FABIAN KUHN

Computer Science and Artificial Intelligence Lab
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OBJECTIVE & SKILLS

I am interested in the fundamental problems of computer science, especially in the area of distributed algorithms, mobile computing, and networking. I am on the one hand attracted by the plethora of mathematical techniques involved; on the other hand, I enjoy the proximity to real-world applications.

I have research expertise in data structures and algorithms, distributed computing (local graph algorithms, lower bounds, peer-to-peer systems), mobile computing (ad-hoc/sensor network routing, modeling, simulation), approximation algorithms, randomized algorithms, analysis of dynamic systems, competitive analysis, and derandomization. In student projects and in the industry, I also gained experience in cryptography, software engineering (mostly Java, C, and C++) and in VLSI design.

EDUCATION

2002 – 2005	Ph.D. studies in computer science at the Computer Science and the Information Technology and Electrical Engineering departments, ETH Zurich (Swiss Federal Institute of Technology), Switzerland. Advisor: Prof. Roger Wattenhofer Co-Examiners: Prof. Nathan Linial, Prof. Friedhelm Meyer auf der Heide *Ph.D. in Computer Science August 2005.*
1996 – 2001	Studies in computer science at ETH Zurich (Swiss Federal Institute of Technology), Switzerland. *Computer Science diploma (equivalent to M.Sc.) 2001.*

EXPERIENCE

Postdoc Position 2008/09 – present	Computer Science and Artificial Intelligence Lab, MIT, USA
Postdoc Position 2007/03 – 2008/08	Institute of Theoretical Computer Science, ETH Zurich, Switzerland
Postdoc Position 2006/02 – 2007/02	Microsoft Research Silicon Valley, Mountain View CA, USA
Research and Teaching Assistant 2002/01 – 2006/02	Computer Engineering and Networks Laboratory, ETH Zurich, Switzerland
Internship (Cryptographic Research) 2001/03 – 2001/06	Certicom, Mississauga ON, Canada
Software Engineering (Java, C, C++) 2000/10 – 2001/03	Syte GmbH, Reinach BL, Switzerland
Teaching Assistant 1997 – 2000	ETH Zurich, Switzerland

FABIAN KUHN

AWARDS

- Best Paper Award at the ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), 2007

- ETH medal for Ph.D. thesis "The Price of Locality – Exploring the Complexity of Distributed Coordination Primitives"

- Best Student Paper Award at the International Conference on Distributed Computing (DISC), 2004

- Best Student Paper Award at the ACM Symposium on Principles of Distributed Computing (PODC), 2004

- Best Student Paper Award at the ACM Symposium on Principles of Distributed Computing (PODC), 2003

- Willi Studer Award 2002 for the best ETH Zurich Computer Science diploma of the year 2001/02.

RESEARCH COMMUNITY SERVICES

- PC member of the 28th ACM Symposium on Principles of Distributed Computing (PODC 2009)

- PC member of the 21st ACM Symposium on Parallelism in Algorithms and Architectures (SPAA 2009)

- PC member of the 8th IEEE Symposium on Network Computing and Applications (NCA 2009)

- PC member of the 27th ACM Symposium on Principles of Distributed Computing (PODC 2008)

- PC member of the 4th International Conference on Mobile Ad-hoc and Sensor Networks (MSN 2008)

- PC member of the 4th International Workshop on Algorithmic Aspects of Wireless Sensor Networks (ALGOSENSORS 2008)

- PC member of the 1st International Workshop on Mobility, Algorithhms, and Graph Theory in Dynamic Networks (IMAGINE 2007)

- PC member of the 1st International Workshop on Theoretical and Algorithmic Aspects of Sensor and Ad-hoc Networks (WTASA 2007)

- PC member of the 6th International Workshop on Peer-to-Peer Systems (IPTPS 2007)

- PC member of the 20th International Symposium on Distributed Computing (DISC 2006)

- PC member of the 2nd International Conference on Mobile Ad-hoc and Sensor Networks (MSN 2006)

- PC member of the 1st International Workshop on Mobility in Peer-to-peer Systems (MPPS 2005)

- Junior PC member of the 25th ACM Symposium on Principles of Distributed Computing (PODC 2006)

- Reviewer of numerous additional conference and journal articles

FABIAN KUHN

TEACHING EXPERIENCE

- Distributed Algorithms for Mobile Wireless Ad Hoc Networks (co-taught with Nancy Lynch), taught in fall 2008 at MIT, course website: `http://courses.csail.mit.edu/6.885/`.

- Principles of Distributed Computing (co-taught with Roger Wattenhofer), taught in spring 2008 at ETH Zurich, Switzerland,
course website: `http://dcg.ethz.ch/lectures/ss08/distcomp/index.html`.

- Teaching Assistant for numerous courses at ETH Zurich, Switzerland.

PUBLICATIONS

1. *Synchrony and Asynchrony in Neural Networks* Fabian Kuhn, Konstantinos Panagiotou, Joel Spencer, and Angelika Steger. Submitted.

2. *Local Multicoloring Algorithms: Computing a Nearly-Optimal TDMA Schedule in Constant Time* Fabian Kuhn. 26th Symposium on Theoretical Aspects of Computer Science (STACS), Freiburg, Germany, February 2009.

3. *Distributed Computation of the Mode* Fabian Kuhn, Thomas Locher, and Stefan Schmid. 27th ACM Symposium on the Principles of Distributed Computing (PODC), Toronto, Canada, August 2008.

4. *Efficient Distributed Approximation Algorithms via Probabilistic Tree Embeddings* Maleq Khan, Fabian Kuhn, Dahlia Malkhi, Gopal Pandurangan, and Kunal Talwar. 27th ACM Symposium on the Principles of Distributed Computing (PODC), Toronto, Canada, August 2008.

5. *Understanding Radio Irregularity in Wireless Networks.* Torsten Mütze, Patrick Stuedi, Fabian Kuhn, and Gustavo Alonso. 5th Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON), San Francisco, California, USA, June 2008.

6. *Reconstructing Approximate Tree Metrics.* Ittai Abraham, Mahesh Balakrishnan, Fabian Kuhn, Dahlia Malkhi, Kunal Talwar, and Venugopalan Ramasubramanian. 26th ACM Symposium on the Principles of Distributed Computing (PODC), Portland, Oregon, USA, August 2007.

7. *Tight Bounds for Distributed Selection.* Fabian Kuhn, Thomas Locher and Roger Wattenhofer. 19th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), San Diego, California, USA, June 2007. Journal version to appear in Communications of the ACM
SPAA Best Paper Award

8. *Distributed Approximation of Capacitated Dominating Sets.* Fabian Kuhn and Thomas Moscibroda. 19th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), San Diego, California, USA, June 2007.

9. *Improved Approximation Algorithms for Connected Sensor Cover.* Stefan Funke, Alexander Kesselman, Fabian Kuhn, Zvi Lotker, and Michael Segal. Wireless Networks 13 (2), 2007.

10. *On the Complexity of Distributed Graph Coloring.* Fabian Kuhn, and Roger Wattenhofer. 25th ACM Symposium on the Principles of Distributed Computing (PODC), Denver, Colorado, USA, July 2006.

11. *Fault-Tolerant Clustering in Ad Hoc and Sensor Networks.* Fabian Kuhn, Thomas Moscibroda, and Roger Wattenhofer. 26th International Conference on Distributed Computing Systems (ICDCS), Lisbon, Portugal, July 2006.

12. *A Blueprint for Constructing Peer-to-Peer Systems Robust to Dynamic Worst-Case Joins and Leaves.* Fabian Kuhn, Stefan Schmid, Joest Smit, and Roger Wattenhofer. 14th IEEE International Workshop on Quality of Service (IWQoS), New Haven, Connecticut, USA, June 2006.

13. *The Price of Being Near-Sighted.* Fabian Kuhn, Thomas Moscibroda, and Roger Wattenhofer. 17th ACM-SIAM Symposium on Discrete Algorithms (SODA), Miami, Florida, USA, January 2006.

14. *Fast Deterministic Distributed Maximal Independent Set Computation on Growth-Bounded Graphs.* Fabian Kuhn, Thomas Moscibroda, Tim Nieberg, and Roger Wattenhofer. 19th International Symposium on Distributed Computing (DISC), Cracow, Poland, September 2005.

15. *Local Approximation Schemes for Ad Hoc and Sensor Networks.* Fabian Kuhn, Thomas Moscibroda, Tim Nieberg, and Roger Wattenhofer. 3rd ACM Joint Workshop on Foundations of Mobile Computing (DIALM-POMC), Cologne, Germany, September 2005.

16. *Interference in Cellular Networks: The Minimum Membership Set Cover Problem.* Fabian Kuhn, Pascal von Rickenbach, Roger Wattenhofer, Emo Welzl, and Aaron Zollinger. 11th International Computing and Combinatorics Conference (COCOON), Kunming, China, August 2005.

17. *On the Locality of Bounded Growth.* Fabian Kuhn, Thomas Moscibroda, and Roger Wattenhofer. 24th ACM Symposium on the Principles of Distributed Computing (PODC), Las Vegas, Nevada, USA, July 2005.

18. *A Self-Repairing Peer-to-Peer System Resilient to Dynamic Adversarial Churn.* Fabian Kuhn, Stefan Schmid, and Roger Wattenhofer. 4th International Workshop on Peer-to-Peer Systems (IPTPS), Ithaca, NY, February 2005.

19. *Efficient Adaptive Collect using Randomization.* Hagit Attiya, Fabian Kuhn, Mirjam Wattenhofer, and Roger Wattenhofer. 18th Annual International Conference on Distributed Computing (DISC), Amsterdam, Netherlands, October 2004. Journal version in Distributed Computing Journal.
DISC Best Student Paper Award

20. *Unit Disk Graph Approximation.* Fabian Kuhn, Thomas Moscibroda, and Roger Wattenhofer. 2nd ACM DIALM-POMC Joint Workshop on Foundations of Mobile Computing (DIALM-POMC), Philadelphia, PA, October 2004.

21. *Initializing Newly Deployed Ad Hoc and Sensor Networks.* Fabian Kuhn, Thomas Moscibroda, and Roger Wattenhofer. 10th ACM International Conference on Mobile Computing and Networking (MOBICOM), Philadelphia, PA, September 2004.

22. *Radio Network Clustering from Scratch.* Fabian Kuhn, Thomas Moscibroda, and Roger Wattenhofer. 12th Annual European Symposium on Algorithms (ESA), Bergen, Norway, September 2004.

23. *What Cannot Be Computed Locally!* Fabian Kuhn, Thomas Moscibroda, and Roger Wattenhofer. 23rd ACM Symposium on the Principles of Distributed Computing (PODC), St. John's, Newfoundland, Canada, July 2004.
PODC Best Student Paper Award

24. *Dynamic Analysis of the Arrow Distributed Protocol.* Fabian Kuhn and Roger Wattenhofer. 16th ACM Symposium on Parallelism in Algorithms and Architectures (SPAA), Barcelona, Spain, June 2004. Journal version in Theory of Computing Systems.

25. *Ad-Hoc Networks Beyond Unit Disk Graphs.* Fabian Kuhn, Roger Wattenhofer, and Aaron Zollinger. 1st ACM DIALM-POMC Joint Workshop on Foundations of Mobile Computing (DIALM-POMC), San Diego, California, USA, September 2003.

26. *Constant-Time Distributed Dominating Set Approximation.* Fabian Kuhn and Roger Wattenhofer. 22nd ACM Symposium on the Principles of Distributed Computing (PODC), Boston, Massachusetts, USA, July 2003. Journal version in Distributed Computing Journal.
PODC Best Student Paper Award

27. *Geometric Ad-Hoc Routing: Of Theory and Practice.* Fabian Kuhn, Roger Wattenhofer, Yan Zhang, and Aaron Zollinger. 22nd ACM Symposium on the Principles of Distributed Computing (PODC), Boston, Massachusetts, USA, July 2003.

28. *Worst-Case Optimal and Average-Case Efficient Geometric Ad-Hoc Routing.* Fabian Kuhn, Roger Wattenhofer, and Aaron Zollinger. 4th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MOBIHOC), Annapolis, Maryland, USA, June 2003.

29. *Asymptotically Optimal Geometric Mobile Ad-Hoc Routing.* Fabian Kuhn, Roger Wattenhofer, and Aaron Zollinger. 6th International Workshop on Discrete Algorithms and Methods for Mobile Computing and Communications (DIALM), Atlanta, Georgia, September 2002.

30. *Random Walks Revisited: Extensions of Pollard's Rho Algorithm for Computing Multiple Discrete Logarithms.* Fabian Kuhn and Ren Struik. 8th Annual Workshop on Selected Areas in Cryptography (SAC), Toronto, Ontario, Canada, August 2001.

REFERENCES

Prof. Roger Wattenhofer, ETH Zurich, wattenhofer@tik.ee.ethz.ch

Prof. Dahlia Malkhi, Microsoft Research Silicon Valley, dalia@microsoft.com

Prof. Hagit Attiya, Technion, hagit@cs.technion.ac.il

Prof. Maurice Herlihy, Brown University, herlihy@cs.brown.edu