Mika Göös

Curriculum Vitae, 2018

School of Mathematics
Institute for Advanced Study

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1. Employment and Education

Institute for Advanced Study 2018 – Present
Member, School of Mathematics

Harvard University 2016 – 2018
Michael O. Rabin Postdoctoral Fellowship

Simons Institute, Berkeley Spring 2017
Simons–Berkeley Research Fellowship, Pseudorandomness program

University of Toronto 2012 – 2016
PhD studies in Theoretical Computer Science
- Supervisor: Prof. Toniann Pitassi
- PhD thesis: **Communication Lower Bounds via Query Complexity**
- Co-recipient of EATCS Distinguished Dissertation Award 2017

University of Helsinki 2011 – 2012
PhD studies in Theoretical Computer Science
- Supervisor: Ass.-Prof. Jukka Suomela
- Transferred over to University of Toronto

University of Oxford 2010 – 2011
MSc in Mathematics and the Foundations of Computer Science (with distinction)
- Supervisors: Prof. Michael J. Collins & Prof. Oliver Riordan
- MSc thesis: **Expansion in Soluble Groups**

Aalto University 2007 – 2010
BSc in Computer Science with minor in Mathematics (with distinction)
- Supervisor: Prof. Pekka Orponen
- BSc thesis: **Creative Sets and Myhill's Isomorphism Theorem**

2. Visiting Positions

IBM Research Almaden Summer 2015
Research intern in Theoretical Computer Science
- Mentor: T.S. Jayram

Microsoft Research Silicon Valley Summer 2014
Research intern in Theoretical Computer Science
- Mentor: Raghu Meka

3. Scholarships

- **Simons Award** for Graduate Students in Theoretical CS 2015
- **Alfred B. Lehman** Graduate Scholarship in CS 2013

4. Selected Talks

- Princeton University, Theory Lunch September 21, 2018
  Title: Adventures in Monotone Complexity and TFNP
- Simons Institute, Workshop on Boolean Devices September 11, 2018
  Title: Monotone Circuit Lower Bounds from Resolution
  Link: https://www.youtube.com/watch?v=0eClgsBTil8
- Simons Institute, Workshop on Extended Formulations November 8, 2017
  Title: Independent Set Polytopes: Query vs. Communication Perspective
  Link: https://www.youtube.com/watch?v=W3XQd59Kaq8
- FOCS'17, Workshop on Hardness Escalation October 14, 2017
  Title: Monotone Circuit Lower Bounds from Resolution
- BIRS, Communication Complexity and Applications II March 21, 2017
  Title: Query-to-Communication Lifting
  Link: http://videos.birs.ca/2017/17w5147/201703210904-Goos.mp4
- BIRS, Computational Complexity September 6, 2016
  Title: Extension Complexity of Independent Set Polytopes
  Link: http://videos.birs.ca/2016/16w5044/201609061314-Goos.mp4
- National University of Singapore, IMS Workshop January 19, 2016
  Title: Extended Formulations and Circuit Complexity
- MIT, Theory of Computation Colloquium October 6, 2015
  Title: Communication Complexity vs. Partition Numbers
- TCS+ Online Seminar September 30, 2015
  Title: Communication Complexity vs. Partition Numbers
  Link: https://www.youtube.com/watch?v=c_UUh62NKBU
- IAS, Theoretical Computer Science/Discrete Mathematics February 23, 2015
  Title: Lower Bounds for Clique vs. Independent Set
  Link: https://video.ias.edu/csdm/2015/0223-MikaGoos
- China Theory Week, Beijing, China September 9, 2014
  Title: Open Problems in Communication Complexity

5. Community Service

- **Journal reviewing:** Journal of the ACM, Algorithmica, Theory of Computing, Theoretical Computer Science, Distributed Computing, Chicago Journal of Theoretical Computer Science
- **Conference reviewing:** FOCS, STOC, PODC, ICALP, ITCS, DISC, STACS, RANDOM, ISAAC, ESA, SPAA, SWAT, SIROCCO, CSR, ICDCN
- **Other:** Review of DISC 2012 for *SIGACT News*, doi:10.1145/2421119.2421140

6. Publications

[1] Mika Göös, Pritish Kamath, Robert Robere, and Dmitry Sokolov. Adventures in monotone complexity and TFNP. In *Proceedings of the 10th Innovations in Theoretical Computer Science* **(ITCS'19)**, 2019. To appear. URL: https://eccc.weizmann.ac.il/report/2018/163/

[2] Mika Göös and Aviad Rubinstein. Near-optimal communication lower bounds for approximate Nash equilibria. In *Proceedings of the 59th Symposium on Foundations of Computer Science* **(FOCS'18)**, pages 397–403. IEEE, 2018. Invited to Special Issue. arXiv:1805.06387

[3] Ankit Garg, Mika Göös, Pritish Kamath, and Dmitrt Sokolov. Monotone circuit lower bounds from Resolution. In *Proceedings of the 50th Annual ACM Symposium on Theory of Computing* **(STOC'18)**, pages 902–911. ACM, 2018. Invited to Theory of Computing. doi:10.1145/3188745.3188838

[4] Yi-Hsiu Chen, Mika Göös, Salil Vadhan, and Jiapeng Zhang. A tight lower bound for entropy flattening. In *Proceedings of the 33rd Conference on Computational Complexity* **(CCC'18)**, volume 102, pages 23:1–23:28. Schloss Dagstuhl, 2018. doi:10.4230/LIPIcs.CCC.2018.23

[5] Mika Göös, Toniann Pitassi, and Thomas Watson. Query-to-communication lifting for BPP. In *Proceedings of the 58th Symposium on Foundations of Computer Science* **(FOCS'17)**, pages 132–143. IEEE, 2017. Invited to Special Issue. doi:10.1109/FOCS.2017.21

[6] Mika Göös, Pritish Kamath, Toniann Pitassi, and Thomas Watson. Query-to-communication lifting for P^{NP}. In *Proceedings of the 32nd Computational Complexity Conference* **(CCC'17)**, pages 12:1–12:16. Schloss Dagstuhl, 2017. doi:10.4230/LIPIcs.CCC.2017.12

[7] Mika Göös, Rahul Jain, and Thomas Watson. Extension complexity of independent set polytopes. *SIAM Journal on Computing*, 47(1):241–269, 2018. Conference version in **(FOCS'16)**. doi:10.1137/16M109884X

[8] Anurag Anshu, Aleksandrs Belovs, Shalev Ben-David, Mika Göös, Rahul Jain, Robin Kothari, Troy Lee, and Miklos Santha. Separations in communication complexity using cheat sheets and information complexity. In *Proceedings of the 57th Symposium on Foundations of Computer Science* **(FOCS'16)**, pages 555–564. IEEE, 2016. doi:10.1109/FOCS.2016.66

[9] Mika Göös and T.S. Jayram. A composition theorem for conical juntas. In *Proceedings of the 31st Conference on Computational Complexity* **(CCC'16)**, pages 5:1–5:16. Schloss Dagstuhl, 2016. doi:10.4230/LIPIcs.CCC.2016.5

[10] Mika Göös, Toniann Pitassi, and Thomas Watson. The landscape of communication complexity classes. *Computational Complexity*, 27(2):245–304, 2018. Conference version in **(ICALP'16)**. doi:10.1007/s00037-018-0166-6

[11] Mika Göös, Juho Hirvonen, Reut Levi, Moti Medina, and Jukka Suomela. Non-local probes do not help with many graph problems. In *Proceedings of the 30th Symposium on Distributed Computing* **(DISC'16)**, pages 201–214. Springer, 2016. doi:10.1007/978-3-662-53426-7_15

[12] Mika Göös. Lower bounds for clique vs. independent set. In *Proceedings of the 56th Symposium on Foundations of Computer Science* **(FOCS'15)**, pages 1066–1076. IEEE, 2015. Machtey award. doi:10.1109/FOCS.2015.69

[13] Mika Göös, T.S. Jayram, Toniann Pitassi, and Thomas Watson. Randomized communication vs. partition number. *ACM Transactions on Computation Theory*, 10(1):4:1–4:20, 2018. Conference version in **(ICALP'17)**. doi:10.1145/3170711

[14] Mika Göös, Toniann Pitassi, and Thomas Watson. Deterministic communication vs. partition number. In *Proceedings of the 56th Symposium on Foundations of Computer Science* **(FOCS'15)**, pages 1077–1088. IEEE, 2015. Invited to Special Issue. doi:10.1109/FOCS.2015.70

[15] Mika Göös, Shachar Lovett, Raghu Meka, Thomas Watson, and David Zuckerman. Rectangles are nonnegative juntas. *SIAM Journal on Computing*, 45(5):1835–1869, 2016. Conference version in **(STOC'15)**. doi:10.1137/15M103145X

[16] Mika Göös, Toniann Pitassi, and Thomas Watson. Zero-information protocols and unambiguity in Arthur–Merlin communication. *Algorithmica*, 76(3):684–719, 2016. Conference version in **(ITCS'15)**. doi:10.1007/s00453-015-0104-9

[17] Mika Göös and Thomas Watson. Communication complexity of set-disjointness for all probabilities. *Theory of Computing*, 12(9):1–23, 2016. Special Issue for **(RANDOM'14)**. doi:10.4086/toc.2016.v012a009

[18] Mika Göös and Toniann Pitassi. Communication lower bounds via critical block sensitivity. *SIAM Journal on Computing*, pages 1778–1806, 2018. Conference version in **(STOC'14)**. doi:10.1137/16M1082007

[19] Mika Göös, Juho Hirvonen, and Jukka Suomela. Linear-in-Δ lower bounds in the LOCAL model. *Distributed Computing*, pages 86–95, 2017. Special Issue for **(PODC'14)**. doi:10.1007/s00446-015-0245-8

[20] Pierre Fraigniaud, Mika Göös, Amos Korman, and Jukka Suomela. What can be decided locally without identifiers? In *Proceedings of the 32nd Annual ACM Symposium on Principles of Distributed Computing* **(PODC'13)**, pages 157–165. ACM, 2013. doi:10.1145/2484239.2484264

[21] Magnus Find, Mika Göös, Matti Järvisalo, Petteri Kaski, Mikko Koivisto, and Janne H. Korhonen. Separating OR, SUM, and XOR circuits. *Journal of Computer and System Sciences*, 82(5):793–801, 2016. doi:10.1016/j.jcss.2016.01.001

[22] Pierre Fraigniaud, Mika Göös, Amos Korman, Merav Parter, and David Peleg. Randomized distributed decision. *Distributed Computing*, 27(6):419–434, 2014. Special Issue for **(DISC'12)**. doi:10.1007/s00446-014-0211-x

[23] Mika Göös and Jukka Suomela. No sublogarithmic-time approximation scheme for bipartite vertex cover. *Distributed Computing*, 27(6):435–443, 2013. Conference version in **(DISC'12)**. Best paper award. doi:10.1007/s00446-013-0194-z

[24] Mika Göös, Juho Hirvonen, and Jukka Suomela. Lower bounds for local approximation. *Journal of the ACM*, 60(5):175–184, 2014. Conference version in **(PODC'12)**. Best student paper award. doi:10.1145/2528405

[25] Mika Göös and Jukka Suomela. Locally checkable proofs in distributed computing. *Theory of Computing*, 2016. Conference version in **(PODC'11)**. doi:10.4086/toc.2016.v012a019

[26] Mika Göös, Tuomo Lempiäinen, Eugen Czeizler, and Pekka Orponen. Search methods for tile sets in patterned DNA self-assembly. *Journal of Computer and System Sciences*, 80(1):297–319, 2014. doi:10.1016/j.jcss.2013.08.003