

- RESEARCH INTERESTS
- ▶ Theoretical Computer Science / Algorithm Design and Analysis,
    - Focus: Distributed Algorithms, Parallel Algorithms, Network Algorithms, & Randomized Algorithms.
- EMPLOYMENT
- ▶ ETH Zurich
    - Assistant Professor (tenure-track) of Computer Science since Fall 2016
- EDUCATION
- ▶ Massachusetts Institute of Technology
    - Ph.D. in Electrical Eng. & Computer Science, GPA: 5.00/5 2016
    - S.M. in Electrical Eng. & Computer Science, GPA: 5.00/5 2013
- HONORS, AWARDS, & MAJOR GRANTS
- European Research Council Starting Grant, 2019–2024, 1 500 000 Euros.
  - Swiss National Foundation Project Grant, 2019–2023, 720 000 Swiss Francs.
  - Google Faculty Research Award, 2019.
  - Best Student Paper award at Int’l Symp. on Princ. of Distributed Computing (PODC), 2019.
  - ACM Doctoral Dissertation Award, Honorable Mention, 2017.
  - ACM-EATCS Principles of Distributed Computing Doctoral Dissertation Award, 2017.
  - George M. Sprowls Award of Best Computer Science PhD Theses at MIT, 2017.
  - Best Paper award at Int’l Symp. on Distributed Computing (DISC), 2017.
  - Best Paper award at ACM-SIAM Symp. on Discrete Algorithms (SODA), 2016.
  - Best Student Paper award at ACM-SIAM Symp. on Discrete Algorithms (SODA), 2016.
  - Best Student Paper award at Int’l Symp. on Princ. of Distributed Computing (PODC), 2015.
  - Best Student Paper award at Int’l Symp. on Princ. of Distributed Computing (PODC), 2014.
  - Best Student Paper award at Int’l Colloq. on Automata, Lang. and Program. (ICALP), 2014.
  - Best Paper award at Int’l Symp. on Distributed Computing (DISC), 2013.
  - Simons Award for Graduate Students in Theoretical Computer Science.
  - Jacobs Presidential Fellowship at MIT.
- ACADEMIC SERVICE
- ▷ Program Committees:
    - STOC’19, SSS’19 (track chair), ICALP’19, WOLA’19, ADGA’19 (workshop chair),
    - PODC’18, DISC’18, WOLA’18, HALG’18, SODA’18, SOSA’18,
    - DISC’17, ICALP’17, SPAA’17.
  - ▷ Steering Committee: Highlights of Algorithms (HALG)
  - ▷ Local Organizer: Highlights of Algorithms (HALG) 2020, Workshop on Local Algorithms (WOLA) 2019
  - ▷ ETH Graduate Admissions Committee for Computer Science, 2018 –
  - ▷ Conferences I reviewed for: STOC, FOCS, SODA, PODC, DISC, ICALP, SPAA, ITCS, OPODIS, ICDCN, ICDCS, SIROCCO, BDA, SOFSEM, ISIT, ICC and NOSSDAV. Journals I reviewed for: Journal of the ACM (JACM), SIAM Journal on Computing (SICOMP), Distributed Computing (DIST), and IEEE Trans. on Information Theory (ITIT), Information and Computation (I&C).

## TEACHING

### ► ETH Zurich, Fall 2019

- [Advanced Algorithms](#) (graduate)
  - [Algorithms, Probability, and Computing](#) (undergrad, joint with Prof. Gartner, Steger, & Steurer)
  - [Seminar on Algorithms for Large-Scale Graph Processing](#) (graduate)
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### ► ETH Zurich, Spring 2019

- [Massively Parallel Algorithms](#) (graduate special-topics class)
  - [Principles of Distributed Computing](#) (graduate, joint with Prof. Wattenhofer)
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### ► ETH Zurich, Fall 2018

- [Advanced Algorithms](#) (graduate)
  - [Algorithms, Probability, and Computing](#) (undergrad, joint with Prof. Steger, Steurer, Welzl, & Widmayer)
  - [Seminar on Algorithms for Large-scale Graph Processing](#) (graduate)
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### ► ETH Zurich, Spring 2018

- [Principles of Distributed Computing](#) (graduate, joint with Prof. Wattenhofer)
  - [A Taste of Research: Algorithms and Combinatorics](#) (undergrad, joint with Prof. Gartner & Steger)
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### ► ETH Zurich, Fall 2017

- [Advanced Algorithms](#) (graduate level)
  - [Algorithms, Probability, and Computing](#) (undergrad, joint with Prof. Steger, Steurer, Welzl, & Widmayer)
- 

### ► ETH Zurich, Spring 2017

- [Principles of Distributed Computing](#) (graduate, joint with Prof. Wattenhofer)
  - [A Taste of Research: Algorithms and Combinatorics](#) (undergrad, joint with Prof. Gartner & Steger)
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### ► ETH Zurich, Fall 2016

- [Algorithms, Probability, and Computing](#) (undergrad, joint with Prof. Steger, Welzl, & Widmayer)
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### ► MIT, Fall 2014

- [Distributed Graph Algorithms](#) (graduate, joint with Dr. Holzer)

## CURRENT GROUP MEMBERS

- Manuela Fischer (PhD student, Google PhD Fellow, Jan.'17–)
- Julian Portmann (PhD student, Apr.'19–)
- Saeed Ilchi (PhD student, jointly advised with Prof. Gartner, Jun.'19–)
- Vaclav Rozhon (Master's student, Feb.'19–)
- Christoph Grunau (Master's student, Sep.'19–)
- Dr. Sebastian Brandt (postdoc, Mar.'18–)
- Dr. Yi-Jun Chang (postdoc, ITS junior fellow, July'19–)
- Dr. Bernhard Haeupler (part-time research scientist, September'19–August'20)

PREVIOUS  
GROUP  
MEMBERS

- Dr. Jara Uitto (postdoc, Mar'17–August'19 → now Assistant Prof. at the Aalto University of Finland)

VISITING  
GROUP  
MEMBERS

- Bernhard Haeupler (visiting prof. from CMU, Jun'19-July'19 + May'18-Jun'18)
- Krzysztof Nowicki (visiting PhD student from U. Wroclaw, Nov'19-Apr'20 + Dec'18)
- Slobodan Mitrovic (visiting postdoc from EPFL & MIT, Jul'18-Aug'18)
- Michal Dory (visiting PhD student from Technion, Aug'18-Sep'18)
- Jukka Suomela (visiting prof. from Aalto U., Jan'17-Feb'17)
- Jason Li (visiting PhD student from CMU, Jun'17-Aug'17)
- Ce Jin (summer intern from Tsinghua U., July'19-Aug'19)
- Sonja Kraiczy (summer intern from U. Glasgow, July'19-Aug'19)
- Ali Sayadi (summer intern from Sharif U., July'19-Aug'19)

PUBLICATIONS

► **2020**

- Mohsen Ghaffari, Krzysztof Nowicki, and Mikkel Thorup, Faster Algorithms for Edge Connectivity via Random 2-Out Contractions, *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2020.
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► **2019**

- Mohsen Ghaffari and Julian Portmann, Improved Network Decompositions using Small Messages with Applications on MIS, Neighborhood Covers, and Beyond, *International Symposium on Distributed Computing (DISC)*, 2019.
- Ruben Becker, Yuval Emek, Mohsen Ghaffari, and Christoph Lenzen, Distributed Algorithms for Low Stretch Spanning Trees, *International Symposium on Distributed Computing (DISC)*, 2019.
- Mohsen Ghaffari, Fabian Kuhn, and Jara Uitto, Conditional Hardness Results for Massively Parallel Computation from Distributed Lower Bounds, *IEEE Symposium on Foundations of Computer Science (FOCS)*, 2019.
- Yi-Jun Chang, Manuela Fischer, Mohsen Ghaffari, Jara Uitto, and Yufan Zheng, The Complexity of  $(\Delta + 1)$  Coloring in Congested Clique, Massively Parallel Computation, and Centralized Local Computation, *ACM Symposium on Principles of Distributed Computing (PODC)*, 2019.  
**Best Student Paper Award at PODC'19.**
- Mohsen Ghaffari and Fabian Kuhn, On the Use of Randomness in Local Distributed Graph Algorithms, *ACM Symposium on Principles of Distributed Computing (PODC)* 2019.
- Michal Dory and Mohsen Ghaffari, Improved Distributed Approximations for Minimum-Weight Two-Edge-Connected Spanning Subgraph, *ACM Symposium on Principles of Distributed Computing (PODC)*, 2019.
- Philipp Bamberger, Mohsen Ghaffari, Fabian Kuhn, Yannic Maus, and Jara Uitto, On the Complexity of Distributed Splitting Problems, *ACM Symposium on Principles of Distributed Computing (PODC)*, 2019.
- Mohsen Ghaffari, Silvio Lattanzi, and Slobodan Mitrovic, Improved Parallel Algorithms for Density-Based Network Clustering, *International Conference on Machine Learning (ICML)*, 2019.

- Mohsen Ghaffari and Ali Sayyadi, Distributed Arboricity-Dependent Graph Coloring via All-to-All Communication, *International Colloquium on Automata, Languages and Programming (ICALP)*, 2019.
- John Augustine, Mohsen Ghaffari, Robert Gmyr, Kristian Hinnenthal, Fabian Kuhn, Jason Li, Christian Scheideler, Distributed Computation in Node-Capacitated Networks, *ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, 2019.
- Mohsen Ghaffari and Jara Uitto, Sparsifying Distributed Algorithms with Ramifications in Massively Parallel Computation and Centralized Local Computation, *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2019.
- Mohsen Ghaffari, Distributed Maximal Independent Set using Small Messages, *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2019.
- Mohsen Ghaffari and David Wajc, Simplified and Space-Optimal Semi-Streaming for  $(2+\epsilon)$ -Approximate Matching, *Symposium on Simplicity in Algorithms (SOSA)*, 2019.

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► **2018**

- M. Ghaffari, D. Harris, and F. Kuhn, On Derandomizing Local Distributed Algorithms, *IEEE Symposium on Foundations of Computer Science (FOCS)*, 2018.
- M. Ghaffari and F. Kuhn, Derandomizing Distributed Algorithms with Small Messages: Spanners and Dominating Set, *International Symposium on Distributed Computing (DISC)*, 2018.
- M. Ghaffari and F. Kuhn, Distributed MST and Broadcast with Fewer Messages, and Faster Gossiping, *International Symposium on Distributed Computing (DISC)*, 2018.
- M. Fischer and M. Ghaffari, A Simple Parallel and Distributed Sampling Technique: Local Glauber Dynamics *International Symposium on Distributed Computing (DISC)*, 2018.
- M. Ghaffari and J. Li, New Distributed Algorithms in Almost Mixing Time via Transformations from Parallel Algorithms, *International Symposium on Distributed Computing (DISC)*, 2018.
- G. Even, M. Ghaffari, and M. Medina Distributed Set Cover Approximation: Primal-Dual with Optimal Locality, *International Symposium on Distributed Computing (DISC)*, 2018.
- A. Clementi, M. Ghaffari, L. Guala, E. Natale, F. Pasquale, and G. Scornavacca, A Tight Analysis of the Parallel Undecided-State Dynamics with Two Colors, *Mathematical Foundations of Computer Science (MFCS)*, 2018.
- M. Ghaffari, T. Gouleakis, C. Konrad, S. Mitrovic, and R. Rubinfeld Improved Massively Parallel Computation Algorithms for MIS, Matching, and Vertex Cover *ACM Symposium on Principles of Distributed Computing (PODC)*, 2018.
- M. Ghaffari, T. Gouleakis, C. Konrad, S. Mitrovic, and R. Rubinfeld Improved Massively Parallel Computation Algorithms for MIS, Matching, and Vertex Cover *ACM Symposium on Principles of Distributed Computing (PODC)*, 2018.
- M. Ghaffari and J. Lengler Nearly-Tight Analysis for 2-Choice and 3-Majority Consensus Dynamics *ACM Symposium on Principles of Distributed Computing (PODC)*, 2018.
- M. Ghaffari and K. Nowicki Congested Clique Algorithms for the Minimum Cut Problem *ACM Symposium on Principles of Distributed Computing (PODC)*, 2018.
- M. Ghaffari, J. Hirvonen, F. Kuhn, and Y. Maus Improved Distributed Delta-Coloring *ACM Symposium on Principles of Distributed Computing (PODC)*, 2018.

- M. Ghaffari, F. Kuhn, Y. Maus, and J. Uitto Deterministic Distributed Edge-Coloring with Fewer Colors *ACM Symposium on Theory of Computing (STOC)*, 2018.
  - M. Ghaffari, and J. Li Improved Distributed Algorithms for Exact Shortest Paths *ACM Symposium on Theory of Computing (STOC)*, 2018.
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► **2017**

- M. Fischer, M. Ghaffari, and F. Kuhn, Deterministic Distributed Edge Coloring via Hypergraph Maximal Matching. *IEEE Symposium on Foundations of Computer Science (FOCS)*, 2017.  
*Invited to the SIAM Journal of Computing (SICOMP) Special Issue for FOCS'17.*
  - M. Fischer and M. Ghaffari, Sublogarithmic Distributed Algorithms for Lovász Local Lemma, and the Complexity Hierarchy. *Int'l Symposium on Distributed Computing (DISC)*, 2017.
  - M. Ghaffari, J. Hirvonen, F. Kuhn, Y. Maus, J. Suomela, and J. Uitto, Improved Distributed Degree Splitting and Edge Coloring. *Int'l Symposium on Distributed Computing (DISC)*, 2017.  
**Best Paper Award at DISC'17.**
  - M. Ghaffari and C. Lymouri, Simple and Near-Optimal Distributed Coloring for Sparse Graphs. *Int'l Symposium on Distributed Computing (DISC)*, 2017.
  - M. Ghaffari and M. Parter, Near-Optimal Distributed DFS in Planar Graphs. *Int'l Symposium on Distributed Computing (DISC)*, 2017.
  - M. Ghaffari, Distributed MIS via All-to-All Communication. *ACM Symposium on Principles of Distributed Computing (PODC)*, 2017.
  - M. Ghaffari, F. Kuhn, and H. Su, Distributed MST and Routing in Almost Mixing Time. *ACM Symposium on Principles of Distributed Computing (PODC)*, 2017.
  - R. Bar-Yehuda, K. Censor-Hillel, M. Ghaffari, and G. Schwartzman Distributed Approximation of Maximum Independent Set and Maximum Matching. *ACM Symposium on Principles of Distributed Computing (PODC)*, 2017.
  - M. Ghaffari, F. Kuhn, and Y. Maus, On the Complexity of Local Distributed Graph Problems. *ACM Symposium on Theory of Computing (STOC)*, 2017.
  - M. Ghaffari, and H. Su. Distributed Degree Splitting, Edge Coloring, and Orientations. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2017.
  - M. Ghaffari, D. Karger, and D. Panigrahi. Random Contractions and Sampling for Hypergraph and Hedge Connectivity. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2017.
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► **2016**

- M. Ghaffari and C. Newport. How to Discreetly Spread a Rumor in a Crowd. *Int'l Symposium on Distributed Computing (DISC)*, 2016.
- M. Ghaffari and M. Parter. A Polylogarithmic Gossip Algorithm for Plurality Consensus. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2016.
- M. Ghaffari and M. Parter. MST in Log-Star Rounds of Congested Clique. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2016.  
*Invited Talk at Highlights of Algorithms (HALG) 2017.*

- M. Ghaffari and B. Haeupler. Distributed algorithms for planar networks I: Planar Embedding. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2016.
  - M. Ghaffari and M. Parter. Near-Optimal Distributed Algorithms for Fault-Tolerant Tree Structures. *ACM Symposium on Parallelism in Algorithms and Architectures (SPAA)*, 2016.
  - M. Ghaffari and C. Newport. Leader Election in Unreliable Radio Networks. *Int'l Colloquium on Automata, Languages and Programming (ICALP)*, 2016.
  - M. Ghaffari. An improved distributed algorithm for Maximal Independent Set. In *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2016.  
**Best Paper and Best Student Paper Awards at SODA'16.**  
*Invited Talk at Highlights of Algorithms (HALG) 2017.*  
*Invited Talk at Symposium on Theory of Computing (STOC) 2017.*
  - M. Ghaffari and B. Haeupler. Distributed algorithms for planar networks II: Low-congestion shortcuts, MST, and Min-Cut. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2016.
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## ► 2015

- M. Ghaffari. Near-optimal scheduling of distributed algorithms. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2015.  
**Best Student Paper Award at PODC'15.**  
*Invited to the Journal of ACM (JACM) Special Issue for PODC'15.*
  - M. Ghaffari, A. Karrenbauer, F. Kuhn, C. Lenzen, and B. Patt-Shamir. Near-optimal distributed maximum flow. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2015.
  - M. Ghaffari, C. Musco, T. Radeva, and N. Lynch. Distributed house-hunting in ant colonies. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2015.
  - K. Censor-Hillel, M. Ghaffari, G. Giakkoupis, B. Haeupler, and F. Kuhn. Tight bounds on vertex connectivity under vertex sampling. *ACM-SIAM Symp. on Discrete Algorithms (SODA)*, 2015.  
*Invited to the Transactions of Algorithms Special Issue for SODA 2015*
  - M. Ghaffari. Distributed broadcast revisited: Towards universal optimality. *Int'l Colloquium on Automata, Languages and Programming (ICALP)*, 2015.
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## ► 2014

- K. Censor-Hillel, M. Ghaffari, and F. Kuhn. Distributed connectivity decomposition. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2014.  
**Best Student Paper Award at PODC'14.**  
*Invited to the Journal of ACM (JACM) Special Issue for PODC'14.*
- M. Ghaffari, E. Kantor, N. Lynch, and C. Newport. Multi-message broadcast with abstract mac layers and unreliable links. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2014.
- M. Ghaffari and B. Haeupler. Optimal error rates for interactive coding II: Efficiency and list decoding. *Symposium on Foundations of Computer Sci. (FOCS)*, 2014.
- M. Ghaffari, B. Haeupler, and M. Sudan. Optimal error rates for interactive coding I: Adaptivity and other settings. *Symposium on Theory of Computing (STOC)*, 2014.
- M. Ghaffari. Near-optimal distributed approximation of minimum-weight connected dominating set. *Int'l Colloq. on Automata, Languages and Prog. (ICALP)*, 2014.  
**Best Student Paper Award at ICALP'14, track C.**

- M. Ghaffari and C. Lenzen. Near-optimal distributed tree embedding. *Int'l Symposium on Distributed Computing (DISC)*, 2014.
  - K. Censor-Hillel, M. Ghaffari, and F. Kuhn. A new perspective on vertex connectivity. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2014.
  - N. Alon, M. Ghaffari, B. Haeupler, and M. Khabbazian. Broadcast throughput in radio networks: routing vs. network coding. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2014.
  - R. Gelashvili, M. Ghaffari, J. Li, and N. Shavit. On the importance of registers for computability. *Int'l Conf. on Princ. of Distributed Systems (OPODIS)*, 2014.
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### ► 2013

- M. Ghaffari and F. Kuhn. Distributed minimum cut approximation. *Int'l Symposium on Distributed Computing (DISC)*, 2013. **Best Paper Award at DISC'13.**
  - M. Ghaffari and B. Haeupler. Fast structuring of radio networks for multi-message communications. *Int'l Symp. on Distributed Computing (DISC)*, 2013.
  - M. Ghaffari, B. Haeupler, and M. Khabbazian. Randomized broadcast in radio networks with collision detection. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2013.
  - S. Daum, M. Ghaffari, S. Gilbert, F. Kuhn, and C. Newport. Maximal independent sets in multichannel radio networks. *Int'l Symp. on Principles of Distributed Computing (PODC)*, 2013.
  - M. Ghaffari, N. Lynch, and C. Newport. The cost of radio network broadcast for different models of unreliable links. *Int'l Symposium on Principles of Distributed Computing (PODC)*, 2013.
  - M. Ghaffari and B. Haeupler. Near optimal leader election in multi-hop radio networks. *ACM-SIAM Symposium on Discrete Algorithms (SODA)*, 2013.
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### ► 2012

- M. Ghaffari, S. Gilbert, C. Newport, and H. Tan. Optimal broadcast in shared spectrum radio networks. *Int'l Conference on Principles of Distributed Systems (OPODIS)*, 2012.
  - M. Ghaffari, B. Haeupler, N. Lynch, and C. Newport. Bounds on contention management in radio networks. *Int'l Symp. on Distributed Comp. (DISC)*, 2012.
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### ► 2011

- M. Ghaffari, N. Lynch, and S. Sastry. Leader election using loneliness detection. *Int'l Symposium on Distributed Computing (DISC)*, 2011.

## REFERENCES

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