

CURRICULUM VITAE

PERSONAL INFORMATION

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PROFILE

I am very interested in Graph Algorithms and Data Structures, also from a lower bound perspective. During the last years, my work has focused on designing data structures for maintaining Shortest Paths in graphs subject to updates. These data structures have deep applications to static and dynamic flow and cut problems under the multiplicative weight update framework. Further, I am also very interested in new techniques/frameworks (expanders, spectral, optimization, algebraic, etc.) and in various settings (dynamic, distributed, PRAM/MPC, Streaming, etc.).

EDUCATION

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| 2020 - | Post Doc at ETH Zurich under supervision of Rasmus Kyng. |
| 2017 - 2020 | Ph.d. at the University of Copenhagen under the supervision of Christian Wulff-Nilsen and Mikkel Thorup with project title "Near-Optimal Algorithms for Single-Source Reachability and Shortest Paths in Partially Dynamic Graphs". <ul style="list-style-type: none">• Development of new techniques for fundamental algorithmic graph problems with focus on dynamic graphs.• Visit at MIT hosted by Virginia Vassilevska Williams for an period of three and a half months.• Coursework: "Approximation Algorithms", and "Advanced Probability Theory". |
| 2015 - 2017 | Master of Computer Science at the University of Copenhagen (Average: 11.2/12). |
| 2012 - 2015 | Bachelor of Science in Computer Science with a specialization in communication technology at Baden-Wuerttemberg Cooperative State University, Stuttgart (Average: 10/12). |

PROFESSIONAL EXPERIENCE

- MAY, 2016 - AUG, 2016 Working on the PRISM project, developed and maintained by the Oxford University under supervision of Milan Češka (in the scope of the Google Summer of Code 2016).
- Analysis of bottlenecks and design flaws; improvements of fundamental data structures for the model construction in regard to time and memory consumption.
- SEP, 2012 - AUG, 2015 Alcatel-Lucent Deutschland AG (now part of Nokia Corporation) in Stuttgart, Germany
- Included a 4 month internship at the Bell Labs in Villarceaux, France, to research new cloud security methods.

TEACHING

- SEP, 2018 - DEC, 2018 Teaching Assistant for the course "Advanced Algorithms and Data Structures".
- APRIL, 2018 - JUN, 2018 Lecturer, Teaching Assistant and Examiner for the course "Randomized Algorithms".
- DEC, 2017 Lecturer in the course "Topics in Algorithms and Data Structures".
- SEP, 2016 - JAN, 2017 Teaching Assistant for the course "Advanced Algorithms and Data Structures".

SCHOLARSHIPS

- 2018 STIBO Fondens IT-rejsestipendium (45.000dkk \approx 6.000€).

PUBLICATIONS

JOURNALS

- 1 "An Almost-Linear-Time Algorithm for Decremental Strongly-Connected Components and Single-Source Reachability", Aaron Bernstein, Maximilian Probst, Christian Wulff-Nilsen, to appear in SICOMP 2021 (special issue).

- 2 "On the complexity of the (approximate) nearest colored node problem", Maximilian Probst, ESA'2018, received the "Best Student ESA Paper (track A)" award.
- 3 "An Almost-Linear-Time Algorithm for Decremental Strongly-Connected Components and Single-Source Reachability", Aaron Bernstein, Maximilian Probst, Christian Wulff-Nilsen, STOC'2019.
- 4 "Deterministic Algorithms for Decremental Approximate Shortest Paths: Faster and Simpler", Maximilian Probst Gutenberg, Christian Wulff-Nilsen, SODA'2020.
- 5 "Decremental SSSP in Weighted Digraphs: Faster and Against an Adaptive Adversary", Maximilian Probst Gutenberg, Christian Wulff-Nilsen, SODA'2020.
- 6 "Fully-Dynamic All-Pairs Shortest Paths: Improved Worst-Case Time and Space Bounds", Maximilian Probst Gutenberg, Christian Wulff-Nilsen, SODA'2020.
- 7 "New Algorithms and Hardness for Incremental Single-Source Shortest Paths in Directed Graphs", Maximilian Probst Gutenberg, Nicole Wein, Virginia Vassilevska Williams, STOC'2020.
- 8 "Near-Optimal Decremental SSSP in Dense Weighted Digraphs", Maximilian Probst Gutenberg, Aaron Bernstein, Christian Wulff-Nilsen, FOCS'2020
- 9 "Deterministic Decremental Reachability, SCC, and Shortest Paths via Directed Expanders and Congestion Balancing", Maximilian Probst Gutenberg, Aaron Bernstein, Thatchaphol Saranurak, FOCS'2020
- 10 "New Techniques and Fine-Grained Hardness for Dynamic Near-Additive Spanners", Thiago Bergamaschi, Monika Henzinger, Maximilian Probst Gutenberg, Virginia Vassilevska Williams, Nicole Wein, SODA'2021