosophy of science, politics, recent societal challenges, and science communication 04/2022

Service to inform about cancellation of school lessons in the early morning before classes start 2015

Development of mobile app to create a precise elevation map of Aachen by use of barometer data of phones, targeted at finding a least elevation bicycle route 2016

Application of machine learning and Fourier decomposition to successfully remove chequered paper background from handwritten lecture notes 2020

## SOFTWARE AND LANGUAGE PROFICIENCY

### Software

Python

Machine Learning frameworks PyTorch and JAX

3D computer graphics with Blender

### Languages

German (native)

English (academic proficiency, daily usage)

French (good, DELF A2)

Japanese (good, weekly practice with Tandem partner)

## RECREATIONAL ACTIVITIES

Bicycle touring and medium distance running (olympic-distance triathlon in September 2022)

Singing in university choir (tenor voice)

## REFERENCES

**Dr. Jonathan Kadmon**, Ph.D. advisor, The Hebrew University of Jerusalem

**Prof. Moritz Helias**, M.Sc. thesis advisor, Juelich Research Center

**Michael Volpp**, research internship advisor, Bosch Center for Artificial Intelligence

**Dr. Christian Keup**, M.Sc. thesis advisor, EPFL Switzerland

**Dr. Tobias Kuehn**, B.Sc. thesis advisor, Ecole Normale Supérieure Paris

*Updated: June 20, 2023*