Name: **Tali Kaufman.**
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Current Position:

- 2015-present   Associate Professor with tenure, Computer Science Department, Bar-Ilan University, Israel.

Previous Positions:

- 2017-2018   Fellow at the IIAS (Israel Institute for Advanced Study) and a co-organizer (with Alex Lubotzky) of a yearly program on "Computational, Geometric and Topological Aspects of High Dimensional Combinatorics", Jerusalem, Israel.
- 2010-2015   Senior Lecturer, Computer Science Department, Bar-Ilan University, Israel.
- 2009   Postdoctoral fellow, Weizmann Institute of Science, Israel.
- 2007-2008   Postdoctoral fellow, Institute for Advanced Study, Princeton NJ, USA.
- 2006-2007   Postdoctoral fellow, Massachusetts Institute of Technology (MIT), Cambridge MA, USA.

Education:

- 2002-2006   Ph.D. Computer Science (summa cum laude), Tel Aviv University; Supervisors: Prof. Noga Alon and Prof. Michael Krivelevich
- 1998-2001   M.SC. Computer Science (summa cum laude), Tel Aviv University; Supervisor: Prof. Amos Fiat
- 1994-1998   B.Sc. Mathematics and Computer Science (summa cum laude), Tel Aviv University (while in military service).

Research Interests:

Expanders and high dimensional expanders, Sub-linear Algorithms and Property Testing, Coding Theory, Graph Theory, Randomness in Computation, Approximation Algorithms, Combinatorics and Additive Combinatorics, Complexity Theory.

Garnts:

- 2021-2024   ISF grant 800,000 Shekels.
- 2014-2020   ERC starting grant 1,302,000 Euros.
- 2013-2019   BSF grant $100,000, with Shachar Lovett.
- 2011-2014   IRG grant 100,000 Euros.
- 2007-2009   NSF grant with Shafi Goldwasser $300,000.

Selected Recent Honors and Awards:

- 2022   Invited Speaker at the International Congress of Mathematics (ICM) 2022.
- 2021   The Bourbaki Seminar at the Institut Henri Poincaré in Paris held a talk about my work.
- 2019   Plenary speaker at FOCS conference 2019.
- 2016,2017   Plenary speaker at Simons Institute prestigious annual event.
- 2016   Delivered world-wide TCS+ seminar.
- 2013   Ranked first (out of 120) in Europe among the recipients of the 2013 ERC starting grant in "Physical Sciences and Engineering".
- 2010   Alon Fellowship for young researchers. Awarded by the Israel Budget and Plenary Committee.
- 2008   Koshtland Fellowship for postdoctoral studies. Awarded by the Weizmann Institute of Science.
- 2005   Fulbright Fellowship for postdoctoral studies. Awarded by Fulbright Foundation.

Supervision of Graduate Students and Postdoctoral Fellows

- Msc Students: Omer Gold (joint with Reuven Cohen, Graduated 2014), Yoav Asharov (Graduated 2016), Dudi Mass (Graduated 2016), Roy Gotlib (Graduated 2019), Ella Shar (Graduated 2021), Eyal Karni (Graduated 2021), Omri Gotlib, Shai Kadria.
- Phd Students: Dudi Mass, Roy Gotlib.
- Postdocs: Konstantin Golubev.

Selected organisational activities: a special year, schools, conferences , program committees

- 2023-Forthcoming   Co-organiser Simons Institute (Berkeley) Summer Program on "Theory of boolean functions and high dimensional expanders".
- 2021   FOCS Program committee member.
- 2017-2018   Co-organised (with Alex Lubotzky) a special year on "Computational, Geometric and Topological aspects of High Dimensional Combinatorics" at the Israel Institute for Advance Study (IIAS).
- 2018   Co-organized (with Alex Lubotzky) a conference "Computational, Geometric and Topological aspects of High Dimensional Combinatorics".
- 2017   Organized a winter school "On interlacing polynomials, high dimensional expanders and representation theory"
- 2016   Co-organized (with Irit Dinur) a summer school: "On high dimensional expanders, PCPs and Inverse theorems".
- 2016   Co-organized (with Joseph Bernstien) an inter universities weekly seminar on "High dimensional expanders codes and lattices".
- 2013   FOCS Program committee member.
- 2013   STOC Program committee member.

Selected Recent Invited Presentations and Plenary Talks:

- 2022   Invited Speaker at the International Congress of Mathematics (ICM) 2022.
- 2019   Invited **Plenary speaker** at the conference in the theory of computation - FOCS 2019, Baltimore, USA.
- 2018   Invited **Plenary talk**, Oberwolfach meeting on complexity theory, Germany.
- 2017   Invited talk, Israel Mathematical Union conference (IMU), Israel.
- 2017   Invited talk, Simons workshop on Expanders and Extractors, USA.
- 2016   Invited **Plenary talk**, Simons Collaboration Annual Meeting, USA.
- 2016   Invited **Plenary talk**, world-wide seminar TCS+ (feature most important results in TCS).

Selected Publications

1. Noga Alon, Tali Kaufman, Michael Krivelevich, Simon Litsyn and Dana Ron. Testing Low Degree Polynomials Over GF(2). *IEEE Transactions on Information Theory*,51(11), 4032-4039, 2005.
   This work introduced, independently from Gowers, the notion which beame to be known as the Gower Norms. This work provided non-trivial bounds on this norm, and applied them to obtain testability of Reed Muller codes.

2. Tali Kaufman and Madhu Sudan. Algebraic Property Testing: The Role of Invariance. *STOC 2008.*
   This work introduced the role of symmetry in the study of locally testable codes. The work explained the testability of many known LTCs, and the work implied many new such codes.

3. Tali Kaufman and Shachar Lovett. Worst Case to Average Case Reductions for Polynomials. *FOCS 2008.*
   This work showed that a polynomial whose values are not equidistributed in the field can be expressed by few lower degree polynomials. This work solves an important open question raised by Green and Tao. This work was used by Tao and Ziegler in their seminal work settling the Gowers Inverse Conjecture over finite fields.

4. Tali Kaufman and Shachar Lovett. List Size vs. Decoding Radius for Reed-Muller Codes. *IEEE Transactions on Information Theory* 58(5): 2689-2696 (2012).
   This work resolves a 30 year old open problem about the weight distribution and list decoding size of Reed-Muller codes.

5. Tali Kaufman and Alexander Lubotzky: *Edge transitive ramanujan graphs and symmetric LDPC good codes*, Proceedings of the 44th ACM Symposium on Theory of Computing (STOC), 2012: 359-366.
   This work constructs the first good explicit symmetric codes. The constructed codes are LDPCs. This settles, in contrast to prevailing opinion, the open question about the existence of such codes.

6. Tali Kaufman, David Kazhdan and Alexander Lubotzky, Ramanujan Complexes and bounded degree topological expanders, FOCS, 2014, 484–493.
   This work shows that bounded degree co-systolic expanders exists in dimension two; Thus answering a famous open problem of Gromov that was open more than 10 years.

7. Tali Kaufman and Alexander Lubotzky, *High Dimensional Expanders and Property Testing*, ITCS 2014, 501-506.
   This work introduces the connection between high dimensional expanders to local testability that is a central notion in the theory of computation.

8. Shai Evra and Tali Kaufman, *Bounded degree cosystolic expanders of every dimension*, STOC 2016: 36-48.
   This work shows that bounded degree co-systolic expanders exists in every dimension; Thus answering a famous open problem of Gromov that was open more than 10 years.

9. Irit Dinur and Tali Kaufman, Agreement expansion from high dimensional expanders, FOCS, 2017.
   This work provides linear de-randomization to direct product tests. The existence of such de-randomization was an open problem in theory, with some relation to the major open problem about the existence of linear PCPs.

10. Tali Kaufman and Izhar Oppenhaim, *New construction of bounded degree high dimensional expanders*, STOC 2018, 773–786 .
    This work provides the first elementary construction of high dimensional expanders, the only previous known constructions were based on deep number theory and representation theory.

11. Tali Kaufman and Izhar Oppenhaim, *High Order random walks: Beyond spectral gap*, COMBINATORICA, 2018. *This work provided strong bounds for high dimensional random walks that were crucial in recent breakthrough works, e.g. in counting bases of matroids- this question was open more than 20 years and found resolution via our high order random walks result.*

12. Shai Evra, Tali Kaufman and Gilles Zemor, *Decodable quantum LDPC codes beyond the square root distance barrier using high dimensional expanders*, FOCS, 2020, 218–227. *This work breaks the 20 years distance record on quatum LDPC codes of Freedman et. al. using high dimensional expanders. Not only improving on the distance of such codes, but also providing codes which are effceintly decodable. Imporantly, this work made the first relation between construction of high distance quantum LDPC codes via local testability of classical codes, using the lens of high dimensional expansion.*

Surveys written about my work:

1. Madhu Sudan. Testing Linear Properties: Some General Themes. *SIGACT News, Complexity Theory Column*, 42(1):59-80, 2011.

2. Madhu Sudan. Invariance in Property Testing. *Property Testing: Current Research and Surveys*, Lecture Notes in Computer Science, volume 6390, pages 211-227, Springer, 2010.