# Maurice Frank
## Machine learning researcher

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I like to hunt creative solutions to challenging problems with the use of machine learning. I want my work to have a real positive impact on the world and I favour team-work with enthusiastic colleagues. My current academic interest lies in deep generative modelling and Bayesian methods, VAEs and Flows. I am especially intrigued by work on and applications to music and sound as well as an understanding of human perception. I have strong theoretical backgrounds on machine learning and a background in physics and mathematics.

## EDUCATION

### M.Sc. Artificial Intelligence
*awarded cum laude* GPA 4/4

⚲ **Universiteit van Amsterdam**  📅 **2018 – 2020**

Research degree with most contemporary topics in AI/ML

- Theory and practical implementation of the concepts of machine and deep learning: CNNs, RNNs/LSTMs, VAEs/Flows, GANs, MCMC/sampling, Gaussian process/Bayesian modelling, ICA
- Specialization in topics: Theoretical machine learning, Computer Vision, Reinforcement Learning, NLP, Information theory

**Thesis:** Investigating Bayesian methods for unsupervised music source separation. Do generative models know what they don't know? % **Read**
*Supervisor:* Maximilian Ilse (AMLab), Dr Efstratios Gavves

### B.Sc. Applied Computer Science
*GPA 3.58/4*

⚲ **University Heidelberg**  📅 **2014 – 2017**

General degree on all topics of Computer Science

- Specialization on image processing and pattern recognition: Deep Learning, 3D Computer vision, medical image analysis, fairness in AI
- Courses on Practical CS, Algorithms, DBMS, Theoretical informatics, Numerical methods and software engineering

**Thesis:** Using a FCN-ResNet based detector the thesis provides a reverse image search tool here in particular to retrieve art historic images containing an object given by a reference image. % **Read**
*Supervisor:* Dr Miguel Bautista Martin, Prof. Dr Björn Ommer

### B.Sc. Physics

⚲ **University Heidelberg**  📅 **2013 – 2014**

Change of degree after the first year, kept as minor studies.

## PUBLICATIONS

[1] (With Maximilian Ilse). "Problems Using Deep Generative Models for Audio Source Separation". In:

## VOLUNTARY WORK

### CO-Founder / Member

⚲ **Ackersyndikat**  📅 **11/2020 –**

Germany-wide non-profit cooperative trying to build a financing model for self-organized ecological farming businesses.

### CO-Founder / Member

⚲ **Collegium Academicum, Heidelberg**  📅 **06/2015 –**

Student-founded non-profit company building sustainable student housing. We are building an innovative living space for 200 young people. Creating an educational center for holistic self-learning.

`team building / lead generation / design work`

## EXPERIENCE

### Machine learning scientist

⚲ **Hummingbird Diagnostics, Heidelberg**  📅 **11/2020 –**

Development of deep learning based approaches to cancer and disease detection from liquid biopsy (blood samples). Working with sequence embedding models and graph networks on microRNA biomarkers.

`Python / PyTorch / Biostatistics`

### Graduate Teaching Assistant

⚲ **Universiteit van Amsterdam**  📅 **01/2020 – 04/2020**

Assisting with the master level courses *Information Retrieval* and *Fairness, Accountability, Confidentiality and Transparency in AI*. Teaching tutorial sessions, correcting course work and support students in finishing scientific work and writing.

`Python / PyTorch`

### Machine learning engineer – Intern

⚲ **BMW Group, Munich**  📅 **06/2019 – 08/2019**

Worked within the engine development department. Building statistical models to analyze engine part quality and live fleet monitoring. Building a production-ready data visualization app.

Official corporate testimony: *Significantly exceeds requirements at all times* in all criteria, engineering, analytical skills and teamwork.

`Python / PySpark / Palantir Foundry / Dash / Agile development`

### Full-stack web developer

⚲ **Bürgerwerke eG, Heidelberg**  📅 **01/2018 – 08/2018**

Ground-up development of a team communication and organization web portal in Ruby on Rails. Backend and Frontend work. Software engineering from planning the project until complete delivery.

`Rails / Ruby / Software Engineering`

### Laboratory software administrator

⚲ **Alfred-Weber-Institute, Heidelberg**  📅 **06/2016 – 06/2017**

Administrator in a computer lab for Behavioral Economics experiments. Development new features of an experiment administration software.

`Ruby / Python / Windows server`

### Teaching Assistant

⚲ **University Heidelberg**  📅 **10/2015 – 02/2016**

Assisting with the Bachelor course *Practical Computer Science*. Teaching in self-prepared weekly tutorial session.

`C++ / C`

## SKILLS

- Excellent skills in machine learning engineering with Python: PyTorch, TensorFlow, Caffe, Pandas, SciPy, OpenCV, Scikit-Learn
- Excellent skills in using GNU/Linux systems: System administration, BASH, Perl, Git, Slurm
- Strong academic and technical writing skills as well as enthusiasm for writing useful tutorials (see blog)
- Strong skills in data visualization: pyplot, Dash (plotly), web technologies
- Engineering experience in working with: MATLAB, Java, C++, JavaScript

- *Spoken languages*: German native, English fluent (TOEFL 112/120), Persian and Dutch beginner level