Richard Hladík

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A second-semester student of the Computer science MSc programme at ETH Zürich. Theoretical computer scientist at heart, but currently also trying to gain experience in more practical fields, such as ML, bioinformatics, operation research or software engineering. Open source enthusiast. I love pushing the boundaries of human knowledge and creating new and meaningful things, especially in a group of similarly passionate people.

Programming languages: advanced: **Python**, **C++**, **C**, **sh**; intermediate: **SQL**; basic: C#, Haskell.

Education

Sept. 2021–Now MSc in Computer science, **ETH Zürich** *(expected graduation: March 2024)*
GPA of 5.58 (out of 6.00) after the first semester

Sept. 2017–June 2021 Bc. in Computer science, **Charles University**, Prague
perfect grades (GPA of 1.00) throughout the studies and 224 ECTS credits

Past Experience

Mar. 2020–Jun. 2021 – **Algorithm research,** *Charles University, Prague.*

- Proposed two **new combinatorial algorithms** for the multicommodity flow (MCF) problem.
- **Improved the state of the art** convergence for combinatorial MCF algorithms from $\mathcal{O}(\varepsilon^{-2})$ to $\mathcal{O}(\log 1/\varepsilon)$ for instances with small inflation rate.
- **Journal article(s)** in progress.
- Superset of my bachelor's thesis; supervised by Martin Koutecký. Includes a **C++ implementation.**

June 2018–Dec. 2020 – **Optimisation research,** *Czech Technical University, Prague.*

- **Proved NP-hardness** of a novel periodic scheduling problem, **developed** (C++) several **heuristics** for it.
- **Decreased** the approximation error **10 times** compared to the base implementation.

Projects

Feb. 2020–Now – **Outotune** – a C++ **harmoniser** implementation.

- Lets you **sing harmonies** in real time by **synthesising** the chords you play on a keyboard **using your voice.**
- Along the way, I **increased the performance** of an open-source DSP library **3 times** by optimising FFT usage and data reuse.

Mar. 2018–Dec. 2022 – **Machine Learning projects** – Charles University, Prague & ETH Zürich

- Executed neural network **attacks**, **analysis** and **adversarial training** in a 3-person team.
- Toy ML projects including image segmentation, PoS tagging, speech recognition, 3D object recognition.

Sept. 2019–Jan. 2020 – **Operating Systems project** – a small MIPS OS in C; part of a university course.

- **Wrote an OS** including interrupt management, heap allocator, scheduler, VM etc. in a **two-person team.**

Skills

Technologies: Git, NumPy, PyTorch, TensorFlow, Pandas, GoogleTest. Long-time (> 10 years) Linux user with sysadmin and systems programming experience.

Relevant courses: Computer Linguistics, Deep Learning, Computer Graphics, Data Compression Algorithms, Reliable and Trustworthy AI, Information Theory. Currently taking Principles of Distributed Computing.

Languages: Czech (native), English (C2 – CAE Grade A), German (B2), French (basics)

Extracurricular activities

2018–Now *Czech Olympiad in Informatics*, *Czech IOI Selection Camp* – I implement, test and write up algorithmic tasks; in the latter, I **reimplemented** and **simplified** a big part of the technical infrastructure.

2017–2020 *KSP* – an algorithmisation correspondence seminar for Czech highschoolers; **led the main category** in 2018–2019, managing 10–20 people.

Achievements & Awards

2021 ETH-D scholarship for excellent Master's students (≈ 90 out of 2500 Master's students awarded each year)
2018 ACM-ICPC World Finals – 56th place out of 140 teams
2017 International Olympiad in Informatics (IOI) – Silver medal, 69th place out of 304 participants
2016 ACM-ICPC Central European Regional Contest – 12th place (unofficial high school participation)
2016 International Olympiad in Informatics (IOI) – Bronze medal, 154th place out of 308 participants

Publications

[1] Richard Hladík, Anna Minaeva, and Zdeněk Hanzálek. On the complexity of a periodic scheduling problem with precedence relations. In *International Conference on Combinatorial Optimization and Applications*, page 107–124. Springer, 2020.