

# Pavel Veselý – Curriculum Vitae

**Current position:** Assistant Professor at Computer Science Institute of Charles University  
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## RESEARCH INTERESTS

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Theoretical computer science, with particular focus on designing efficient algorithms and data structures, specifically:

- streaming algorithms and data summaries/sketches (e.g., quantile estimation, geometric streams, etc.),
- online algorithms (primarily packing and scheduling problems, with particular focus on buffer management problems),
- approximation algorithms (e.g., the shortest superstring problem), and
- data structures for  $k$ -mer sets of genomic data.

## POSITIONS, EDUCATION, AND ACADEMIC DEGREES

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September 2020 — present: **Assistant Professor**, Computer Science Institute of Charles University, Prague, Czech Republic. On leave from 19 September 2020 – 30 April 2021.

September 2018 — April 2021: **Research Fellow**, Department of Computer Science, University of Warwick. Advisor prof. **Graham Cormode**.

**Ph.D.** — 2018, Charles University, doctoral thesis *Online Algorithms for Packet Scheduling*. Advisor prof. RNDr. **Jiří Sgall**, DrSc.

October 2014 — September 2018: PhD studies at Computer Science Institute of Charles University, Prague, Czech Republic. Advisor prof. RNDr. **Jiří Sgall**, DrSc.

**Mgr.** — 2014, Charles University, master thesis *Online algorithms for variants of bin packing*. Advisor prof. RNDr. **Jiří Sgall**, DrSc.

October 2012 — September 2014: master studies, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic.

**Bc.** — 2012, Charles University, bachelor thesis *Artificial intelligence in abstract 2-player games*. Advisor RNDr. **Tomáš Valla**, Ph.D.

October 2010 — September 2012: bachelor studies, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic.

## AWARDS

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**2022 ACM SIGMOD Research Highlight Award** for the PODS 2021 paper *Relative Error Streaming Quantiles*.

**Best Paper Award** at the 40th ACM SIGMOD-SIGACT-SIGAI Symposium on Principles of Database Systems (PODS 2021) for paper *Relative Error Streaming Quantiles*.

**Faculty Post-Doctoral Research Prize** at the University of Warwick’s Faculty of Science, Engineering and Medicine (SEM) for paper *A Tight Lower Bound for Comparison-Based Quantile Summaries*.

Tutorial for *Linear algebra I* in winter semester 2016/2017 was awarded by dean as **one the best tutorials in the student rating** at the Faculty of Mathematics and Physics, Charles University.

Paper *Online Chromatic Number is PSPACE-Complete* received the **Best Student Paper Award** at the 27th International Workshop on Combinatorial Algorithms (IWCOA 2016).

Thesis *Artificial intelligence in abstract 2-player games* obtained the **Dean’s award for the best bachelor thesis** at the Faculty of Mathematics and Physics, Charles University in academic year 2011/2012.

## SUPERVISION OF POSTDOCTORAL FELLOWS

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**Aleksander Łukasiewicz** (2024 – present)

**Nicolaos Matsakis** (2022 – 2024)

## SUPERVISION OF PHD STUDENTS

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**Tomáš Domes** (2024 – present): PhD student, working primarily on quantile summaries.

## UNDERGRADUATE STUDENTS

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### Master students

**Jakub Komárek** (2024 – present): working on differentially private quantile summaries.

**Tomáš Domes** (2023 – 2024): master thesis *Streaming Algorithms for Estimating Quantiles with Novel Error Guarantees* defended in 2024.

### Selected Bachelor students

**Ján Plachý** (2023 – 2025): bachelor thesis *Targeted optimization of masked superstrings for  $k$ -mer sets* defended in 2025 and co-supervised by O. Sladký and K. Břinda. The thesis **won the Czech-Slovak undergraduate student competition SVOČ 2025** in category TCS+ML. Further collaboration on a paper based on his thesis.

**Ondřej Sladký** (2022 – 2025): bachelor thesis *Masked Superstrings for Efficient  $k$ -Mer Set Representation and Indexing* on data structures for  $k$ -mer sets in computational genomics, defended in 2024 and co-supervised by K. Břinda. The thesis **won the Czech-Slovak undergraduate student competition SVOČ 2024** in category TCS+ML, and received the **Dean's award for the best bachelor thesis** in computer science in 2024. Further collaboration on three papers that resulted from the thesis.

**Vojtěch Gaďurek** (2023 – present): bachelor thesis *Data Structures for Sketching Dynamic Sets* on efficiently implementing and improving Invertible Bloom Lookup Tables (IBLT) for structured data, such as  $k$ -mer sets, defended in 2024. The thesis got the 3rd place in the Czech-Slovak undergraduate student competition SVOČ 2025 in category TCS+ML. Preparing a paper with results from the thesis.

## ORGANIZATION OF SCIENTIFIC MEETINGS

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**Spring School of Combinatorics 2022—present** (annual event held in the Czech countryside consisting of student presentations of research papers)

**Current Trends in Theoretical Computer Science 2023 and 2025** (“Současné trendy teoretické informatiky”, a Czech/Slovak conference consisting of invited presentations by young researchers in TCS)

## GRANT PROJECTS AS PRINCIPAL INVESTIGATOR

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*RoSAlg: Robust Streaming Algorithms versus Adaptive Adversaries*, 2024 – 2026 ERC CZ grant LL2406 from the Ministry of Education, Youth and Sports of the Czech Republic. PI: Mgr. Pavel Veselý, Ph.D.

*Efficient Indexing of Large Genome Collections via Masked Superstrings of  $k$ -Mers*, 2025 – 2026. Mobility grant for collaboration with Inria – French National Institute for Research in Digital Science and Technology, specifically with Karel Břinda and his collaborators. PHC BARRANDE project 8J25FR053 of the Ministry of Education, Youth and Sports of the Czech Republic. PI: Mgr. Pavel Veselý, Ph.D.

*Effective scheduling in overloaded systems*, 2017 – 2018. Grant 634217 of the Charles University Grant Agency. PI: Mgr. Pavel Veselý. Supervisor prof. RNDr. Jiří Sgall, DrSc.

## SELECTED PUBLICATIONS

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### Journal Publications

- [1] G. Cormode, Z. Karnin, E. Liberty, J. Thaler, P. Veselý: *Relative Error Streaming Quantiles*. Journal of the ACM, vol. 70(5), p. 30:1–30:48, 2023. doi:10.1145/3617891. Appeared at PODS 2021 (Best Paper Award).
- [2] P. Veselý, M. Chrobak, Ł. Jeż, J. Sgall: *A  $\phi$ -Competitive Algorithm for Scheduling Packets with Deadlines*. SIAM Journal on Computing, vol. 51(5), p. 1626–1691, 2022. doi:10.1137/21M1469753. Appeared at SODA 2019.
- [3] M. Bienkowski, M. Böhm, J. Byrka, M. Chrobak, C. Dürr, L. Folwarczny, Ł. Jeż, J. Sgall, N. K. Thang, P. Veselý: *Online Algorithms for Multi-Level Aggregation*. Operations Research, vol. 68(1), p. 214–232, 2020. doi:10.1287/opre.2019.1847. Appeared at ESA 2020.

### Publications in Conference Proceedings

- [4] A. Czumaj, G. Gao, S. H.-C. Jiang, R. Krauthgamer, P. Veselý: *Fully-Scalable MPC Algorithms for Clustering in High Dimension*. In Proc. of the 51st EATCS International Colloquium on Automata, Languages, and Programming (ICALP 2024), Vol. 297, pp. 50:1-50:20, Schloss Dagstuhl – Leibniz-Zentrum für Informatik (2024). doi:LIPICs.ICALP.2024.50.
- [5] A. Czumaj, S. H.-C. Jiang, R. Krauthgamer, P. Veselý, M. Yang: *Streaming Facility Location in High Dimension via Geometric Hashing*. In Proc. of the 63rd IEEE Symposium on Foundations of Computer Science (FOCS 2022), p. 450–461, IEEE. doi:10.1109/FOCS54457.2022.00050.
- [6] M. Englert, N. Matsakis, P. Veselý: *Improved Approximation Guarantees for Shortest Superstrings using Cycle Classification by Overlap to Length Ratios*. In Proc. of the 54th ACM Symposium on Theory of Computing (STOC 2022), p. 317-330, ACM, 2022. doi:10.1145/3519935.3520001.
- [7] G. Cormode, A. Mishra, J. Ross, P. Veselý: *Theory meets Practice at the Median: a worst case comparison of relative error quantile algorithms*. In Proc. of the 27th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD 2021), pp 2722–2731, ACM, 2021. doi:10.1145/3447548.3467152
- [8] G. Cormode, P. Veselý: *Tight Lower Bound for Comparison-Based Quantile Summaries*. In Proc. of the 39th ACM SIGMOD-SIGACT-SIGAI Symposium on Principles of Database Systems (PODS 2020), p. 81–93, ACM, 2020. doi:10.1145/3375395.3387650.

## TEACHING

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Lectures at the Faculty of Mathematics and Physics, Charles University:

- *Data Structures I* (core master course; winter semester 25/26)
- *Algorithms and automata for teachers* (core bachelor course; winter semester 24/25)
- *Algorithms and data structures I* (core bachelor course; summer semesters 21/22 and 23/24)
- *Streaming Algorithms for Big Data* (designed new course; summer semesters 21/22 and 23/24, winter semester 25/26)
- *Combinatorics and Graph Theory 2* (bachelor course; summer semester 22/23)
- *Algorithmic Data Privacy* (designed new course, together with Pavel Hubáček; summer semesters 22/23 and 24/25)

Taught 32 tutorials/seminars in total for 12 different CS and math courses

## OTHER ACADEMIC ACTIVITIES

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**Collaboration with Splunk Inc.**, a US-based company that focuses on processing machine-generated big data, on algorithms for estimating quantiles in data streams that resulted in a joint publication at KDD 2021.

**Collaboration with Apache DataSketches**, an open-source software library of stochastic streaming algorithms, on implementing the algorithm for relative-error streaming quantiles from the PODS 2021 paper.

Program committee member:

- 32nd Annual European Symposium on Algorithms (**ESA 2024**),
- 18th Workshop on Approximation and Online Algorithms (**WAOA 2020**).