Yuval Filmus

Curriculum Vitæ and Publication List

Taub Center, Room 519
Technion, Haifa, Israel
+972-77-8874876
✉ *yuvalfi@cs.technion.ac.il*
🖥 *http://cs.toronto.edu/~yuvalf*

Employment and Education

2015–current	**Assistant Professor**, *Technion*, Haifa, Israel.
2014–2015	**Member**, *Institute for Advanced Study*, Princeton, NJ.
Fall 2013	**Research Fellow**, *Simons Institute for the Theory of Computing*, Berkeley, CA. Special semester on real analysis in computer science.
Fall 2011	**Early Stage Researcher**, *Charles University*, Prague. Special semester in logic and complexity.
2009–2013	**Ph.D. in Computer Science**, *University of Toronto*. Advisor: Prof. Toniann Pitassi. Thesis: Spectral methods in extremal combinatorics. **Winner of the 2015 Canadian Mathematical Society Doctoral Prize.**
2000–2002	**M.Sc. in Computer Science**, *Weizmann Institute*. Advisor: Prof. Uriel Feige. Thesis: Bandwidth approximation of many-caterpillars.
1997–2000	**B.A. in Computer Science**, *The Open University of Israel*, Summa cum laude. Dean's honors (1998,1999,2000).

Community Service

2021	Program committee of ICALP.
2019–2020	Program committee of CCC (2019), FOCS (2019,2020) and FSTTCS (2019).
2014–2017	Program committee of ITCS (2014), STOC (2015), ICALP (2017).

Postdocs

2019–	Nitin Saurabh, Marc Vinyals

Students

Current	Ph.D.: Avi Kaplan. M.Sc.: Igor Margulis, Idan Mehalel, Neta Dafni, Gilad Chase.
Past	Yuval Dagan (M.Sc., 2018).

Prizes

2020	Krill prize
2016	Alon fellowship

Grants

2019–2024	European Research Council
2016–2020	Israel Science Foundation

Journal Publications

[1] Yuval Filmus, "Lower bounds for context-free grammars," *Information Processing Letters*, vol. 111, no. 18, pp. 895–898, 2011.

[2] David Ellis, Yuval Filmus, and Ehud Friedgut, "Triangle-intersecting families of graphs," *Journal of the European Mathematical Society*, vol. 14, no. 3, pp. 841–885, 2012.

[3] Yuval Filmus, "Inequalities on submodular functions via term rewriting," *Information Processing Letters*, vol. 113, no. 13, pp. 457–464, 2013.

[4] Yuval Filmus, "Universal codes of the natural numbers," *Logical Methods in Computer Science*, vol. 9, no. 3, paper no. 7, 2013.

[5] Yuval Filmus and Justin Ward, "Monotone submodular maximization over a matroid via non-oblivious local search," *SIAM Journal on Computing*, vol. 43, no. 2, pp. 514–542, 2014.

[6] Stephen A. Cook, Yuval Filmus, and Dai Tri Man Lê, "The complexity of the comparator circuit value problem," *ACM Transactions on Computation Theory*, vol. 6, no. 4, article no. 15, 2014.

[7] David Ellis, Yuval Filmus, and Ehud Friedgut, "A quasi-stability result for dictatorships in S_n," *Combinatorica*, vol. 35, no. 5, pp. 573–618, 2015.

[8] David Ellis, Yuval Filmus, and Ehud Friedgut, "A stability result for balanced dictatorships in S_n," *Random Structures and Algorithms*, vol. 46, no. 3, pp. 494–530, 2015.

[9] Yuval Filmus, Toniann Pitassi, and Rahul Santhanam, "Exponential lower bounds for AC^0-Frege imply superpolynomial Frege lower bounds," *ACM Transactions on Computation Theory*, vol. 7, no. 2, article no. 5, 2015.

[10] Yuval Filmus, Massimo Lauria, Mladen Mikša, Jakob Nordström, and Marc Vinyals, "From small space to small width in resolution," *ACM Transactions on Computational Logic*, vol. 16, no. 4, p. 28, 2015.

[11] Yuval Filmus, Massimo Lauria, Jakob Nordström, Neil Thapen, and Noga Ron-Zewi, "Space complexity in polynomial calculus," *SIAM Journal on Computing*, vol. 44, no. 4, pp. 1119–1153, 2015.

[12] Yuval Filmus, "An orthogonal basis for functions over a slice of the Boolean hypercube," *Electronic Journal of Combinatorics*, vol. 23, no. 1, P1.23, 2016.

[13] Yuval Filmus, "Friedgut–Kalai–Naor theorem for slices of the Boolean cube," *Chicago Journal of Theoretical Computer Science*, 14:1–14:17, 2016.

[14] Yuval Filmus, Hamed Hatami, Nathan Keller, and Noam Lifshitz, "On the sum of the L1 influences of bounded functions," *Israel Journal of Mathematics*, vol. 214, no. 1, pp. 167–192, 2016.

[15] David Ellis, Yuval Filmus, and Ehud Friedgut, "Low-degree Boolean functions on S_n, with an application to isoperimetry," *Forum of Mathematics, Sigma*, vol. 5, 2017. DOI: 10.1017/fms.2017.24.

[16] Yuval Filmus and Edinah K. Gnang, "On the spectra of hypermatrix direct sum and Kronecker products constructions," *Linear Algebra and its Applications*, vol. 519, pp. 238–277, 2017.

[17] Yuval Filmus, "The weighted complete intersection theorem," *Journal of Combinatorial Theory, Series A*, vol. 151, pp. 84–101, 2017.

[18] Yuval Filmus, Guy Kindler, Elchanan Mossel, and Karl Wimmer, "Invariance principle on the slice," *ACM Transactions on Computation Theory*, vol. 10, no. 3, p. 11, 2018.

[19] Yuval Dagan, Yuval Filmus, Hamed Hatami, and Yaqiao Li, "Trading information complexity for error," *Theory of Computing*, vol. 14, no. 6, pp. 1–73, 2018.

[20] Yoram Bachrach, Yuval Filmus, Joel Oren, and Yair Zick, "Analyzing power in weighted voting games with super-increasing weights," *Theory of Computing Systems*, vol. 63, no. 1, pp. 150–174, 2019.

[21] Yuval Filmus, "Another look at degree lower bounds for polynomial calculus," *Theoretical Computer Science*, vol. 796, pp. 286–293, 2019.

[22] Yuval Filmus and Ferdinand Ihringer, "Boolean constant degree functions on the slice are juntas," *Discrete Mathematics*, vol. 342, no. 12, p. 111 614, 2019.

[23] Yuval Filmus and Ferdinand Ihringer, "Boolean degree 1 functions on some classical association schemes," *Journal of Combinatorial Theory, Series A*, vol. 162, pp. 241–270, 2019.

[24] Yuval Filmus and Elchanan Mossel, "Harmonicity and invariance on slices of the Boolean cube," *Probability Theory and Related Fields*, vol. 175, no. 3–4, pp. 721–782, 2019.

[25] Yuval Filmus, Hamed Hatami, Yaqiao Li, and Suzin You, "Information complexity of the AND function in the two-party and multi-party settings," *Algorithmica*, vol. 81, no. 11–12, pp. 4200–4237, 2019.

[26] Yuval Filmus, "More complete intersection theorems," *Discrete Mathematics*, vol. 342, no. 1, pp. 128–142, Jan. 2019.

[27] Yuval Dagan, Yuval Filmus, Ariel Gabizon, and Shay Moran, "Twenty (short) questions," *Combinatorica*, vol. 39, no. 3, pp. 597–626, 2019.

[28] Yuval Filmus, "FKN theorem for the multislice, with applications," *Combinatorics, Probability and Counting*, vol. 29, no. 2, pp. 200–212, 2020. DOI: 10.1017/S0963548319000361.

[29] Edinah K. Gnang and Yuval Filmus, "On the Bhattacharya–Mesner rank of third order hypermatrices," *Linear Algebra and its Applications*, vol. 588, pp. 391–418, 2020.

[30] Niv Buchbinder, Moran Feldman, Yuval Filmus, and Mohit Garg, "Online submodular maximization: Beating 1/2 made simple," *Mathematical Programming*, vol. 183, pp. 149–169, 2020.

[31] Yuval Filmus, Yasushi Kawase, Yusuke Kobayashi, and Yutaro Yamaguchi, "Tight approximation for unconstrained XOS maximization," *Mathematics of Operations Research*, Accepted.

Conference Publications

[32] Allan Borodin, Yuval Filmus, and Joel Oren, "Threshold models for competitive influence in social networks," in *Proceedings of the 6th Workshop on Internet and Network Economics (WINE 2010)*, 2010, pp. 539–550.

[33] Yuval Filmus, Toniann Pitassi, and Rahul Santhanam, "Exponential lower bounds for AC^0-Frege imply superpolynomial Frege lower bounds," in *Proceedings of the 38th International Colloquium on Automata, Languages and Programming (ICALP 2011)*, 2011, pp. 618–629.

[34] Yuval Filmus and Justin Ward, "A tight combinatorial algorithm for submodular maximization subject to a matroid constraint," in *Proceedings of the 53rd Annual IEEE Symposium on Foundations of Computer Science (FOCS 2012)*, 2012, pp. 659–668.

[35] Philip Bohannon, Nilesh Dalvi, Yuval Filmus, Nori Jacoby, Sathiya Keerthi, and Alok Kirpal, "Automatic web-scale information extraction," in *Proceedings of the 2012 ACM SIGMOD International Conference on Management of Data*, 2012, pp. 609–612.

[36] Yuval Filmus and Justin Ward, "Maximum coverage over a matroid," in *Proceedings of the 29th Symposium on Theoretical Aspects of Computer Science (STACS 2012)*, 2012, pp. 601–612.

[37] Yuval Filmus, Massimo Lauria, Jakob Nordström, Neil Thapen, and Noga Ron-Zewi, "Space complexity in polynomial calculus," in *Proceedings of the 27th Annual Conference on Computational Complexity (CCC 2012)*, 2012, pp. 334–344.

[38] Yuval Filmus, Toniann Pitassi, Robert Robere, and Stephen A. Cook, "Average case lower bounds for monotone switching networks," in *Proceedings of the 54th Annual Symposium on Foundations of Computer Science (FOCS 2013)*, 2013, pp. 598–607.

[39] Craig Boutilier, Yuval Filmus, and Joel Oren, "Efficient vote elicitation under candidate uncertainty," in *Proceedings of the 23rd International Joint Conference on Artificial Intelligence (IJCAI 2013)*, 2013, pp. 309–316.

[40] Yuval Filmus, Massimo Lauria, Mladen Mikša, Jakob Nordström, and Marc Vinyals, "Towards an understanding of Polynomial Calculus: New separations and lower bounds," in *Automata, Languages, and Programming*, ser. Lecture Notes in Computer Science, vol. 7965, Springer Berlin Heidelberg, 2013, pp. 437–448.

[41] Yuval Filmus and Joel Oren, "Efficient voting via the top-k elicitation scheme: A probabilistic approach," in *Proceedings of the 15th ACM conference on Economics and Computation (EC 2014)*, 2014, pp. 295–312.

[42] Yuval Filmus, Massimo Lauria, Mladen Mikša, Jakob Nordström, and Marc Vinyals, "From small space to small width in resolution," in *Proceedings of the 31st Symposium on Theoretical Aspects of Computer Science (STACS 2014)*, Ernst W. Mayr and Natacha Portier, Eds., ser. Leibniz International Proceedings in Informatics (LIPIcs), vol. 25, Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2014, pp. 300–311.

[43] Andris Ambainis, Yuval Filmus, and François Le Gall, "Fast matrix multiplication: Limitations of the Coppersmith–Winograd method," in *Proceedings of the 47th Annual Symposium on the Theory of Computing (STOC 2015)*, 2015, pp. 585–593.

[44] Yoram Bachrach, Yuval Filmus, Joel Oren, and Yair Zick, "A characterization of voting power for discrete weight distributions," in *Proceedings of the 26th International Joint Conference on Artificial Intelligence (IJCAI 2016)*, 2016.

[45] Yoram Bachrach, Yuval Filmus, Joel Oren, and Yair Zick, "Analyzing power in weighted voting games with super-increasing weights," in *Proceedings of the 9th International Symposium on Algorithmic Game Theory (SAGT 2016)*, 2016.

[46] Yuval Filmus and Elchanan Mossel, "Harmonicity and invariance on slices of the Boolean cube," in *31st Conference on Computational Complexity (CCC 2016)*, Ran Raz, Ed., ser. Leibniz International Proceedings in Informatics (LIPIcs), vol. 50, Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2016, 16:1–16:13, ISBN: 978-3-95977-008-8.

[47] Yuval Filmus, Guy Kindler, Elchanan Mossel, and Karl Wimmer, "Invariance principle on the slice," in *31st Conference on Computational Complexity (CCC 2016)*, Ran Raz, Ed., ser. Leibniz International Proceedings in Informatics (LIPIcs), vol. 50, Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2016, 15:1–15:10, ISBN: 978-3-95977-008-8.

[48] Yuval Filmus, Pavel Hrubeš, and Massimo Lauria, "Semantic versus syntactic cutting planes," in *33rd Symposium on Theoretical Aspects of Computer Science (STACS 2016)*, Nicolas Ollinger and Heribert Vollmer, Eds., ser. Leibniz International Proceedings in Informatics (LIPIcs), vol. 47, Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum fuer Informatik, 2016, 35:1–35:13, ISBN: 978-3-95977-001-9.

[49] Yuval Filmus, Hamed Hatami, Yaqiao Li, and Suzin You, "Information complexity of the AND function in the two-party and multi-party settings," in *23rd annual international computing and combinatorics conference (COCOON'17)*, 2017.

[50] Yuval Dagan, Yuval Filmus, Hamed Hatami, and Yaqiao Li, "Trading information complexity for error," in *32nd Conference on Computational Complexity (CCC 2017)*, 2017.

[51] Yuval Dagan, Yuval Filmus, Ariel Gabizon, and Shay Moran, "Twenty (simple) questions," in *49th ACM Symposium on Theory of Computing (STOC 2017)*, 2017.

[52] Yotam Dikstein, Irit Dinur, Yuval Filmus, and Prahladh Harsha, "Boolean function analysis on high-dimensional expanders," in *22nd International Conference on Randomization and Computation (RANDOM'2018)*, 2018.

[53] Yuval Filmus, Ryan O'Donnell, and Xinyu Wu, "A log-Sobolev inequality for the multislice, with applications," in *Proceedings of the 10th Innovations in Theoretical Computer Science conference (ITCS'19)*, 2019.

[54] Irit Dinur, Yuval Filmus, and Prahladh Harsha, "Analyzing boolean functions on the biased hypercube via higher-dimensional agreement tests," in *ACM-SIAM Symposium on Discrete Algorithms (SODA19)*, 2019.

[55] Yuval Filmus, Lianna Hambardzumyan, Hamed Hatami, Pooya Hatami, and David Zuckerman, "Biasing Boolean functions and collective coin-flipping protocols over arbitrary product distributions," in *46th International Colloquium on Automata, Languages and Programming (ICALP'19)*, 2019.

[56] Niv Buchbinder, Moran Feldman, Yuval Filmus, and Mohit Garg, "Online submodular maximization: Beating 1/2 made simple," in *20th Conference on Integer Programming and Combinatorial Optimization (IPCO'19)*, 2019.

[57] Arkadev Chattopadhyay, Yuval Filmus, Sajin Koroth, Or Meir, and Toniann Pitassi, "Query-to-communication lifting for BPP using inner product," in *46th International Colloquium on Automata, Languages and Programming (ICALP'19)*, 2019.

[58] Yuval Filmus, Noam Lifshitz, Dor Minzer, and Elchanan Mossel, "AND testing and robust judgement aggregation," in *52nd ACM Symposium on Theory of Computing (STOC'20)*, 2020.

[59] Yuval Filmus, Yuval Ishai, Avi Kaplan, and Guy Kindler, "Limits of Preprocessing," in *35th Computational Complexity Conference (CCC 2020)*, Shubhangi Saraf, Ed., ser. Leibniz International Proceedings in Informatics (LIPIcs), vol. 169, Dagstuhl, Germany: Schloss Dagstuhl–Leibniz-Zentrum für Informatik, 2020, 17:1–17:22, ISBN: 978-3-95977-156-6. DOI: `10.4230/LIPIcs.CCC.2020.17`. [Online]. Available: `https://drops.dagstuhl.de/opus/volltexte/2020/12569`.

[60] Yuval Filmus, Meena Mahajan, Gaurav Sood, and Marc Vinyals, "MaxSAT resolution and subcube sums," in *23nd International Conference on Theory and Applications of Satisfiability Testing (SAT'20)*, 2020.