

# Maximilian Vötsch

in maximilian-vötsch  
✉ max@voets.ch

🌐 boredoms  
🌐 voets.ch

🏠 voetschm  
📍 Vienna, Austria

## Work Experience

### University of Vienna

Feb 2021 - Ongoing

*Prae-Doc Assistant in the Theory and Applications of Algorithms (TAA) group*

- Researched how tools from classical algorithm research can be used to design efficient algorithms for unsupervised learning objectives to speed up AI applications
- Implemented, benchmarked, and optimized algorithms in C++ following algorithm engineering practices
- Organized workshops and conferences, co-organizing the Queer in AI workshop at ICML 2024 and local organizer of the SEA 2024 conference
- Collaborated internationally with researchers from academia and industry (Stanford, CMU, TU Munich, IIT Delhi, Google, ...)
- Acted as an expert reviewer for high profile conferences (NeurIPS, KDD, ICML, ALENEX, ICALP, SEA, ...)
- Co-supervised a Bachelor's thesis and a Masters thesis. Taught the courses "Advanced Algorithms" and "Algorithms and Data Structures for Computational Science". Taught the exercise class for "Mathematical Foundations of Computer Science 1" for six semesters.
- Received the faculty award for significant contributions in the category Publications in Highest Ranking Venues in 2023

## Projects

### XCut (published at KDD 2024)

May 2023 - Ongoing

*First practical algorithm using expander decomposition to cluster a graph.*

XCut solves the normalized cut problem by using new techniques for sparsifying a graph to a tree. It is the current state of the art solver for this problem. I co-designed, implemented and optimized the algorithm in C++, and performed all experiments and data analysis using *Python*. This project received the audience appreciation award at KDD 2024, which is awarded to papers that garner significant public interest.

### PRONE (published at NeurIPS 2023)

February 2023 - Ongoing

*New algorithm for solving  $k$ -means in time  $O(n \log n)$  and creating coresets for downstream applications.*

The algorithm is available as a *Python* package, with its main implementation in C++, and *Cython* wrappers provided to make it available to data scientists working in Python. I co-designed, implemented and optimized the algorithm in C++, ran experiments, and performed the data analysis using Python.

## Education

### University of Vienna

February 2021 - Ongoing

Dr. techn. Computer Science

Supervisors: Univ.-Prof. Dr. Monika Henzinger and Ass.-Prof. Dr. Kathrin Hanauer, B.Sc. M.SC.

Thesis Title: Efficient Algorithms for Problems in Clustering and Fairness

### University of Vienna

March 2018 - August 2020

M.Sc. Mathematics, Thesis title: Cofinitary Groups

### University of Vienna

October 2016 - January 2021

B.Sc. Computer Science, did not graduate

### University of Vienna

October 2014 - March 2018

B.Sc. Mathematics, Thesis title: Lattice Path Matroids

## Skills

### Languages

C++, Python, Haskell, Rust, German (native), English (fluent)

### Skills

Linux, git, SQL, Docker, automated testing and profiling, CI/CD (Github Actions/GitLab CI), mathematical problem solving, research skills

### Libraries

OneTBB, OpenMP, OpenMPI, GTest, Catch2, pandas, numpy, scikit-learn, pytorch

## Personal Interests

Bouldering, Analog and Digital Photography, Electronics, Playing the Guitar