Resume

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Daniella Bar-Lev

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Academic Degrees

2020 - 2024 **Ph.D. Computer Science,** Technion – Israel Institute of Technology

- Thesis: "Theory and Practice of DNA Storage".
- Advisors: Prof. Tuvi Etzion and Prof. Eitan Yaakobi.
- Received on September 2024.

2019 - 2020 **M.Sc. Computer Science,** Technion – Israel Institute of Technology

- Advisors: Prof. Tuvi Etzion and Prof. Eitan Yaakobi.
- Granted as part of the direct PhD track.

2014 - 2019 **B.Sc. in Computer Science and B.Sc. in Mathematics,** Technion – Israel Institute of Technology

- Magna cum laude.
- Scholar at the Lapidim CS Excellence Program.

Professional Experience

Jan 2026 - Present **Postdoctoral Research Scholar** Universität Zürich (UZH)

2025 (Jan–Dec) **Postdoctoral Research Scholar** University of California at San Diego

2024 (Aug–Dec) **Postdoctoral Fellow** Technion – Israel Institute of Technology

Summer 2022 **Research Intern (Summer Internship),** Pinecone

- Designing and developing methods to remove elements from graph index while maintaining information retrieval quality.

Summer 2020 **Research Intern (Summer Internship),** VAST Data

- Researching methods for float data compression.
- Designing a compression tool for float data that competes with existing compressors.

2016 - 2018 **Intern Software Engineer,** ScaleIO EMC (Dell)

- Developing features as part of the core product.

Military Service

2013-2014 **Medical corps -** Volunteered as a project manager during exemption from mandatory military service.

2012-2013 **Intelligence corps -** 8200.

Research Interests

Coding Theory, DNA Storage, Algorithms, Combinatorial Structures.

Teaching

Logic and Set Theory, Head Lecturer, Undergraduate	*Reichman University*
Coding Theory, Head Lecturer, Graduate	*Reichman University*
Computational Models, TA, Undergraduate	*Reichman University*
Coding and Algorithms for Memories, Head TA, Graduate	*Technion – Israel Institute of Technology*
Combinatorics, Head TA, Undergraduate	*Technion – Israel Institute of Technology*
C language Programming, TA, Undergraduate	*Technion – Israel Institute of Technology*

Academic Professional Activities

Guest Editor, IEEE Transactions on Molecular, Biological, and Multi-Scale Communications

- *Special Issue on Molecular Systems for Digital Information: Storage, Computation, and Cryptography.*

Reviewer, journals:

- IEEE Transactions on Information Theory.
- Journal of Combinatorial Theory, Series A.
- Nature Communications.
- Designs, Codes and Cryptography.
- IEEE Journal on Selected Areas in Information Theory.

Reviewer, conferences:

- IEEE International Symposium on Information Theory (ISIT), annually 2021–2025.
- IEEE International Symposium on Information Theory and Its Applications (ISITA), 2024.
- IEEE Information Theory Workshop (ITW), 2022, 2024.

Membership in Professional Societies

Student Member, IEEE Membership.
Student Member, IEEE Information Theory Society Membership.
Member, DNA Storage Alliance.

Fellowships, Awards and Honors

2026	**Feder Family Prize** for Outstanding Research in the Field of Communication Technologies – 1st Place.
2024	**Excellence Scholarship-** Spring Semester; Issued by the Computer Science Department, Technion – Israel Institute of Technology.
2024	**VATAT Scholarship for Outstanding Postdoctoral Women Students.**
2024	**Fulbright Postdoctoral Fellowship** (awarded and declined by Daniella Bar-Lev).
2024	**The Eric and Wendy Schmidt Postdoctoral Award for Women in Mathematical and Computing Sciences-** in funding of Schmidt Sciences.
2024	**Excellence Scholarship-** Winter Semester; Issued by the Computer Science Department, Technion – Israel Institute of Technology.
2023	**Student Research Prize for Cross-PI Collaboration in Data Science-** in funding of VATAT.
2023	**Excellence Scholarship-** Spring Semester; Issued by the Computer Science Department, Technion – Israel Institute of Technology.
2023	**Best Poster Award-** for the poster "Accelerated Clustering and Alignment of Nanopore Signals"; Issued by London Calling 2023 - Oxford Nanopore Technologies.
2023	**Blavatnik Prize for Outstanding Israeli Ph.D. Students in Computer Science.**
2023	**Excellence Scholarship-** Winter Semester; Issued by the Computer Science Department, Technion – Israel Institute of Technology.
2022	**Gutwirth Excellence Scholarship.**
2022	**Student Research Prize for Cross-PI Collaboration in Data Science-** in funding of VATAT.
2022	**Research Grant for Collaborative Projects Led by Research Students-** in funding of the Gelman Lazar fund.
2022	**Best Paper Award-** for the paper "Codes for Constrained Periodicity"; Issued by the International Symposium on Information Theory and Its Applications (ISITA).
2022	**Excellence Scholarship-** Spring Semester; Issued by the Computer Science Department, Technion – Israel Institute of Technology.
2022	**Excellence Scholarship-** Winter Semester; Issued by the Computer Science Department, Technion – Israel Institute of Technology.
2021	**Faculty Persistent Excellent Teaching Assistant Award -** Spring Semester.
2021	**Excellent Teaching Assistant Award-** Winter Semester.
2020	**The Fine Certificate of Excellence-** Winter Semester.
2019	**Best Project Award-** Networked Software Systems Lab, Electrical Engineering Department, Technion. The award was given to 5 out of 70 projects during undergraduate studies.
2015-2019	**Lapidim CS Excellence Program-** Undergraduate.

Publications

Journals:

Published papers:

[1] **D. Bar-Lev**, O. Sabary, and E. Yaakobi. "Exciting Coding Problems for DNA-Based Storage Systems," *Notices of the American Mathematical Society*, December 2022. doi:10.1090/noti2576.

[2] **D. Bar-Lev**, T. Etzion, and E. Yaakobi. "On the Size of Balls and Anticodes of Small Diameter under the Fixed-Length Levenshtein Metric," *IEEE Transactions on Information Theory*, vol. 69, no. 4, pp. 2324-2340, April 2023. doi: 10.1109/TIT.2022.3227128.

[3] Y. Yehezkeally, **D. Bar-Lev**, S. Marcovich, and E. Yaakobi. "Generalized Unique Reconstruction from Substrings," *IEEE Transactions on Information Theory*, vol. 69, no. 9, pp. 5648-5659, September 2023. doi: 10.1109/TIT.2023.3269124.

[4] **D. Bar-Lev**, S. Marcovich, E. Yaakobi, and Y. Yehezkeally. "Adversarial Torn-Paper Codes," *IEEE Transactions on Information Theory*, vol. 69, no. 10, pp. 6414-6427, October 2023. doi: 10.1109/TIT.2023.3292895.

[5] Y. Nogin, **D. Bar-Lev**, D. Hanania, T. Detinis Zur, Y. Ebenstein, E. Yaakobi, N. Weinberger, and Y. Shechtman. "Design of Optimal Labeling Patterns for Optical Genome Mapping via Information Theory," *Bioinformatics*, vol. 39, no. 10, October 2023. doi: 10.1093/bioinformatics/btad601.

[6] **D. Bar-Lev**, O. Sabary, and E. Yaakobi. "The Zettabyte Era is in Our DNA," *Nature Computational Science*, vol. 4, pp. 813-817, November 2024. doi: 10.1038/s43588-024-00717-1.

[7] **D. Bar-Lev**, O. Sabary, R. Gabrys, and E. Yaakobi. "Cover Your Bases: How to Minimize the Sequencing Coverage in DNA Storage Systems," *IEEE Transactions on Information Theory*, vol. 71, no. 1, pp. 192-218, January 2025. doi: 10.1109/TIT.2024.3496587.

[8] **D. Bar-Lev**, I. Orr, O. Sabary, T. Etzion, and E. Yaakobi "Scalable and robust DNA-based storage via coding theory and deep learning," *Nature Machine Intelligence*, vol. 7, pp. 639–649, February 2025. doi: 10.1038/s42256-025-01003-z.

[9] D. Hanania, **D. Bar-Lev**, Y. Nogin, and E. Yaakobi. "On the Capacity of DNA Labeling," *IEEE Transactions on Information Theory*, vol. 71, no. 5, pp. 3457-3472, May 2025, doi: 10.1109/TIT.2025.3545662.

[10] A. Boruchovsky, **D. Bar-Lev**, and E. Yaakobi. "DNA-Correcting Codes: End-to-end Correction in DNA Storage Systems," *IEEE Transactions on Information Theory*, vol. 71, no. 6, pp. 4214-4227, June 2025, doi: 10.1109/TIT.2025.3559684.

[11] S. Singhvi, O. Sabary, **D. Bar-Lev**, and E. Yaakobi. "Conditional Entropies of k-Deletion/Insertion Channels," *IEEE Transactions on Information Theory*, vol. 71, no. 9, pp. 6503-6516, Sept. 2025, doi: 10.1109/TIT.2025.3581849.

[12] A. Gruica, **D. Bar-Lev**, A. Ravagnani, and E. Yaakobi. "A Combinatorial Perspective on Random Access Efficiency for DNA Storage," *IEEE Transactions on Information Theory*, vol. 71, no. 12, pp. 9395-9412, Dec. 2025, doi: 10.1109/TIT.2025.3623202.

[13] A. Kobovich, O. Leitersdorf, **D. Bar-Lev**, and E. Yaakobi. "Universal Framework for Parametric Constrained Coding," to appear at *IEEE Transactions on Information Theory*.

Submitted papers:

[14] O. Sabary, **D. Bar-Lev**, Y. Gershon, A. Yucovich, and E. Yaakobi. "On The Decoding Error Weight of One or Two Deletion Channels," submitted to *Designs, Codes and Cryptography*.

In preparation (for a journal submission):

[15] O. Sabary, **D. Bar-Lev**, I. Orr, T. Etzion, and E. Yaakobi. "DNA Datasets for the Development of DNA-Based Storage Systems".

[16] **D. Bar-Lev**, T. Etzion, E. Yaakobi, and Z. Yakhini. "Representing Information on DNA using Patterns Induced by Enzymatic Labeling".

[17] **D. Bar-Lev**, R. Rak, P. H. Siegel, and Z. Yakhini. "Secure Shamir Secret Sharing in DNA using a CRISPR-Cas Protocol".

[18] A. Tan, O. Limor, S. S. Berrebi, **D. Bar-Lev**, E. Yaakobi, R. Gabrys, Z. Yakhini, and P. H. Siegel. "The Labeled Coupon Collector Problem".

[19] **D. Bar-Lev**. "Optimal Almost-Balanced Sequences".

Peer reviewed conference proceedings:

[20] **D. Bar-Lev**, T. Etzion, and E. Yaakobi. "On Levenshtein Balls with Radius One," *IEEE International Symposium on Information Theory (ISIT)*, Melbourne, Australia, 12-20 July 2021 (virtual). doi: 10.1109/ISIT45174.2021.9517922. (Contained in [2]).

[21] **D. Bar-Lev**, Y. Gershon, O. Sabary, and E. Yaakobi. "Decoding for Optimal Expected Normalized Distance over the t-Deletion Channel," *IEEE International Symposium on Information Theory (ISIT)*, Melbourne, Australia, 12-20 July 2021 (virtual). doi: 10.1109/ISIT45174.2021.9517773. (Contained in [14]).

[22] **D. Bar-Lev**, O. Sabary, Y. Gershon, and E. Yaakobi. "The Intersection of Insertion and Deletion Balls," *IEEE Information Theory Workshop (ITW)*, Kanazawa, Japan, 17-21 October 2021 (virtual). doi: 10.1109/ITW48936.2021.9611515.

[23] **D. Bar-Lev**, S. Marcovich, E. Yaakobi, Y. Yehezkeally. "Adversarial Torn-Paper Codes," *IEEE International Symposium on Information Theory (ISIT)*, Espoo, Finland, June 26-July 1, 2022. doi: 10.1109/ISIT50566.2022.9834766. (Contained in [4]).

[24] Y. Yehezkeally, **D. Bar-Lev**, S. Marcovich, and E. Yaakobi. "Reconstruction from Substrings with Partial Overlap," *IEEE International Symposium on Information Theory and its Applications (ISITA)*, Tsukuba, Japan, 17-19 October 2022. doi: 10.48550/arXiv.2205.03933. (Contained in [3]).

[25] A. Kobovich, O. Leitersdorf, **D. Bar-Lev**, and E. Yaakobi. "Codes for Constrained Periodicity," *IEEE International Symposium on Information Theory and its Applications (ISITA)*, Tsukuba, Japan, 17-19 October 2022. doi: 10.48550/arXiv.2205.03911. **Best Paper Award**. (Contained in [13]).

[26] S. Singhvi, O. Sabary, **D. Bar-Lev**, and E. Yaakobi. "The Input and Output Entropies of the k-Deletion/Insertion Channel with Small Radii," *IEEE Information Theory Workshop (ITW)*, Mumbai, India, 6-9 November 2022. doi: 10.1109/ITW54588.2022.9965878. (Contained in [11]).

[27] **D. Bar-Lev**, O. Sabary, R. Gabrys, and E. Yaakobi. "Cover Your Bases: How to Minimize the Sequencing Coverage in DNA Storage Systems," *IEEE International Symposium on Information Theory (ISIT)*, Taipei, Taiwan, 25-30 June 2023. doi: 10.1109/ISIT54713.2023.10206882. (Contained in [7]).

[28] **D. Bar-Lev**, A. Mizrahi, T. Etzion, O. Rottenstreich, and E. Yaakobi. "Codes for IBLTs with Listing Guarantees," *IEEE International Symposium on Information Theory (ISIT)*, Taipei, Taiwan, 25-30 June 2023. doi: 10.1109/ISIT54713.2023.10206563.

[29] D. Hanania, **D. Bar-Lev**, Y. Nogin, and E. Yaakobi. "On the Capacity of DNA Labeling," *IEEE International Symposium on Information Theory (ISIT)*, Taipei, Taiwan, 25-30 June 2023. doi: 10.1109/ISIT54713.2023.10206769. (Contained in [9])

[30] A. Boruchovsky, **D. Bar-Lev**, and E. Yaakobi. "DNA Correcting Codes: End-to-end Correction in DNA Storage Systems," *IEEE International Symposium on Information Theory (ISIT)*, Taipei, Taiwan, 25-30 June 2023. doi: 10.1109/ISIT54713.2023.10206536. (Contained in [10])

[31] A. Mizrahi, **D. Bar-Lev**, E. Yaakobi, and O. Rottenstreich. "Invertible Bloom Look-Up Tables with Listing Guarantees," *ACM SIGMETRICS*, Venice, Italy 10-14 June, 2024. doi: 10.1145/3626792.

[32] A. Gruica, **D. Bar-Lev**, A. Ravagnani, and E. Yaakobi. "A Combinatorial Perspective on Random Access Efficiency for DNA Storage," *IEEE International Symposium on Information Theory (ISIT)*, Athens, Greece, 7-12 July 2024. doi: 10.1109/ISIT57864.2024.10619151. (Contained in [12])

[33] **D. Bar-Lev**, A. Kobovich, O. Leitersdorf, and E. Yaakobi. "Optimal Almost-Balanced Sequences," *IEEE International Symposium on Information Theory (ISIT)*, Athens, Greece, 7-12 July 2024. doi: 10.1109/ISIT57864.2024.10619424. (Contained in [19])

[34] A. Kobovich, O. Leitersdorf, **D. Bar-Lev**, and E. Yaakobi. "Universal Framework for Parametric Constrained Coding," *IEEE International Symposium on Information Theory (ISIT)*, Athens, Greece, 7-12 July 2024. doi: 10.1109/ISIT57864.2024.10619700. (Contained in [13]).

[35] **D. Bar-Lev**, T. Etzion, E. Yaakobi, and Z. Yakhini. "Representing Information on DNA using Patterns Induced by Enzymatic Labeling," *IEEE International Symposium on Information Theory (ISIT)*, Athens, Greece, 7-12 July 2024. doi: 10.1109/ISIT57864.2024.10619227. (Contained in [16]).

[36] **D. Bar-Lev** and M. Shlizerman. "A Single-Bit Redundancy Framework for Multi-Dimensional Parametric Constraints," *IEEE International Symposium on Information Theory (ISIT)*, Ann Arbor, Michigan, USA, 22-27 June 2025.

[37] A. Tan, O. Limor, **D. Bar-Lev**, R. Gabrys, Z. Yakhini, and P. H. Siegel. "The Labeled Coupon Collector Problem", *IEEE Information Theory Workshop (ITW)*, Sydney, Australia, September 29 – October 3, 2025. (Contained in [18]).

Conferences

Plenary, keynote or invited talks:

[38] **D. Bar-Lev**, O. Sabary, and E. Yaakobi. "Coding and Algorithms for DNA Storage Systems," **tutorial**, *IEEE International Symposium on Information Theory (ISIT)*, Taipei, Taiwan, 25-30 June, 2023. (3 hours tutorial).

[39] **D. Bar-Lev**, "Universal Framework for Parametric Constrained Coding," (15 minutes talk, considered as plenary in the workshop website), *ISIT2024 Satellite Workshop about Coding Theory and Algorithms for DNA-based Data Storage*, Athens, Greece, 7-12 July, 2024.

[40] **D. Bar-Lev**. "The Coded Coupons Collector's Problem," **invited talk**, *2026 International Zurich Seminar on Information and Communication*, Zurich, Switzerland, 25–27 February 2026.

Contributed Talks and Posters :

[40] **D. Bar-Lev**. "Adversarial Torn-paper Codes," oral presentation, *The 1st International Conference in Data Storage in Molecular Media*, Marburg, Germany, 21-23 March, 2022 (virtual). (Contained in [4]).

[41] **D. Bar-Lev**, R. Gabrys, I. Orr, O. Sabary, and E. Yaakobi. "Minimizing the Sequencing Coverage of DNA Storage Systems," accepted as a poster to *Munich Workshop on Coding and Cryptography*, Munich, Germany, 22-24 June, 2022. (Contained in [7]).

[42] **D. Bar-Lev**, O. Sabary, R. Gabrys, and E. Yaakobi. "Cover Your Bases: How to Minimize the Sequencing Coverage in DNA Storage Systems," accepted as a poster to *London Calling 2023 – Oxford Nanopore Technologies*, London, England, 17-19 May, 2023. (Contained in [7]).

[43] H. Abraham, O. Leitersdorf, **D. Bar-Lev**, O. Sabary, and E. Yaakobi. "Accelerated Clustering and Alignment of Nanopore Signals," accepted as a poster to *London Calling 2023 – Oxford Nanopore Technologies*, London, England, 17-19 May, 2023. **Best Poster Award**.

[44] **D. Bar-Lev**. "Scalable and Robust DNA-based Storage via Coding Theory and Deep Learning", oral presentation, *Dagstuhl Seminar 24511*, Dagstuhl, Germany, 15–20 December, 2024. (Contained in [8]).

[45] **D. Bar-Lev**. "Cover Your Bases: How to Minimize the Sequencing Coverage in DNA Storage Systems," oral presentation, *16th Annual Non-Volatile Memories Workshop*, Las Vegas, Nevada, USA, 1–2 March, 2025. (Contained in [7]).

[46] **D. Bar-Lev**. "Scalable and Robust DNA-based Storage via Coding Theory and Deep Learning", oral presentation, *16th Annual Non-Volatile Memories Workshop*, Las Vegas, Nevada, USA, 1–2 March, 2025. (Contained in [8]).