

# JAKUB TARNAWSKI

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Pronouns: he/his

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## Research interests

- Approximation algorithms, graph algorithms, combinatorial optimization, submodularity

## Work experience

- Microsoft Research, Zürich, Switzerland – Senior Researcher (08.2019–present), Algorithms group, Machine Learning research area (Research@Redmond).
- Microsoft Research, Redmond, USA – Research Intern (05–08.2018), under supervision of Nikhil Devanur and Janardhan Kulkarni.
- Facebook, Seattle, USA – Software Engineering Intern (07–09.2012). Traffic Infrastructure team. Performance optimization of the load balancing software that all of Facebook’s web traffic passes through. Achieved a 30% gain in efficiency.

## Education and academic research

- École Polytechnique Fédérale de Lausanne, Switzerland – Doctoral Assistant (09.2014–07.2019, PhD), Theory of Computation laboratory under supervision of Ola Svensson.
  - Simons Institute for the Theory of Computing – visiting graduate student (11–12.2017).
- École Polytechnique Fédérale de Lausanne, Switzerland – Summer@EPFL internship (07–08.2013), Theory of Computation laboratory under supervision of Aleksander Mądry.
- Faculty of Mathematics and Computer Science, University of Wrocław, Poland.  
Two majors: Computer Science and Mathematics, 2008–2014, MSc in both. GPA over 4.95/5.00.

## Awards

- **A. W. Tucker Prize** (2021)
- **EPFL Doctorate Award** (2020)
- **2019 ACM Dissertation Award Honorable Mention**
- EATCS Dissertation Award (2020)
- GI-Dissertationspreis 2019
- Chorafas Award (2019)
- EPFL Thesis Distinction (2019)
- **Best Paper Award** at STOC 2018
- **Best Paper Award** at FOCS 2017
- Scholarship of Polish Ministry of Education – 2008, 2011, 2013

## Teaching and mentorship

- Mentored interns at MSR (summers 2020, 2021, 2022): Sami Davies, Nathan Klein, Yang P. Liu, Shyam Narayanan, Mehtaab Sawhney, June (Thuy-Duong) Vuong
- Mentored a Master semester project (02–06.2016), EPFL
- Teaching Assistant for 8 semesters (Advanced Algorithms 2016–2018, Algorithms 2015–2018, Theory of Computation 2015), EPFL
- Gave several lectures in Algorithms (2018) and Advanced Algorithms (2016, 2018), EPFL
- Taught exercises in Algorithms and Data Structures (graduate level) (02–06.2014), Wrocław
- Taught supplementary tutorial in Logic For Computer Science for first-year students (10.2010–02.2011), Wrocław

## Service and leadership

- Program Committee member of APPROX 2020
- Reviewer for journals: Journal of the ACM, SICOMP, Theoretical Computer Science, 4OR, Discrete Optimization, RAIRO
- Regular reviewer for conferences: STOC, FOCS, SODA, ICML, ICALP, ITCS, APPROX, ESA, SWAT
- Reviewer of grant proposals: Polish National Science Center
- Head of problemsetting team at Helvetic Coding Contest, an annual programming competition held at EPFL (2015–2018); same for Santa’s Programming Challenge (2014–2017)
- Member of Scientific Committee of EGOI (European Girls’ Olympiad in Informatics) – first edition (2021) and second edition (2022)
- Contributed problems to Polish Collegiate Programming Contest AMPPZ (2015–2018)
- Maintainer and main author of open source project Hightail, a tool for competitive programming (> 6000 downloads)

## Competitive programming

- Onsite finals of Facebook Hacker Cup 2014 and 2015 (top 25)
- ACM ICPC World Finals 2013 and 2014 (13th place out of 12000 teams)
- 1st place in IEEEExtreme 10.0 2016 (out of ~2000 teams), 2nd place in 2015, 3rd place in 2018
- 1st place in Wielka Przesmycka 2016 (open individual championship of Poland)
- Finals of Google Hash Code 2020 (top 45 out of 10000 teams)

## Invited talks

- EPFL Bernoulli Center Workshop on Combinatorial Optimization (Jul 2022)
- Oberwolfach Workshop on Combinatorial Optimization (Nov 2021)

- ICPC University Lecture Series (Dec 2020)
- ETH Zürich, Switzerland (Mar 2019, Nov 2019, Feb 2020)
- University of Bonn, Germany (Apr 2019)
- Toyota Technological Institute of Chicago, USA (Feb 2019)
- University of California San Diego, USA (Feb 2019)
- Georgia Institute of Technology, USA (Jan 2019)
- BIRS workshop on TSP, Banff Centre, Canada (Sep 2018)
- Microsoft Research Redmond, USA (Jul 2018, Feb 2019)
- Google Research Zürich, Switzerland (Apr 2018)
- Aussois, 22nd Combinatorial Optimization Workshop, France (Jan 2018)
- Stanford University, USA (Nov 2017)
- Georgia Institute of Technology, USA (Oct 2017)
- ETH Zürich, Switzerland (Sep 2017)
- 8th Cargese-Porquerolles Workshop on Combinatorial Optimization, France (Sep 2017)
- NII Shonan Meeting “Current Trends in Combinatorial Optimization”, Japan (Apr 2016)
- University of Wroclaw, Poland (Feb 2016, Apr 2018, Jul 2020)

## References

- Prof. Ola Svensson (*ola.svensson@epfl.ch*), faculty at EPFL.  
Association: Co-author and PhD advisor.
- Prof. Aleksander Mądry (*madry@mit.edu*), faculty at MIT.  
Association: Co-author and internship supervisor.
- Dr. Nikhil Devanur (*iam@nikhildevanur.com*), researcher at Amazon.  
Association: Co-author and internship supervisor.
- Prof. Amin Saberi (*saberi@stanford.edu*), faculty at Stanford.

## Conference publications

- Vincent Cohen-Addad, Chenglin Fan, Silvio Lattanzi, Slobodan Mitrović, Ashkan Norouzi-Fard, Nikos Parotsidis and Jakub Tarnawski. Near-Optimal Correlation Clustering with Privacy. In *Neural Information Processing Systems (NeurIPS)*, 2022.
- Youjie Li, Amar Phanishayee, Derek Murray, Jakub Tarnawski and Nam Sung Kim. Harmony: Overcoming the hurdles of GPU memory capacity to train massive DNN models on commodity servers. In *48th International Conference on Very Large Databases (VLDB)*, 2022.
- Janardhan Kulkarni, Yang P. Liu, Ashwin Sah, Mehtaab Sawhney and Jakub Tarnawski. Online Edge Coloring via Sparsification and Tree Recurrences. In *54th Annual ACM Symposium on the Theory of Computing (STOC)*, 2022, **invited to SICOMP special issue**.
- Sami Davies, Janardhan Kulkarni, Thomas Rothvoss, Sai Sandeep, Jakub Tarnawski and Yihao Zhang. On the Hardness of Scheduling With Non-Uniform Communication Delays. In *33rd Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2022.

- Jakub Tarnawski, Deepak Narayanan and Amar Phanishayee. Piper: Multidimensional Planner for DNN Parallelization. In *Neural Information Processing Systems (NeurIPS)*, 2021.
- Vincent Cohen-Addad, Silvio Lattanzi, Slobodan Mitrović, Ashkan Norouzi-Fard, Nikos Parotsidis and Jakub Tarnawski. Correlation Clustering in Constant Many Parallel Rounds. In *38th International Conference on Machine Learning (ICML)*, 2021, **long talk**.
- Sami Davies, Janardhan Kulkarni, Thomas Rothvoss, Jakub Tarnawski and Yihao Zhang. Scheduling with Communication Delays via LP Hierarchies and Clustering II: Weighted Completion Times on Related Machines. In *32nd Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2021.
- Marwa El Halabi, Slobodan Mitrović, Ashkan Norouzi-Fard, Jakab Tardos and Jakub Tarnawski. Fairness in Streaming Submodular Maximization: Algorithms and Hardness. In *Neural Information Processing Systems (NeurIPS)*, 2020.
- Silvio Lattanzi, Slobodan Mitrović, Ashkan Norouzi-Fard, Jakub Tarnawski and Morteza Zadimoghaddam. Fully Dynamic Algorithm for Constrained Submodular Optimization. In *Neural Information Processing Systems (NeurIPS)*, 2020, **oral presentation**.
- Jakub Tarnawski, Amar Phanishayee, Divya Mahajan, Nikhil Devanur and Fanny Nina Paravecino. Efficient Algorithms for Device Placement of DNN Graph Operators. In *Neural Information Processing Systems (NeurIPS)*, 2020.
- Sami Davies, Janardhan Kulkarni, Thomas Rothvoss, Jakub Tarnawski and Yihao Zhang. Scheduling with Communication Delays via LP Hierarchies and Clustering. In *61st Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2020.
- Janardhan Kulkarni, Shi Li, Jakub Tarnawski and Minwei Ye. Hierarchy-Based Algorithms for Minimizing Makespan under Precedence and Communication Constraints. In *31st Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2020.
- Ashkan Norouzi-Fard, Jakub Tarnawski, Slobodan Mitrović, Amir Zandieh, Aida Mousavifar and Ola Svensson. Beyond  $1/2$ -Approximation for Submodular Maximization on Massive Data Streams. In *35th International Conference on Machine Learning (ICML)*, 2018, **long talk**.
- Ola Svensson, Jakub Tarnawski and László Végh. A Constant-Factor Approximation Algorithm for the Asymmetric Traveling Salesman Problem. In *50th Annual ACM Symposium on the Theory of Computing (STOC)*, 2018. **Best Paper Award**
- Ola Svensson and Jakub Tarnawski. The Matching Problem in General Graphs is in Quasi-NC. In *58th Annual IEEE Symposium on Foundations of Computer Science (FOCS)*, 2017. **Best Paper Award**
- Slobodan Mitrović, Ilija Bogunović, Ashkan Norouzi-Fard, Jakub Tarnawski and Volkan Cevher. Streaming Robust Submodular Maximization: A Partitioned Thresholding Approach. In *Neural Information Processing Systems (NeurIPS)*, 2017.
- Agata Mosińska, Jakub Tarnawski and Pascal Fua. Active Learning and Proofreading for Delineation of Curvilinear Structures. In *20th International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI)*, 2017, **oral presentation**.
- Christos Kalaitzis, Ola Svensson and Jakub Tarnawski. Unrelated Machine Scheduling of Jobs with Uniform Smith Ratios. In *28th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2017.
- Ola Svensson, Jakub Tarnawski and László Végh. Constant Factor Approximation for ATSP with Two Edge Weights. In *18th Conference on Integer Programming and Combinatorial Optimization (IPCO)*, 2016.

- Aleksander Mądry, Damian Straszak and Jakub Tarnawski. Fast Generation of Random Spanning Trees and the Effective Resistance Metric. In *26th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2015.

## Journal publications

- Ola Svensson, Jakub Tarnawski and László Végh. A Constant-Factor Approximation Algorithm for the Asymmetric Traveling Salesman Problem. *Journal of the ACM*, volume 67, article 37, November 2020.
- Ola Svensson, Jakub Tarnawski and László Végh. Constant Factor Approximation for ATSP with Two Edge Weights. *Mathematical Programming*, volume 172, 2018.

## Other publications

- Jakub Tarnawski and Vera Traub. Recent Results on the Traveling Salesman Problem (*short survey*). In *Views and News (newsletter of SIAG/OPT)*, 2019.