Artem Pulkin

[ɐrˈtsʲɵm]

✉️ gpulkin@gmail.com

🌐 pulk.in

🏠 Amsterdam NL 🇳🇱

Expertise

Software development, machine learning, data, scientific research.

Education 🎓

Docteur ès Sciences EPFL 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

Master of Science Chalmers in applied physics Göteborg SE 🇸🇪 Thesis: Spintromechanical Aspects of Charge Transport in Nanostructures (06/2012); supervisor: Robert Shekhter — 2010-2012

B.Sc. in Physics cum laude V.N. Karazin's State University Kharkiv UA 🇺🇦 — 2006-2010

Training

Coursera: Machine Learning from Stanford University

Experience 🔬

Engineering scientific software @ QuTech TU Delft 🇳🇱 — Apr'19-Apr'22

I led development of an open-source ML research software in **python** for material properties miniff: **formulated** tech requirements and **designed** the software; **organized** a team of 2-4 people with different backgrounds towards Agile workflow and **priority** goals; **optimized and scaled** the code; prepared, **released** and integrated the package for running in distributed HPC environment; **attracted** users and **coordinated** various parties (scientists, HPC platform, industry users).

Research and engineering @ Caltech US 🇺🇸 — Jul'17-Mar'19

Performed R&D in numerical computer simulations of properties of novel materials. As a part of a bigger team (10-20 team members) **implemented new functionality** in the open-source python software project pyscf; contributed to **strategic decisions** and assigning **priorities**; refactored, prepared unit tests and documentation.

Pursued PhD @ EPFL CH 🇨🇭 — Oct'12-Apr'17

Contributed to scientific research @ Seoul National University, KR 🇰🇷 — Jun'12-Aug'12

Performed scientific research @ Chalmers, SE 🇸🇪 — Aug'10-Jun'12

Projects

More on github/pulkin

miniff https://gitlab.kwant-project.org/qt/miniff

A **machine learning** project in **python** to simulate molecular dynamics with classical force fields. Combines the power of **cython**, **numpy** and **torch** to deliver maximal performance in a high-quality python code. Demonstrates my passion for using cython when it comes to solving bottlenecks.

pyscf https://github.com/pyscf/pyscf

A large collaboration across universities and public companies towards high-performance quantum chemistry in **python**. Implemented with **numpy** and pure-**C**. Proud of having worked with these people.

pyteleport https://github.com/pulkin/pyteleport

My experiment in teleporting python runtimes from within the stack. Uses **cPython bytecode** (and relies on **dill** for object serialization). Integrates with **AWS EC2**. A sole project and idea I am very proud of.

pycoordinates https://github.com/pulkin/dfttools

A simple computational package for basis transformations. Implemented with **python**, **numpy** and **cython**. One of my cleanest code where I discovered the power of python **build**.

micropython https://github.com/pulkin/micropython

A micropython (**python** dialect) port to a popular cellular network module A9G written in **C**. Enjoyed supporting others in their hardware projects while digging into embedded firmware design.

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 🔨

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; other: FastAPI, django, OpenCV, OpenCL, bytecode.

C/C++: HPC and parallel environments (MPI, OpenMP); Lapack; embedded platforms; interfacing other languages; decompiling and reverse-engineering.

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

Infrastructure: git, CI/CD (Travis, Gitlab-CI, Azure pipelines), docker, HPC, AWS (EC2, S3).

IDEs: Pycharm, vim.

Machine learning: supervised learning (DNN, linear fits, logistic fits, SVM); unsupervised learning (PCA/SVD, K-means, anomaly detection); dataset generation, feature extraction, adversarial models.

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 (prof), Ukrainian (mother), Russian, French (basic), Dutch (basic).

Hobbies

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