

# Artem Pulkin

[er'tsiəm]

Researcher, data scientist, software engineer

✉ gpulkin@gmail.com 🌐 pulk.in 🏠 Amsterdam NL 🇳🇱

🔍 jobs: **researcher, ML scientist, research engineer, data scientist, software engineer**



**Currently** Developing innovative machine learning approaches to engineer electronic materials and molecules addressing modern society challenges

**Expertise** Computational condensed matter, quantum chemistry, numerical materials science, machine learning, many-body physics, research code development.

**Education** 🎓

<b>Docteur ès Sciences EPFL</b> in physics Lausanne CH 🇨🇭 Specialized on: numerical electronic structure, quantum simulations. Thesis: Electronic Transport in 2D Materials with Strong Spin-orbit Coupling (03/2017); supervisor: Oleg Yazyev	2012-2017
<b>Master of Science Chalmers</b> in applied physics Göteborg SE 🇸🇪 Thesis: Spintromechanical Aspects of Charge Transport in Nanostructures (06/2012); supervisor: Robert Shekhter	2010-2012
<b>B.Sc. in Physics cum laude</b> V.N. Karazin's State University Kharkiv UA 🇺🇦	2006-2010

**Training** Coursera: Machine Learning from Stanford University

**Experience** 🏢

<b>Researcher @ QuTech Delft university of technology NL</b> 🇳🇱	Apr '19-Apr '22
As a part of a multi-disciplinary team of condensed matter and quantum nanoscience researchers I carried out a long-term ambitious research of materials for application in future electronics. I developed and implemented novel numerical approaches to solving materials in the open-source python package miniff.	
<b>Postdoc @ Caltech US</b> 🇺🇸	Jul '17-Mar '19
In collaboration with prof. Garnet Chan quantum chemistry group from Caltech I developed and implemented a ground breaking computational many-body quantum chemistry framework to model two-dimensional crystalline materials as a part of pyscf python package.	
<b>Doctoral assistant @ EPFL CH</b> 🇨🇭	Oct '12-Apr '17
I discovered a new class of electronic band structure effects in two-dimensional transition metal dichalcogenides using a stack of high-performance distributed numerical tools developed by myself in python, C, Matlab, and Fortran.	
<b>Research assistant @ Seoul National University, KR</b> 🇰🇷	Jun '12-Aug '12
I was studying electronic structure of edge states in models of overlapping topological graphene nanoribbons.	
<b>Research assistant @ Chalmers, SE</b> 🇸🇪	Aug '10-Jun '12
I was designing a concept of a nanoscale spin-mechanical single-electron transistor (SET).	

**In numbers** 15 publications >500 citations 14 talks  
>10 countries  
>30 collaborators

**Software** More on [github/pulkin](https://github.com/pulkin)

**miniFF** <https://gitlab.kwant-project.org/qt/miniff> (python, cython)

Simulate molecular dynamics with classical force fields and machine learning. Combines the power of cython, numpy and torch to deliver maximal performance in a high-quality python code.

**pyscf** <https://github.com/pyscf/pyscf> (python, C)



A large collaboration across universities and public companies towards high-performance Quantum chemistry in python. I contributed towards implementing periodic boundary conditions for diagrammatic kernels.

**pyteleport** <https://github.com/pulkin/pyteleport>

Pause, teleport and resume your python runtime from within the stack. Manipulates cPython memory and bytecode.



**dfttools** <https://github.com/pulkin/dfttools> (python)

Parsing and plotting the results of first-principles simulations.

**openmx-hks** <https://github.com/pulkin/openmx-hks> (C)

A practical tool to convert the data from a popular density functional theory code into numpy.

**micropython** <https://github.com/pulkin/micropython> (C)

A micropython port to a popular cellular network module A9G.

## Awards 🏆

💰 Personal **Swiss NSF grant** to study abroad 80k CHF, 18 months, postdoctoral level (Early Postdoc.Mobility) grant P2ELP2\_175281 postgraduate

💰 Personal computing time at **national supercomputing facilities (SURF NL)** Approximate equivalent of 26k EUR, 24 months project 45873

🏆 Olympiad in Physics for University Students (national in Ukraine) – **first prize** graduate

🏆 **Youth Physicists Tournament** (national in Ukraine, team) – multiple prizes

🏆 Open Olympiad in Applied Physics (MIPT Moscow) – **first prize**

💰 Kharkiv City Mayor and Kharkiv State Governor scholarships for gifted youth

🏆 Dozens of prizes in physics and informatics (olympiads, student projects; **top-10 and top-1 in national competitions**) high school

💰 Multiple scholarships

## Skills 🔧

**Science:** quantum condensed matter, first-principles approaches.

**Machine learning:** supervised learning (DNN, linear fits, logistic fits, SVM); unsupervised learning (PCA/SVD, K-means, anomaly detection); dataset generation, feature extraction, adversarial models; deployment: HPC, heterogeneous environments (GPU+CPU).

**Software development in 🐍 Python** (7 years): scientific stack: numpy, torch, matplotlib; notebooks; HPC and parallel/distributed/concurrent computing (MPI, OpenMP, multiprocessing, async); performance-driven development with C and cython; styling, testing, documenting, packaging; micropython and python beyond standards (cPython bytecode).

**C:** HPC and parallel environments (MPI, OpenMP); Lapack; embedded platforms.

**Other:** ☕ Java, Fortran, Julia, Javascript, Matlab.

**Infrastructure:** git, CI/CD (Travis, Gitlab-CI, Azure pipelines).

**IDEs:** Pycharm, vim.

**Soft skills:** critical analysis, problem solving, communicating (organizing discussions, presenting, paper/grant/documentation writing), full-cycle project management (idea - funding - implementation - reporting), supervision.

## Languages

English (proficient), Russian (mother), French (basic), Dutch (basic).

## Hobbies

Sports, ✈️ travels, cross-stitching, soldering, 🔑 lock picking, 🎮 board and video games, open-source projects.