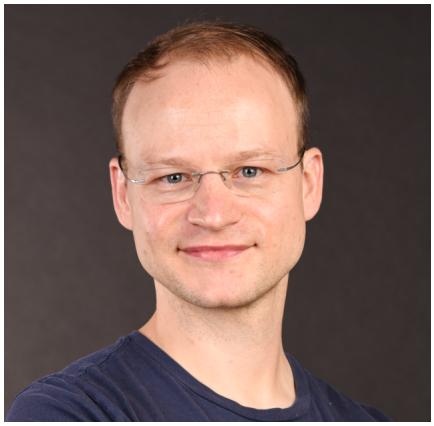

Dr. Kai Hoffmann

Software Engineer | Physicist

Zürich

GitHub

Bitbucket

LinkedIn

ORCiD

About me

I am a physicist with 11 years of international research experience in astrophysics, specializing in statistical and numerical methods. Today, I apply this expertise as a software engineer, developing robust back-end solutions for financial and insurance data.

Programming

Python, C++

Git, SQL, TypeScript

Machine Learning

Work experience

Senior Software Engineer **02/2022-today**

Datahouse AG (Zürich)

- Responsible for the back-end development of a nationwide Swiss insurance data collection system, focusing on data validation and **statistical analysis** using **TypeScript**, **SQL** and **Docker**. Collaborate with clients to translate business requirements into software solutions.
- Deployed **machine learning** models for art price estimation, leveraging image analysis with **Keras** and **TensorFlow**, as well as random forests. Supervised a trainee on front-end and API development.
- Developed features for a **stock portfolio optimization** web application in **Python**, enhancing its analytical and usability capabilities.

Postdoctoral Researcher **03/2022-10/2022**

Institute of Space Sciences (Barcelona)

- **Optimized** and performed **statistical analysis** of cosmological simulations at the PIC data center for ESA's Euclid mission, utilizing **C++** and **Python**.
- Implemented and tested **machine learning methods for classification problems** by developing Python code and supervising a master's student.

Postdoctoral Researcher **09/2018 - 02/2022**

University of Zürich

- Developed an efficient post-processing algorithm for large simulations using Python (**NumPy**, **SciPy**, **Pandas**, **Jupyter**) in close collaboration with data engineers, implemented statistical analysis tools in **C++**.
- Designed and implemented a **software pipeline for model fitting** using Bayesian statistics and hypothesis testing. This work supports two major science collaborations (Euclid, DES), resulting in three published articles and multiple ongoing projects.
- **Co-managed a work package** with approximately 40 participants in the Euclid science collaboration by organizing monthly online meetings and progress presentations.
- **Co-organized institute seminars** by hosting speakers and moderating discussions, introducing a voting system to involve junior scientists, which attracted talks by leading global experts.
- Delivered over 10 talks at seminars, collaboration meetings, and public events, while mentoring students on seminar topics and providing essential scientific background.

Education

2012 - 2015

Physics (Ph.D.)

Universitat
Autònoma de Barcelona

2004 - 2011

Physics (Diplom)

Universität Potsdam

2007 - 2008

Physics (Exchange Year)

Universitàdegli Studi di Firenze

Languages

German

English

Spanish

Italian

Interests

- Bass guitar
- Mountainbiking
- Mountaineering
- Environmental protection
- Astrophotography
- Finance

Postdoctoral Researcher **09/2016 - 08/2018**
Tsinghua University (Beijing)

- **Developed a mathematical model** describing hydrogen clustering in the early Universe.
- **Run simulations** and performed statistical analysis using (**C++**, **Slurm**) on a computing cluster to validate the model.
- Presented the work in one research article and four international conference presentations.

Visiting Researcher **08/2015 - 11/2015**
International Centre for Theoretical Physics
(Sao Paulo)

- Tested accuracy of a mathematical model for the cross-correlation between different statistics of galaxy populations **using simulations**.

Predoc, Ph.D. research student, Postdoctoral Researcher **07/2011 - 08/2016**
Institute of Space Sciences (Barcelona)

- Investigated the accuracy of different **mathematical models** for galaxy **clustering statistics** using simulations. This work was published in 7 **research articles** and was presented at 13 **talks at international conferences and research institutes**.
- **Developed codes in C, C++, Python, Cython** for efficient measurements of different statistics in big data sets, quantifying the clustering and alignment of galaxies. Codes from this work are publicly available and are being used by collaborating researchers.

Diploma student (equivalent to Masters) **02/2010 - 04/2011**
Leibniz-Institute for Astrophysics (Potsdam)

- **Developed codes in C++** for efficient measurements of galaxy clustering statistics. Applied code to analyze data from simulations and observations.

Formation in Machine Learning and Python

- Certificate as TensorFlow Developer (DeepLearning.AI, 2025)
- Hackathon on classification of bio-acoustic data (ETH AI center, 2024)
- Coursera course on Machine Learning (Stanford University, 2021)
- Workshop on Machine Learning (University of Zurich, 2019)
- Workshop on "High-Performance Computing with Python" (Swiss National Supercomputing Centre, 2018)

Academic achievements

- 18 publications in international peer reviewed journals (impact factor > 5)
- 25 talks at international conferences, workshops and research institutes
- 6 research grants and fellowships
- h-index: 13 (according to ADS)