

Nir Weinberger – Resume

January 13, 2023

1 PERSONAL DETAILS

Full name: Nir Weinberger
Identity No.: 066646274
Date and place of birth: April 22, 1984, Israel.
Marital status: Married + 2 children.
Phone number: +972-52-4480568 (mobile).
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2 ACADEMIC DEGREES

2017 Ph.D. in Electrical Engineering, Technion – Israel Institute of Technology. GPA: 97/100.
2009 M.Sc. in Electrical Engineering, *summa cum laude*, Tel-Aviv University, Israel. GPA: 95/100.
2006 B.Sc. in Electrical Engineering, *summa cum laude*, Tel-Aviv University, Israel. GPA: 95/100.

3 ACADEMIC APPOINTMENTS

2020– Assistant Professor, Department of Electrical Engineering, Technion – Israel Institute of Technology.
2018–2020 Post-doctoral fellow, IDSS and LIDS, Massachusetts Institute of Technology, Massachusetts, USA.
Host: Prof. Guy Bresler.
2017–2018 Post-doctoral associate, School of Electrical Engineering, Tel-Aviv University, Israel.
Host: Prof. Ofer Shayevitz.

4 PROFESSIONAL EXPERIENCE

2006–2013 Algorithms Engineer, Technological Unit of the Intelligence Corps, IDF. Highest rank: Major. Design and simulation of algorithms for proprietary communication, detection and signal processing systems, under strict reliability requirements.
2005–2006 Junior Researcher, Ramot at Tel-Aviv University.
The Israeli Short Range Communication consortium project: A simulation of a universal decoding algorithm.

5 RESEARCH INTERESTS

• Statistical inference in high dimension and non-asymptotic regime • Statistical learning • Information theory • Analysis of Boolean functions

6 TEACHING EXPERIENCE

2016– Lecturer, Department of Electrical Engineering, Technion – Israel Institute of Technology:

1. **Analog Communication**, graduate level. Prepared and authored lectures monograph.
2. **Probability in High Dimension with Applications to Data Science**, graduate level. Initiated and prepared.
3. **Modern Communication Techniques**, graduate level. Authored lectures monograph.
4. **Introduction to Coding Theory**, graduate level.

2014–2018 Teaching assistant and lab instructor, Department of Electrical Engineering, Technion – Israel Institute of Technology:

1. **Modern Communication Techniques**, graduate level.
2. **DSP Speech Processing Laboratory Experiment**, undergraduate level.
3. **Analog Communication**, graduate level.
4. **Information Theory**, graduate level.

2006–2012 Teaching assistant, School of Electrical Engineering, Tel-Aviv University:

1. **Introduction to Error Control Coding**, graduate level.
2. **Communication Systems**, undergraduate level.
3. **Principles of Digital Communication**, graduate level.

7 DEPARTMENTAL ACTIVITIES

2021– A counselor for undergraduate students under improper academic standing

2020–2021 Faculty council secretary

8 PUBLIC PROFESSIONAL ACTIVITIES

2014–2022 Reviewer for IEEE Trans. Inform. Theory journal; ISIT, ITW, ISITA, DCC, ICC conferences, and a book (Springer)

9 MEMBERSHIP IN PROFESSIONAL SOCIETIES

2018–2022 Member, IEEE

2014–2017 Student Member, IEEE

10 FELLOWSHIPS, AWARDS AND HONORS

- 2018–2020 The MIT-Technion postdoctoral fellowship.
- 2018–2019 The Viterbi scholarship for nurturing future faculty members, Technion – Israel Institute of Technology.
- 2017 The Advanced Communication Center (ACC) Feder family award for outstanding research work in the field of communication technologies.
- 2016 One of 6 finalists for the best student paper award, ISIT 2016, for the paper "A Large Deviations Approach to Secure Lossy Compression".
- 2015 The Gutwirth scholarship for Ph.D. studies, Technion – Israel Institute of Technology.
- 2014 Shortlisted for the best student paper award, ISIT 2014, for the paper "Large Deviations Analysis of Variable-Rate Slepian-Wolf Coding".
- 2014 The Jacobs scholarship for Ph.D. studies, Technion – Israel Institute of Technology.
- 2013 The Fine scholarship for Ph.D. studies, Technion – Israel Institute of Technology.

11 GRADUATE STUDENTS

Completed M.Sc. theses

1. Tom Norman, August 2022 (secondary supervisor, with Dr. Kfir Y. Levy), "Robust Linear Regression for General Feature Distribution".
2. Amit Tsvieli, December 2022, "Learning Algorithms and Theory for Nearest Neighbor Channel Decoding".

M.Sc. theses in progress

3. Neria Uzan, expected graduation 2023, "Optimal Representation for Adversarial Statistical Inference Tasks".
4. Or Glassman, expected graduation 2023, (Joint supervision with Dr. Batya Kenig) "Compression of Relational Structured Data".
5. Shay Septon, expected graduation 2024, "Error Bounds for Learning Partition Rules in Regression".
6. Omer Cohen, expected graduation 2024, (Joint supervision with Prof. Ron Meir) "Statistical Analysis of Curriculum Learning".
7. Abeer Khwaled, *on leave for personal reasons*, "Learning High-Dimensional Regression via Convex Relaxations".

12 RESEARCH GRANTS

1. 2022-2026, the Israel Science Foundation (ISF), 760,000 NIS, 237,000 for equipment, and 38,000 NIS for international collaborations, "Theory and Learning Algorithms for Localized Regression," PI: N. Weinberger.

13 PUBLICATIONS

13.1 THESES

1. **N. Weinberger**, “Universal Decoding for Linear Gaussian Fading Channels”.
M.Sc. thesis, Tel-Aviv University, December 2008 (Supervisor: Prof. Meir Feder)
2. **N. Weinberger**, “Large Deviations Aspects in Coding Problems.”
Ph.D. thesis, Technion – Israel Institute of Technology, March 2017 (Advisor: Prof. Neri Merhav)

13.2 REFEREED PAPERS IN PROFESSIONAL JOURNALS

Published papers

1. **N. Weinberger** and N. Merhav, “Codeword or Noise? Exact Random Coding Exponents for Joint Detection and Decoding,” *IEEE Trans. Inform. Theory*, vol. 60, no. 9, pp. 5077–5094, September 2014.
2. **N. Weinberger** and N. Merhav, “Optimum Trade-offs Between the Error Exponent and the Excess-Rate Exponent of Variable-Rate Slepian-Wolf Coding,” *IEEE Trans. Inform. Theory*, vol. 61, no. 4, pp. 2165–2190, April 2015.
3. W. Huleihel, **N. Weinberger**, and N. Merhav, “Erasure/List Random Coding Error Exponents Are Not Universally Achievable,” *IEEE Trans. Inform. Theory*, vol. 62, no. 10, pp. 5403–5421, October 2016.
4. **N. Weinberger** and N. Merhav, “A Large Deviations Approach to Secure Lossy Compression,” *IEEE Trans. Inform. Theory*, vol. 63, no. 4, pp. 2533–2559, April 2017.
5. **N. Weinberger** and N. Merhav, “Lower Bounds on Parameter Modulation–Estimation Under Bandwidth Constraints,” *IEEE Trans. Inform. Theory*, vol. 63, no. 6, pp. 3854 – 3874, June 2017.
6. **N. Weinberger** and O. Shayevitz, “On the Optimal Boolean Function for Prediction Under Quadratic Loss,” *IEEE Trans. Inform. Theory*, vol. 63, no. 7, pp. 4202 – 4217, July 2017.
7. **N. Weinberger** and N. Merhav, “Simplified Erasure/List Decoding,” *IEEE Trans. Inform. Theory*, vol. 63, no. 7, pp. 4218 – 4239, July 2017.
8. **N. Weinberger** and N. Merhav, “Channel Detection in Coded Communication,” *IEEE Trans. Inform. Theory*, vol. 63, no. 10, pp. 6364 – 6392, October 2017.
9. S. Hu, **N. Weinberger**, and O. Shayevitz, “On the VC-Dimension of Binary Codes,” *SIAM Journal on Discrete Mathematics*, vol.32, no. 3, pp. 2161-2171, 2018.
10. **N. Weinberger** and O. Shayevitz, “Self-Predicting Boolean Functions,” *SIAM Journal on Discrete Mathematics*, vol. 33, no. 2, pp. 665-693, 2019.
11. R. Averbuch, **N. Weinberger**, N. Merhav, “Expurgated Bounds for the Asymmetric Broadcast Channel,” *IEEE Trans. Inform. Theory*, vol. 65, no. 2, pp. 3412 – 3435, June 2019.
12. **N. Weinberger**, Y. Kochman, “On the Reliability Function of Distributed Hypothesis Testing Under Optimal Detection,” *IEEE Trans. Inform. Theory*, vol. 65, no. 8, pp. 4940 – 4965, August 2019.
13. **N. Weinberger** and O. Shayevitz, “Guessing with a Bit of Help,” *Entropy*, vol. 22, no. 1, 2020.
14. R. Tamir (Averbuch), N. Merhav, **N. Weinberger** and A. G. i Fàbregas, “Large Deviations Behavior of the Logarithmic Error Probability of Random Codes,” *IEEE Trans. Inform. Theory*, vol. 66, no. 11, pp. 6635–6659, November 2020.

15. **N. Weinberger** and M. Feder, "The k -vectors Algorithm: An Alternating Minimization Algorithm for Learning Regression", *IEEE Trans. Inform. Theory*, vol. 66, no. 11, pp. 7196-7221, November 2020.
16. **N. Weinberger**, "Generalization Bounds and Algorithms for Learning to Communicate over Additive Noise Channels," *IEEE Trans. Inform. Theory*, vol. 68, no. 3, pp. 1886-1921, March 2022.
17. **N. Weinberger** and G. Bresler, "The EM Algorithm is Adaptively-Optimal for Unbalanced Symmetric Gaussian Mixtures," *Journal of Machine Learning Research*, vol. 23, no. 103, pp. 1-79, May 2022.
18. **N. Weinberger** and N. Merhav, "The DNA Storage Channel: Capacity and Error Probability Bounds", *IEEE Trans. Inform. Theory*, vol. 68, no. 9, 5657–5700, September 2022.
19. **N. Weinberger**, "Error Probability Bounds for Coded-Index DNA Storage Systems", *IEEE Trans. Inform. Theory*, vol. 68, no. 11, 7005–7022, November 2022.

Accepted papers

Submitted

20. A. Tsvieli and **N. Weinberger**, "Learning Maximum Margin Channel Decoders", under revision for the *IEEE Trans. Inform. Theory*, February 2022.
21. M. Dikshtein, **N. Weinberger**, and S. Shamai (Shitz), "The Compound Information Bottleneck Outlook", under revision for the *IEEE Journal on Selected Areas in Information Theory*, April 2022.
22. **N. Weinberger** and M. Yemini, "Multi-Armed Bandits with Self-Information Rewards," submitted to the *IEEE Trans. Inform. Theory*, September 2022.

13.3 REFEREED PAPERS IN CONFERENCE PROCEEDINGS

1. **N. Weinberger**, M. Feder, "Universal Decoding for Linear Gaussian Fading Channels in the Competitive Minimax Sense," *Proc. ISIT 2008*, pp. 782–786, Toronto, Canada, July 2008.
2. **N. Weinberger**, M. Feder, "Universal Decoding over Gaussian Fading Channels – Metric Calculation and Performance Evaluation," *Proc. ISIT 2011*, pp. 1812–1816, Saint Petersburg, Russia, July-August 2011.
3. **N. Weinberger** and N. Merhav, "Large Deviations Analysis of Variable-Rate Slepian-Wolf Coding," *Proc. ISIT 2014*, pp. 481–485, Honolulu, Hawaii, USA, June–July 2014. **Shortlisted for the Best Student Paper Award of ISIT 2014.**
4. **N. Weinberger** and N. Merhav, "Codeword or Noise? Exact Random Coding Exponents for Slotted Asynchronism," *Proc. ISIT 2014*, pp. 2509–2513, Honolulu, Hawaii, USA, June–July 2014.
5. **N. Weinberger**, W. Huleihel, and N. Merhav, "Erasure/List Random Coding Error Exponents are not Universally Achievable," *Proc. ITW 2015*, pp. 1–5, Jerusalem, Israel, April-May 2015.
6. **N. Weinberger**, N. Merhav, "Optimum Trade-offs Between the Error Exponent and the Excess-Rate Exponent of Variable-Rate Slepian-Wolf Coding," *Proc. ISIT 2015*, pp. 1565–1569, Hong-Kong, China, June 2015.
7. **N. Weinberger**, N. Merhav, "Simplified Erasure/List Decoding," *Proc. ISIT 2015*, pp. 2226–2230, Hong-Kong, China, June 2015.

8. **N. Weinberger** and N. Merhav, "Channel Detection in Coded Communication," *Proc. IZS 2016*, pp. 10–14, Zurich, Switzerland, March 2016.
9. **N. Weinberger** and O. Shayevitz, "On the Optimal Boolean Function for Prediction Under Quadratic Loss," *Proc. ISIT 2016*, pp. 495–499, Barcelona, Spain, July 2016.
10. **N. Weinberger** and N. Merhav, "A Large Deviations Approach to Secure Lossy Compression," *Proc. ISIT 2016*, pp. 765–769, Barcelona, Spain, July 2016. **One of 6 finalists for the Best Student Paper Award of ISIT 2016.**
11. S. Hu, **N. Weinberger**, and O. Shayevitz, "On the VC-Dimension of Binary Codes," *Proc. ISIT 2017*, pp. 589–593, Aachen, Germany, June 2017.
12. **N. Weinberger** and N. Merhav, "Lower Bounds on Parameter Modulation–Estimation Under Bandwidth Constraints," *Proc. ISIT 2017*, pp. 2088–2092, Aachen, Germany, June 2017.
13. **N. Weinberger** and O. Shayevitz, "Guessing with a Boolean Helper," *Proc. ISIT 2018*, pp. 271–275, Vail, Colorado, USA, June 2018.
14. **N. Weinberger** and O. Shayevitz, "Self-Predicting Boolean Functions," *Proc. ISIT 2018*, pp. 276–280, Vail, Colorado, USA, June 2018.
15. **N. Weinberger**, Y. Kochman, "On the Reliability Function of Distributed Hypothesis Testing Under Optimal Detection," *Proc. ISIT 2018*, pp. 1066–1070, Vail, Colorado, USA, June 2018.
16. R. Averbuch, **N. Weinberger**, N. Merhav, "Expurgated Bounds for the Asymmetric Broadcast Channel," *Proc. IZS 2018*, pp. 15–19, Zurich, Switzerland, February 2018.
17. **N. Weinberger**, Y. Kochman, M. Wigger, "Exponent Trade-off for Hypothesis Testing Over Noisy Channels," *Proc. ISIT 2019*, pp. 1852–1856, Paris, France, July 2019.
18. **N. Weinberger** and M. Feder, " k -vectors: An Alternating Minimization Algorithm for Learning Regression Functions", *Proc. Allerton 2019*, Allerton, Illinois, USA, September 2019.
19. **N. Weinberger**, "Learning Additive Noise Channels: Generalization Bounds and Algorithms," *Proc. ISIT 2020*, pp. 2586–2591, Los Angeles, California, USA, June 2020.
20. A. Tsvieli and **N. Weinberger**, "Learning Maximum Margin Channel Decoders for Additive Noise Channels," *Proc. IZS 2022*, pp. 79–83, Zurich, Switzerland, March 2022.
21. **N. Weinberger**, "Error Probability Bounds for Coded-Index DNA Storage Channels," *Proc. IZS 2022*, pp. 49–53, Zurich, Switzerland, March 2022.
22. **N. Weinberger** and N. Merhav, "The DNA Storage Channel: Capacity and Error Probability Bounds," *Proc. ISIT 2022*, pp. 1803–1808, Helsinki, Finland, June-July 2022.
23. A. Tsvieli and **N. Weinberger**, "Learning Maximum Margin Channel Decoders for Non-linear Gaussian Channels," *Proc. ISIT 2022*, pp. 2469–2474, Helsinki, Finland, June-July 2022.
24. **N. Weinberger** and M. Yemini, "Upper Confidence Interval Strategies for Multi-Armed Bandits with Entropy Rewards," *Proc. ISIT 2022*, pp. 1647–1652, Helsinki, Finland, June-July 2022.
25. M. Dikshtein, **N. Weinberger**, and S. Shamai (Shitz), "The Compound Information Bottleneck Program," *Proc. ISIT 2022*, pp. 2475–2480, Helsinki, Finland, June-July 2022.
26. **N. Weinberger**, and M. Feder, "On Information-Theoretic Determination of Misspecified Rates of Convergence," *Proc. ISIT 2022*, pp. 1695–1700, Helsinki, Finland, June-July 2022.
27. M. Dikshtein, **N. Weinberger**, and S. Shamai (Shitz), "On Information Bottleneck for Gaussian Processes", *Proc. ITW 2022*, pp. 546–551, Mumbai, India, November 2022.

28. Y. Zhang and **N. Weinberger**, “Mean Estimation in High-Dimensional Binary Markov Gaussian Mixture Models”, NeurIPS 2022.
29. B. Kenig and **N. Weinberger**, “Quantifying the Loss of Acyclic Join Dependencies”, PODS 2023.

Submitted papers

30. T. Norman, **N. Weinberger**, Kfir Y. Levy, “Robust Linear Regression for General Feature Distribution”, submitted to AISTAS 2023.

13.4 OTHER

1. **N. Weinberger**, “Analog Communication – Lecture Notes,” Technion – Israel Institute of Technology (in Hebrew). 2016.
2. **N. Weinberger**, “Modern Communication Techniques – Lecture Notes,” Technion – Israel Institute of Technology. 2021.

14 CONFERENCE

14.1 Contributed Talks

1. IEEE International Symposium on Information Theory, Toronto, Canada, July 2008:
 - Universal Decoding for Linear Gaussian Fading Channels in the Competitive Minimax Sense
2. IEEE International Symposium on Information Theory, Saint Petersburg, Russia, July-August 2011:
 - Universal Decoding over Gaussian Fading Channels – Metric Calculation and Performance Evaluation
3. IEEE International Symposium on Information Theory, Honolulu, Hawaii, USA, June–July 2014:
 - Large Deviations Analysis of Variable-Rate Slepian-Wolf Coding
 - Codeword or Noise? Exact Random Coding Exponents for Slotted Asynchronism
4. IEEE Information Theory Workshop, Jerusalem, Israel, April-May 2015:
 - Erasure/List Random Coding Error Exponents are not Universally Achievable
5. IEEE International Symposium on Information Theory, Hong Kong, China, June 2015:
 - Optimum Trade-offs Between the Error Exponent and the Excess-Rate Exponent of Variable-Rate Slepian-Wolf Coding
 - Simplified Erasure/List Decoding
6. Information Theory and Applications, San-Diego, California, USA, February 2016:
 - A Large Deviations Approach to Secure Lossy Compression, Graduation Day Talk.
7. International Zurich Seminar on Information and Communication, Zurich, Switzerland, February 2016:
 - Channel detection in coded communication
8. IEEE International Symposium on Information Theory, Barcelona, Spain, July 2016:

- On the Optimal Boolean Function for Prediction Under Quadratic Loss
 - A Large Deviations Approach to Secure Lossy Compression
9. Information Theory and Applications, San-Diego, California, USA, February 2017:
 - On the Reliability Function of Distributed Hypothesis Testing Via a Reduction to a Channel Detection Problem
 10. IEEE International Symposium on Information Theory, Aachen, Germany, June 2017:
 - On the VC-Dimension of Binary Codes
 - Lower Bounds on Parameter Modulation–Estimation Under Bandwidth Constraints
 11. Information Theory and Applications, San-Diego, California, USA, February 2018:
 - Self-Predicting Boolean Functions
 12. IEEE International Symposium on Information Theory, Vail, Colorado, USA, June 2018:
 - Self-Predicting Boolean Functions
 - Guessing with a Boolean Helper
 - On the Reliability Function of Distributed Hypothesis Testing Under Optimal Detection
 13. IEEE International Symposium on Information Theory, Paris, France, July 2019:
 - Exponent Trade-off for Hypothesis Testing Over Noisy Channels
 14. The 57th Annual Allerton Conference on Communication, Control, and Computing, Allerton, Illinois, USA, September 2019:
 - k -vectors: An Alternating Minimization Algorithm for Learning Regression Functions
 15. Information Theory and Applications, San-Diego, California, USA, February 2020:
 - The EM Algorithm is Nearly-Optimal for Unbalanced Symmetric Gaussian Mixtures
 16. IEEE International Symposium on Information Theory, Los Angeles, California, USA (virtual on-line conference), June 2020:
 - Learning Additive Noise Channels: Generalization Bounds and Algorithms
 17. International Israel Data Science Initiative Conference, Ein Gedi, Israel, January 2022:
 - Minimax Regret Rates for Prediction under Log Loss via Information Geometry
 - k -vectors: An Alternating Minimization Algorithm for Learning Regression Functions
 18. International Zurich Seminar on Information and Communication, Zurich, Switzerland, March 2022 (conference was canceled due to the Covid-19 pandemic).
 - Error Probability Bounds for Coded-Index DNA Storage Channels
 19. IEEE International Symposium on Information Theory, Helsinki, Finland, June-July 2022:
 - The DNA Storage Channel: Capacity and Error Probability Bounds
 - On Information-Theoretic Determination of Misspecified Rates of Convergence
 20. International Israel Data Science Initiative Conference, Ein Gedi, Israel, January 2023:
 - Mean Estimation in High-Dimensional Binary Markov Gaussian Mixture Models

14.2 Invited Talks

1. IEEE Information Theory Workshop, Mumbai, India, November 2022:
 - Misspecified Regret Rates of Convergence for Unknown Feature Density.