

# Curriculum Vitae

NERI MERHAV ID#54146790

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## Personal Data

Date and place of birth: March 16, 1957, Haifa, Israel  
Marital Status: Married + 3 children  
Citizenship: Israeli and Italian  
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## Academic Degrees

*Technion—Israel Institute of Technology*

D.Sc. in Electrical Engineering, February 1988.  
M.Sc. in Electrical Engineering, November 1985 (with distinction).  
B.Sc. in Electrical Engineering, June 1982 (Summa Cum Laude).

## Academic Appointments

July 1998 – present	Professor, Department of Electrical Engineering, Technion.
January 1995 – June 1998	Associate Professor, Department of Electrical Engineering, Technion.
November 1991 – December 1994	Senior Lecturer, Department of Electrical Engineering, Technion (tenured: June 1993).
October 1990 – October 1991	Lecturer, Department of Electrical Engineering, Technion.
March 1988 – September 1988	Lecturer, Department of Electrical Engineering, Technion.

## Research Interests

Information theory, statistical communications and statistical signal processing. In particular, lossless/lossy source coding and prediction/filtering, relationships between information theory and statistics, detection, estimation, and Shannon Theory, including topics in joint source–channel coding,

source/channel simulation, and coding with side information with applications to information hiding and watermarking systems. Recently, relationships between information theory and statistical physics.

## Teaching Experience

1985–1988 Teaching Instructor, Department of Electrical Engineering, Technion.

### Undergraduate Studies

- Introduction to Digital Signal Processing
- Analog Communication

### Graduate Studies

- Digital Signal Processing
- Selected Topics in Signal Processing

1988, 1990–present

Faculty member, Department of Electrical Engineering, Technion.

### Undergraduate Studies

- Introduction to Digital Communications (046206)
- Electric Circuit Theory (044105)
- Introduction to Digital Signal Processing (044198)
- Introduction to Random Signal Processing (046201)
- Random Signals (044202)
- Introduction to Coding Theory (046205)
- Statistical Physics, Fluctuations and Noise\* (046242)

### Graduate Studies<sup>1</sup>

- Ergodic Theory and Information Measures\*
- Information Theory (046733)
- Coded Communications (048934)
- Universal Data Compression\* (049043) – jointly with Prof. J. Ziv.
- Lossy Data Compression\* (049044)
- Information Theory and Statistical Physics\* (049054)

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<sup>1</sup>Asterisks correspond to courses that I initiated and prepared.

## Professional Experience

- 1980–81 Elbit Computers Ltd. – student apprentice:  
Computer hardware development, microcoding, gate arrays  
(in association with Amos Sobel and Michael Har-Even).
- 1982–85 Israel IBM Scientific Center – research associate:  
Speech coding, adaptive noise cancelling in array sensors, speech  
synthesis (in association with Yoav Medan and Dan Chazan).
- 1988–90 AT&T Bell Laboratories – post doctoral staff member:  
Hidden Markov model based speech recognition algorithms, ma-  
chine learning, and source coding (in association with Lawrence  
Rabiner, Yariv Ephraim, Naftali Tishby, David Neuhoff, Chin-  
Hui Lee, and Nambi Seshadri).
- 1993 Intel Israel – Consulting:  
Data compression (in association with Michael Gutman)
- 1993–94 Efrat – Future Technology, Ltd. – Consulting:  
Speech recognition (in association with Shlomo Becker, Yaacov  
Stein, and Eli Zehngut).
- 1994–99 Hewlett–Packard Laboratories – Israel (HPL-I) – Consulting:  
Image and video compression, compressed-domain image pro-  
cessing (in association with Abraham Lempel, Marcelo Wein-  
berger, Gadiel Seroussi, Ron Roth, and Vasudev Bhaskaran).
- 1995–96 Hewlett–Packard Laboratories, Palo Alto, CA – Sabbatical year:  
Image and Video compression, compressed domain image ma-  
nipulation (in association with Abraham Lempel, Marcelo Wein-  
berger, Gadiel Seroussi, Ron Roth, and Vasudev Bhaskaran).
- 1994, 1997–2008  
Hewlett–Packard Laboratories, Information Theory Group, Palo  
Alto, CA – summer visits of several weeks.

## Departmental, Technion and National Academic Activities

### Departmental Activities

- 1990–92 Consultant of undergraduate students.
- 1992–93 Member of the committee of curriculum.
- 1993–95, 96–98 Organizer of the departmental Communications & Sig-  
nal Processing Seminar.
- 1994–95 Consultant of students under discussion.
- 1994–95, 96–99 Coordinator of EE graduate courses in the field of Com-  
munications.
- 1996–99 Consultant of EE undergraduate students in the field of  
Communications.

1999–2002	Deputy Dean for undergraduate studies.
2005–2007	Member of the committee for outstanding employees (“veadat ovdim mitztaynim”).
2007–2009	Member of the Ollendorf Center committee.
2008–ongoing	Member of development, resources and finance committee.
2009–2012	Member of the graduate studies committee.
2011–2012	Member of the committee for acceptance of graduate students.
2014–2017	Member of the committee of prizes for graduate students.

### **Technion Activities**

2002–04	Member of the Technion Senate preparatory committee for the appointment and tenure of faculty members (“veada mekhina senatit le’minui segel bakhir ve’lekviut”).
2003–05	Member of the Technion committee for prizes and awards for faculty members (“veada lehaanakat pirsei hitztainut lesegel academi”).
Nov. 2004–06	Member of the Technion Senate permanent committee for the appointment and tenure of faculty members (“veadat keva le’minui segel bakhir ve’lekviut”).
2005–06	Member of the special Technion committee for the appointment of distinguished professors.
2009–11	Chairman of professional committees for appointment and tenure of faculty members.
2010–12	Member of the special Technion committee for the appointment of distinguished professors.
2014–ongoing	Member of the Technion Senate (by general Technion voting).
2018–ongoing	Member of the Technion steering committee (“veada merakezet”).

### **National Academic Activities**

2016–ongoing	Member of the committee for Allon Scholarships of the Council for Higher Education in Israel.
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### **Invited Lectures, Seminars, and Mini-Courses**

1. “Parameter estimation using partial statistics,” AT&T Bell Laboratories, Murray Hill, New Jersey, U.S.A., November 1988.

2. "A Bayesian classification approach with application to speech recognition," Yale University, New Haven, Connecticut, U.S.A., March 1989.
3. "Hidden Markov modeling using the dominant sequence of states," IBM Watson Research Center, Yorktown Heights, New York, U.S.A., May 1989.
4. "Universal coding with minimum probability of codeword length overflow," Stanford University - Information Systems Laboratory, Stanford, California, U.S.A., January 1990.
5. "A minimax classification approach to speech recognition," AT&T Bell Laboratories, Murray Hill, New Jersey, U.S.A., August 1990.
6. "Variable-to-fixed length codes provide better large deviations performance than fixed-to-variable length codes," IBM Almaden Research Center, San Jose, California, U.S.A., September 1990.
7. "Variable-to-fixed length codes provide better large deviations performance than fixed-to-variable length codes," Tel Aviv University, Tel Aviv, Israel, November 1990.
8. "How many information bits does a vector quantizer need about the source statistics?" Stanford University - Information Systems Laboratory, Stanford, California, U.S.A., October 1995.
9. A one week mini-course on universal lossless data compression (jointly with Prof. J. Ziv), the Euler Institute for Discrete Mathematics and its Applications (EIDMA), Eindhoven, the Netherlands, May 1998.
10. "On error exponents of private watermarking systems," Tel Aviv University, Tel Aviv, Israel, April 2000.
11. "On codes for joint information embedding and lossy source coding," Department of Electrical Engineering, Stanford University, August 2003.
12. "Rate distortion theory, lossy data compression, and quantization" a two-week course for Ph.D. students, Department of Information Engineering, Siena University, May 5-15, 2008.
13. "Statistical physics of random coding," Mathematical/Theoretical Physics Seminar, Physics Department, Technion, June 2008.
14. "A statistical-mechanical view on code ensembles and random coding exponents," ISL Colloquium, Department of Electrical Engineering, Stanford University, September 2008.
15. "Statistical physics of the mutual information," Physics Colloquium, Physics Department, Technion, February 2009.
16. "Physics of the Shannon Limits," Advanced Communication Center (ACC), annual meeting, Tel Aviv University, February 2010.

17. “Statistical physics of random codes in information theory,” Department of Physics of Complex Systems, Weizmann Institute of Science, Rehovot, Israel, February 2010.
18. “Statistical mechanics of code ensembles,” Engineering Colloquium, School of Engineering, Bar Ilan University, April 2010.
19. “A physical perspective on code ensembles,” the Communications Engineering weekly seminar (“Network Agora”) at the Communications Systems Engineering Department, Ben Gurion University, May 2010.
20. “Optimum modulation–estimation from a large deviations perspective,” the Communications Engineering weekly seminar (“Network Agora”) at the Communications Systems Engineering Department, Ben Gurion University, November 2012.
21. Information and Physics – Better Together, Electrical and Computer Engineering Departmental Seminar, Ben Gurion University, November 2017.
22. Information and Physics – Better Together, Statistical Mechanics Seminar, the Department of Complex Systems, Faculty of Physics, the Weizmann Institute for Science, November 2017.

## **Active Participation in International Conferences**

### **Invited Presentations**

1. The 1989 IEEE Workshop on Information Theory (ITW 1989), Ithaca, New York, June 1989: “Estimation of model order in exponential families.”
2. The 1990 IEEE Workshop on Information Theory (ITW 1990), Eindhoven, the Netherlands, June 1990: “Variable-to-fixed length codes have better large deviations performance than fixed-to-variable length codes.”
3. IEEE-IMS Information Theory Workshop on Information Theory and Statistics, Alexandria, Virginia, USA, October 1994: “A stronger version of the redundancy-capacity theorem of universal coding.”
4. The 18th Convention of Electrical & Electronics Engineers in Israel, Tel-Aviv, March 1995: “Recent results on universal coding for probabilistic sources and individual sequences.”
5. Workshop on Non-Linear Time Series for Prediction and Control, Technion, Israel, June–July 1998: “Universal prediction for indexed classes of sources.”
6. The 1999 IEEE Information Theory Workshop on Detection, Estimation, Classification, and Imaging, Santa-Fe, New Mexico, February 1999: “Minimax–universal composite hypothesis testing.”

7. The 2002 MSRI Workshop on Information Theory, Berkeley, California, February–March 2002: “On large-deviations tradeoffs between code-length and distortion in certain lossy source coding problems.”
8. The 40th Annual Allerton Conference on Communication, Control, and Computing, University of Illinois, Urbana Champaign, October, 2002: “On joint source–channel coding for the Wyner–Ziv source and the Gel’fand–Pinsker channel.”
9. “Dirty–Paper and Watermarking Day,” Tel Aviv University, December 1st, 2003: “On joint information embedding and data compression.”
10. The Seventh Information Hiding Workshop (IH ‘05), Barcelona, Spain, June 6–8, 2005: “On joint coding for watermarking and encryption,” **key–note lecture**.
11. WaCha 2005, Barcelona, Spain, June 8–9, 2005: “Counterfeiting geometric attacks: is exhaustive search the ultimate solution?” **key–note lecture**.
12. IEEE Workshop on Information Theory (ITW 2006), Punta del Este, Uruguay, March 2006: “On context–tree prediction of individual sequences.”
13. Mathematical Foundations of Learning Theory II (MFLT2), Paris, France, May–June 2006: “Context–tree prediction in the thermodynamic limit,” **plenary talk**.
14. The 44th Annual Allerton Conference on Communication, Control, and Computing, University of Illinois, Urbana Champaign, September 2006: “On the Shannon cipher system with a capacity–limited key–delivery channel.”
15. The 2008 Information Theory and Applications Workshop (ITA 2008), the University of California at San Diego (UCSD), January 28–February 1, 2008: “Error exponents of erasure/list decoding revisited via analysis of distance enumerators.”
16. Physics of Algorithms, Santa Fe, New Mexico, U.S.A., August 31 – September 4, 2009: “Statistical physics of information measures.”
17. The 2010 Information Theory and Applications Workshop (ITA 2010), the University of California at San Diego (UCSD), January 31–February 5, 2010: “Signal estimation in Gaussian noise: a statistical–mechanical perspective.”
18. The 2011 Information Theory and Applications Workshop (ITA 2011), the University of California at San Diego (UCSD), February 6–11, 2011: “Data processing theorems and the second law of thermodynamics.”

19. The Fourth Workshop on Information–Theoretic Methods in Science and Engineering (WITMSE 2011), Helsinki, Finland, August 2011: “Random coding and statistical physics,” **plenary talk**.
20. The 2012 Information Theory and Applications Workshop (ITA 2012), San Diego, California, February 5–10: “Data processing inequalities based on certain structured class of information measures with application to estimation theory.”
21. The 2012 International Workshop on Applied Probability (IWAP 2012), June, 11–14, 2012: “Bose–Einstein condensation in the large deviations regime with applications to information system models,” invited to a special session dedicated to the interface between statistical physics and queueing theory – Jobs and Particles: Where Statistical Physics and Queueing Theory Meet.
22. Statistical Mechanics Day V, the Weizmann Institute of Science, June 25, 2012: “Bose–Einstein condensation in the large deviations regime with applications to information system models.”
23. “What is Information” Workshop, Sde Boker, Israel, January 7–11, 2013: “A statistical-mechanical view of code ensembles and random coding exponents.”
24. The 2013 Information Theory and Applications Workshop (ITA 2013), San Diego, California, February 10–15: “On optimum modulation–estimation from a large deviations perspective.”
25. The 2014 Information Theory and Applications 2014 Workshop (ITA 2014), San Diego, California, February 9–14: “On the data processing theorem in the semi–deterministic setting.”
26. The 2013 information Theory Workshop (ITW 2013), Sevilla, Spain, September 9–13, 2013: “Erasure/list exponents for Slepian–Wolf decoding,”
27. The 2014 International Zurich Seminar (IZS 2014), February 26–28, 2014: “Universal decoding for arbitrary channels with respect to a given class of decoding metrics.”
28. The 2015 Information Theory and Applications Workshop (ITA 2015), San Diego, California, February 1–6: “Exact random coding exponents for the wiretap channel model: authorized decoder and wiretapper.”
29. The 2015 Information Theory Workshop (ITW 2015), Jerusalem, Israel, April–May 2015: “Information and physics – better together,” **plenary talk** (also, given as a colloquium in the EE department, Technion, May 3, 2017).
30. Statistical Mechanics Day VIII, the Weizmann Institute of Science, December 21, 2015: “Sequence complexity and work extraction”.



31. The 2016 Information Theory and Applications Workshop (ITA 2016), San Diego, California, January 31 – February 5: “Sequence complexity and work extraction.”
32. The 2016 International Zurich Seminar (IZS 2016), March 2–4, 2016: “Combining detection with other tasks of information processing.”
33. The IEEE 2016 International Conference on the Science of Electrical Engineering (ICSEE 2016), Eilat, Israel, November 16–18, 2016: “Lower bounds on parameter modulation–estimation under bandwidth constraints.”
34. The 2017 Information Theory and Applications Workshop (ITA 2017), San Diego, California, February 12 – February 17, 2017: “Relations between work extraction and entropy production for information–driven finite–state machines.”
35. The 2018 International Zurich Seminar (IZS 2018), February 21–23, 2018: “My little toolbox for code ensemble performance analysis,” **plenary talk**.

### Contributed Presentations

1. The 14th Convention of Electrical & Electronics Engineers in Israel, Tel-Aviv, March 1985: “Solving unstable differences equations recursively.”
2. EUSIPCO - 86, Hague, the Netherlands, September 1986: “Adaptive maximum entropy coding.”
3. IEEE International Symposium on Information Theory, San Diego, CA, January 1990:
  - “Universally efficient parameter estimation and universal data compression.”
  - “Estimating the number of states of a finite-state source.”
  - “A Bayesian classification approach with application to Speech recognition.”
  - Chairing a session on Trellis Coding.
4. AAAI Spring Symposium on the Theory and Application of Minimal-Length Encoding, Stanford University, March 1990:
  - “Estimating the number of states of a finite-state source.”
  - “Universal coding with minimum probability of length overflow.”
5. The 17th Convention of Electrical & Electronics Engineers in Israel, Tel-Aviv, March 1991: “Universal prediction of individual sequences.”

6. IEEE International Conference on Acoustics, Speech, and Signal Processing, San Francisco, May 1991:
  - “A Bayesian classification approach with application to speech recognition.”
  - “Hidden Markov modeling using the most likely state sequence.”
7. IEEE International Symposium on Information Theory, Budapest, Hungary, June 1991:
  - “Lower and upper bounds on the minimum mean square error in composite source estimation.”
  - “A minimax classification approach with application to robust speech recognition.”
  - “When is the generalized likelihood ratio test optimal?”
8. The Second ETH–Technion Workshop on Information Theory and Communications, February 1992:

“Universal sequential decision from individual data sequences.”
9. Fifth ACM Workshop on Computational Learning Theory, Pittsburgh, July 1992:

“Universal sequential learning and decision from individual data sequences.”
10. IEEE International Symposium on Information Theory, San Antonio, Texas, January 1993:
  - “Relations between entropy and error probability.”
  - “On information rates for mismatched decoders.”
  - “Universal Decoding for Memoryless Gaussian Channels with a Deterministic Interference.”
  - “A measure of relative entropy between individual sequences with application to universal classification.”
  - “Universal schemes for sequential decision from individual data sequences.”
11. IEEE International Symposium on Information Theory, Trondheim, Norway, June 1994:

- “Bounds on convergence rates of parameter estimators via universal coding.”
  - “On the cost of universality of block codes for individual sequences.”
  - “Optimal sequential probability assignment for individual sequences.”
  - Chairing a session on Statistical Analysis of Stationary Sources.
12. The Israeli-French Workshop on Coding and Information Integrity, Tel Aviv, December 1994:  
“Universal coding for arbitrarily varying sources.”
13. IEEE Information Theory Workshop, Rydzyna, Poland, June 1995:
- “Strong lower bounds in universal coding for general classes and for hierarchies of source classes.”
  - “Stochastic complexity of learning realizable and unrealizable rules.”
14. IEEE International Symposium on Information Theory, Whistler, British Columbia, Canada, September 1995:  
“Universal coding for arbitrarily varying sources.”
15. HP Image and Data Compression Conference, Palo Alto, CA, USA, October 1995:
- “A transform domain approach to spatial domain image scaling.”
  - “A fast algorithm for DCT-domain inverse motion compensation.”
16. Santa Cruz Workshop on Sequence Prediction, Santa Cruz, May 1996:
- “Hierarchical universal coding.”
  - “Guessing subject to distortion.”
17. IEEE Information Theory Workshop, Haifa, Israel, June 1996:
- “How many information bits does a vector quantizer need about the source statistics?”
  - “Guessing subject to distortion.”
  - Member of the organizing committee (in association with A. D. Wyner, S. Shamai (Shitz), M. Feder, and M. Sidi).

18. IEEE International Symposium on Information Theory, Ulm, Germany, June-July 1997:  
“How many information bits does a decoder need about the channel statistics?”
19. IEEE Information Theory Workshop, San Diego, California, February 1998:  
“Hierarchical guessing with a fidelity criterion.”
20. IEEE International Symposium on Information Theory, MIT Cambridge, MA, August 1998:  
“The Shannon cipher system with a guessing wiretapper.”
21. The Third ETH–Technion Workshop on Information Theory and Communications, January 2000:  
“On random coding error exponents of watermarking systems.”
22. The Fourth Annual Convention of Radio Sciences in Israel, February 2000:  
“Identification in the presence of side information with application to watermarking.”
23. The 21st Convention of Electrical & Electronics Engineers in Israel, April 2000:  
“Universal detection of messages via finite-state channels.” (invited talk)
24. IEEE International Symposium on Information Theory, Sorrento, Italy, June 2000:  
On sequential strategies for loss functions with memory.”
25. IEEE International Symposium on Information Theory, Washington, 2001:  
Program co-chair (in association with Shlomo Shamai).
26. IEEE International Symposium on Information Theory, Lausanne, Switzerland, 2002:  
“Universal simulation of information sources using training data.”  
Also, member of the Program Committee.
27. IEEE International Symposium on Information Theory, Yokohama, Japan, 2003:
  - “On achievable key rates for universal simulation of random data with respect to a set of statistical tests.”
  - “On the capacity game of private fingerprinting systems under collusion attacks.”
28. The Fourth ETH–Technion Workshop on Information Theory and Communications, February 2004:  
“On hierarchical joint source–channel coding.”

29. IEEE International Symposium on Information Theory, Chicago, Illinois, U.S.A., 2004:

- “On causal and semicausal codes for joint information embedding and source coding.”
- “On the random coding error exponents of the single-user and the multiple-access Gel’fand–Pinsker channels.”

Also, member of the Program Committee.

30. Information Theory Workshop, Punta del Este, Uruguay, March 2006: Organizing a session on the Shannon Theory.

31. IEEE International Symposium on Information Theory, Seattle Washington, U.S.A., July 2006:

- “Information rates subjected to state masking.”

32. IEEE International Symposium on Information Theory, Nice, France, June 2007:

- “Shannon’s secrecy system with informed receivers and its application to systematic coding for wiretapped channels.”
- “Universal decoding with an erasure option.”

Also, member of the Program Committee.

33. IEEE International Symposium on Information Theory, Toronto, Canada, July 2008:

- “An identity of Chernoff bounds with an interpretation in statistical physics and applications in Information Theory.”
- “Relations between random coding exponents and the statistical physics of random codes.”
- “Error exponents for degraded broadcast channels.”

Also, member of the Program Committee.

34. IEEE International Symposium on Information Theory, Seoul, Korea, June–July 2009:

- “On the statistical physics of directed polymers in a random medium and their relation to tree codes.”
- “Joint source–channel coding via statistical mechanics: thermal equilibrium between the source and the channel.”

35. IEEE Workshop on Information Theory, Taormina, Sicily, Italy, October 2009: “Physics of the Shannon limits.”
36. IEEE International Symposium on Information Theory, Austin, Texas, U.S.A., June 2010:
  - “Rate–distortion function via minimum mean square–error estimation.”
  - “Optimum estimation via partition functions and information measures.”
37. IEEE Workshop on Information Theory, Paraty, Brazil, October 2011: “Threshold effects in parameter estimation as phase transitions in statistical physics.”
38. IEEE International Symposium on Information Theory, Boston, MA, U.S.A., July 2012:
  - “On optimum strategies for minimizing the exponential moments of a loss function.”
  - “Relations between redundancy patterns of the Shannon code and wave diffraction patterns of partially disordered media.”
  - “Data processing inequalities based on a certain structured class of information measures with application to estimation theory.”
  - “Perfectly secure encryption of individual sequences.”
39. IEEE International Symposium on Information Theory, Istanbul, Turkey, July 2013:
  - “Average redundancy of the Shannon code for Markov sources.”
  - “Exponential error bounds on parameter modulation–estimation for memoryless channels.”
40. IEEE International Symposium on Information Theory, Honolulu, Hawaii, U.S.A., June–July 2014:
  - “List decoding – random coding exponents and expurgated exponents.”
41. IEEE International Symposium on Information Theory, Hong Kong, China, June 2015:
  - “Information–theoretic applications of the logarithmic probability comparison bound.”
  - “Statistical physics of random binning.”

42. IEEE International Symposium on Information Theory, Barcelona, Spain, July 2016:
  - “The generalized likelihood decoder: random coding and expurgated bounds.”
  - “Universal decoding for joint source–channel coding with side information.”
43. IEEE International Symposium on Information Theory, Aachen, Germany, June 2017:
  - “Universal decoding using a noisy codebook.”
  - “Reliability of universal decoding based on vector–quantized code-words.”
  - “On the empirical cumulant generating function of the code lengths for individual sequences.”

### Membership in Scientific and Professional Associations

IEEE, Information Theory Society: Student Member 1985–1988, Member 1988–1993, Senior member 1993–1998, Fellow since 1999.

### Public Professional Activities

1. Member of the organizing committee of the Information Theory Workshop, June 1996, Haifa, Israel.
2. Associate Editor for Source Coding, IEEE Transactions on Information Theory, 1996–1999.
3. Member of the electrical–engineering professional committee of the Israel Science Foundation, 1997.
4. Chairman of the electrical–engineering professional committee of the Israel Science Foundation, 1998.
5. Program co–chair (with S. Shamai), ISIT 2001.
6. Member of the Year 2000 Awards Committee of the IEEE Information Theory Society.
7. Member of the Technical Program Committee, ISIT 2002.
8. Member of the Technical Program Committee, ISIT 2004.
9. Member of Editorial Board of *Foundations and Trends in Communications and Information Theory* (beginning from 2004).
10. Member of the 2004 IEEE–IT Society Best Paper Award Committee.

11. Member of the Technical Program Committee and session organizer, ITW 2006.
12. Member of the Technical Program Committee, ISIT 2007 (area leader for Information Theory and Statistics).
13. Member of the Technical Program Committee, ISIT 2008.
14. Member of the Technical Program Committee, the 2009 Information Theory Workshop on Networking and Information Theory (ITW 2009), Volos, Greece, June 2009.
15. Member of the electrical–engineering professional committee of the Israel Science Foundation, 2010.
16. Member of the Technical Program Committee, ISIT 2012.
17. Member of the Technical Program Committee, ISIT 2013.
18. Member of the Technical Program Committee, NETSTAT 2013.
19. Member of the Technical Program Committee, ITW 2015.
20. Member of the Technical Program Committee, ISIT 2016.
21. Associate Editor for the Shannon Theory, IEEE Transactions on Information Theory, starting from March 2017.
22. Reviewer for several journals, such as: IEEE Trans. on Information Theory (as well as related conferences, ISIT, ITW, DCC), IEEE Trans. on Signal Processing, IEEE Trans. on Image Processing, IEEE Trans. on Communication, IEEE Trans. on Information Forensics and Security, IEEE Trans. on Circuits and Systems for Video Technology.
23. Reviewer of proposals for funding agencies, such as the Israel Science Foundation (ISF) and the U.S.–Israel Binational Science Foundation (BSF).

## Honors

1. President's Prize and Honor List, Technion, 1980, 1982.
2. The B.Sc. Summa Cum Laude.
3. Miriam and Aaron Gutwirth Memorial Fellowship, March 1986.
4. Miriam and Aaron Gutwirth Memorial Fellowship, March 1987.
5. Scholarship of the Chief Scientist's Division at the Israel Ministry of Communication, December 1987.
6. Allon Scholarship, 1990–1993.



7. The 1993 IEEE Information Theory Society Best Paper Award for the paper: M. Feder, N. Merhav, and M. Gutman, "Universal prediction of individual sequences," *IEEE Trans. Inform. Theory*, vol. 38, no. 4, pp. 1258-1270, July 1992 (no. 13 in the list of publications).
8. Prize for Academic Excellence of The New England Chapter of the American Technion Society, August 1994.
9. A letter of appreciation from the Dean on excellence in teaching, June 1995.
10. Election to IEEE Fellow grade (Information Theory Society) with the citation: "For contributions to universal methods of prediction and data compression," November 1998.
11. Reviewer Appreciation Award, IEEE Information Theory Society, April 1999.
12. Certificate in recognition and appreciation of valued services and contributions as Associate Editor for Source Coding, IEEE Transactions on Information Theory, 1996-1999.
13. Certificate in recognition and appreciation of valued services and contributions as Program Committee Co-Chairman of ISIT 2001.
14. The Henry Taub Award for Excellence in Research, June 2002.
15. The Irving Shepard Chair, June 2002.
16. Technion Excellent Lecturer Award (top 5%), 2006.
17. Listed as an ISI highly cited researcher in the field of Computer Science (ISIHighlyCited.com), since November 2009 (5 people listed from the Technion and a total of 49 from all institutions in Israel, in all fields).
18. The *7th IEEE International Workshop on Information Forensics and Security (WIFS 2015)* Best Paper Award, for the paper: B. Tondi, M. Barni, and N. Merhav, "Detection games with a fully active attacker," *Proc. 7th IEEE International Workshop on Information Forensics and Security (WIFS 2015)*, Rome, Italy, November 2015.

## Student Honors<sup>2</sup>

1. The Best Student Paper Award, granted to my Ph.D. student, Asaf Cohen (co-supervised with Prof. Tsachy Weissman of Stanford University) at the *The 24th IEEE Convention of the Electrical and Electronic Engineers in Israel*, Eilat, Israel ("Electricity 2006"), November 2006, for the paper: A. Cohen, N. Merhav, and T. Weissman, "Universal scanning of mixing random fields and performance of the Peano-Hilbert scan."

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<sup>2</sup>Partial list only.

2. The 2009/10 Feder Award for Best Student Work in Communications Technology, granted by the Advanced Communication Center (ACC) at the School of Electrical Engineering of Tel Aviv University, February 2010: Second Prize granted to my M.Sc. student, Yonatan Kaspi for the paper: Y. Kaspi and N. Merhav, “Error exponents for broadcast channels with degraded message sets.”
3. The Best Student Paper Award, granted to my Ph.D. student, Yonatan Kaspi at the *The 26th IEEE Convention of the Electrical and Electronic Engineers in Israel*, Eilat, Israel, November 2010, for the paper: Y. Kaspi and N. Merhav, “Revisiting Gallager’s error exponent analysis technique.”
4. The 2013/14 Feder Award for Best Student Work in Communications Technology, granted by the Advanced Communication Center (ACC) at the School of Electrical Engineering of Tel Aviv University, February 2014: First Prize granted to my Ph.D. student, Wasim Huleihel for the paper: W. Huleihel and N. Merhav, “Analysis of mismatched estimation error using gradients of partition functions.”
5. A Jack Keil Wolf Best Student Paper Award finalist of the 2016 IEEE International Symposium on Information Theory (ISIT 2016): N. Weinberger and N. Merhav, “A large deviations approach to secure lossy compression,” (among 6 finalists).
6. The 2016/17 Feder Award for Best Student Work in Communications Technology, granted by the Advanced Communication Center (ACC) at the School of Electrical Engineering of Tel Aviv University, February 2017: Second Prize granted to my Ph.D. student, Nir Weinberger for the paper: N. Weinberger and N. Merhav, “A large deviations approach to secure lossy compression.”

## LIST OF PUBLICATIONS<sup>3</sup>

### Theses

1. N. Merhav, “Adaptive maximum entropy coding of speech signals,” M.Sc. thesis, Technion—I.I.T., November 1985 (Advisor: Prof. D. Malah).
2. N. Merhav, “Parameter estimation with partial statistics,” D.Sc. thesis, Technion—I.I.T., March 1988 (Advisor: Prof. J. Ziv).

### Refereed Journal Articles

#### Published Articles

1. N. Merhav and J. Ziv, “Estimating with partial statistics the parameters of ergodic finite Markov sources,” *IEEE Trans. Inform. Theory*,

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<sup>3</sup>A coauthor whose name appears in a slanted font, is/was a graduate student under my supervision and the paper is part of his/her thesis.

- vol. 35, no. 2, pp. 326–333, March 1989.
2. N. Merhav, “On the estimation of the model order in exponential families,” *IEEE Trans. Inform. Theory*, vol. IT-35, no. 5, pp. 1109–1114, September 1989.
  3. N. Merhav, M. Gutman, and J. Ziv, “On the estimation of the order of a Markov chain and universal data compression,” *IEEE Trans. Inform. Theory*, vol. 35, no. 5, pp. 1014–1019, September 1989.
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110. N. Merhav, "On optimum strategies for minimizing exponential moments of a given cost function," Technical Report, CCIT Pub. no. 785, EE Pub. no. 1742, March 2011 (also, to appear in *Communications in Information and Systems*, vol. 11, 2011).
111. N. Merhav, "Relations between redundancy patterns of the Shannon code and wave diffraction patterns of partially disordered media," Technical Report, CCIT Pub. no. 788, EE Pub. no. 1745, April 2011 (also, in *IEEE Trans. Inform. Theory*, vol. 58, no. 6, pp. 3402–3406, June 2012).
112. N. Merhav, "Subset–sum phase transitions and data compression," Technical Report, CCIT Pub. no. 792, EE Pub. no. 1749, July 2011 (also, in *Journal of Statistical Mechanics: Theory and Experiment*, P09017, September 2011, doi: 10.1088/1742-5468/2011/09/P01029).
113. Y. Kaspı and N. Merhav, "Structure theorems for real–time variable–rate coding with and without side information," Technical Report, CCIT Pub. no. 794, EE Pub. no. 1751, August 2011 (also, (also, accepted to *IEEE Trans. Inform. Theory*, August 2012).
114. N. Merhav, "Data processing inequalities based on a certain structured class of information measures with application to estimation theory," Technical Report, CCIT Pub. no. 796, EE Pub. no. 1753, September 2011 (also, in *IEEE Trans. Inform. Theory*, vol. 58, no. 8, pp. 5287–5301, August 2012).
115. N. Merhav, "Perfectly secure encryption of individual sequences," Technical Report, CCIT Pub. no. 800, December 2011 (also, in *IEEE Trans. Inform. Theory*, vol. 59, no. 3, pp. 1302–1310, March 2013).

116. N. Merhav, "On optimum parameter modulation–estimation from a large deviations perspective," Technical Report, CCIT Pub. no. 806, EE Pub. no. 1763, March 2012 (also, in *IEEE Trans. Inform. Theory*, vol. 58, no. 12, December 2012).
117. N. Merhav and W. Szpankoswki, "Average redundancy of the Shannon code for Markov sources," Technical Report, CCIT Pub. no. 811, EE Pub. no. 1768, August 2012 (also, submitted to *IEEE Trans. Inform. Theory*, August 2012).
118. A. Reani and N. Merhav, "Data processing lower bounds for scalar lossy source codes with side information at the decoder," Technical Report, CCIT Pub. no. 813, EE Pub. no. 1770, September 2012 (also, submitted to *IEEE Trans. Inform. Theory*, September 2012).
119. N. Merhav, "Universal decoding for arbitrary channels relative to a given family of decoding metrics," Technical Report, CCIT Pub. no. 819, EE Pub. no. 1776, October 2012 (also in *IEEE Trans. Inform. Theory*, 2013).
120. N. Merhav, "Exponential error bounds on parameter modulation–estimation for discrete memoryless channels," Technical Report, CCIT Pub. no. 822, EE Pub. no. 1779, December 2012 (also in *IEEE Trans. Inform. Theory*, February 2014).
121. Y. Kaspi and N. Merhav, "Zero–delay and causal single–user and multi–user lossy source coding with decoder side information," Technical Report, CCIT Pub. no. 824 EE Pub. no. 1781, December 2012 (also, submitted to *IEEE Trans. Inform. Theory*, January 2013).
122. N. Merhav, "Another look at expurgated bounds and their statistical–mechanical interpretation," Technical Report, CCIT Pub. no. 825 EE Pub. no. 1782, January 2013.
123. N. Merhav, "On the data processing theorem in the semi–deterministic setting," Technical Report, CCIT Pub. no. 828 EE Pub. no. 1785, April 2013 (also, submitted to *IEEE Trans. Inform. Theory*, March 2013).
124. N. Merhav, "Erasure/list exponents for Slepian–Wolf decoding," Technical Report, CCIT Pub. no. 830 EE Pub. no. 1787, May 2013 (also submitted to *IEEE Trans. Inform. Theory*, May 2013).
125. W. Huleihel and N. Merhav, "Analysis of mismatched estimation errors using gradients of partition functions," Technical Report, CCIT Pub. no. 831 EE Pub. no. 1788, June 2013 (also submitted to *IEEE Trans. Inform. Theory*, June 2013).
126. J. Scarlett, L. Peng, N. Merhav, A. Martinez, and A. G. i Fàbregas, "Expurgated random–coding ensembles: exponents, refinements and connections," Technical Report, CCIT Pub. no. 837 EE Pub. no. 1794, July 2013 (also, submitted to *IEEE Trans. Inform. Theory*, July 2013).

127. N. Merhav, “Codeword or noise? Exact random coding exponents for slotted asynchronism,” Technical Report, CCIT Pub. no. 839 EE Pub. no. 1796, August 2013 (also submitted to *IEEE Trans. Inform. Theory*, August 2013).
128. N. Merhav, “Asymptotically optimal decision rules for joint detection and source coding,” Technical Report, CCIT Pub. no. 841 EE Pub. no. 1798, October 2013 (also, submitted to *IEEE Trans. Inform. Theory*, October 2013).
129. Y. Kaspi and N. Merhav, “Zero-delay and causal secure source coding,” Technical Report, CCIT Pub. no. 844 EE Pub. no. 1801, November 2013 (also submitted to *IEEE Trans. Inform. Theory*, November 2013).
130. N. Merhav, “List decoding – random coding exponents and expurgated exponents,” Technical Report, CCIT Pub. no. 845 EE Pub. no. 1802, November 2013 (also submitted to *IEEE Trans. Inform. Theory*, November 2013).
131. W. Huleihel and N. Merhav, “Asymptotic MMSE analysis under sparse representation modeling,” Technical Report, CCIT Pub. no. 846 EE Pub. no. 1803, December 2013 (also, submitted to *IEEE Trans. Inform. Theory*, December 2013).
132. N. Weinberger and N. Merhav, “Large deviations analysis of variable-rate Slepian–Wolf coding,” Technical Report, CCIT Pub. no. 850 EE Pub. no. 1807, January 2014 (also submitted to *IEEE Trans. Inform. Theory*, January 2014).
133. W. Huleihel and N. Merhav, “Universal decoding for Gaussian intersymbol interference channels,” Technical Report, CCIT Pub. no. 852 EE Pub. no. 1809, March 2014 (also submitted to *IEEE Trans. Inform. Theory*, March 2014).
134. W. Huleihel, N. Merhav and S. Shamai (Shitz), “On compressive sensing in coding problems: a rigorous approach,” Technical Report, CCIT Pub. no. 853 EE Pub. no. 1810, March 2014 (also, submitted to *IEEE Trans. Inform. Theory*, March 2014).
135. N. Merhav, “Exact correct-decoding exponent for the wiretap channel decoder,” Technical Report, CCIT Pub. no. 854 EE Pub. no. 1811, March 2014 (also, submitted to *IEEE Trans. Inform. Theory*, March 2014).
136. D. Vinkler, H. Permuter, and N. Merhav, “Analogy between gambling and measurement-based work extraction,” Technical Report, CCIT Pub. no. 857 EE Pub. no. 1814, April 2014 (also, submitted to *IEEE Trans. Inform. Theory*, April 2014).

137. N. Merhav, "Exact random coding exponents of optimal bin index decoding," submitted *IEEE Trans. Inform. Theory*, April 2014. Technical Report, CCIT Pub. no. 858 EE Pub. no. 1815, April 2014 (also, submitted to *IEEE Trans. Inform. Theory*, April 2014).
138. N. Merhav, "On zero-rate error exponents of finite-state channels with input-dependent states," Technical Report, CCIT Pub. no. 863 EE Pub. no. 1820, June 2014 (also, submitted to *IEEE Trans. Inform. Theory*, June 2014).
139. W. Huleihel, N. Weinberger, and N. Merhav, "Erasure/list random coding error exponents are not universally achievable," Technical Report, CCIT Pub. no. 869 EE Pub. no. 1826, October 2014 (also, submitted to *IEEE Trans. Inform. Theory*, October 2014).
140. A. Reani and N. Merhav, "Universal quantization for separate encodings and joint decoding of correlated sources," Technical Report, CCIT Pub. no. 870 EE Pub. no. 1827, November 2014 (also submitted to *IEEE Trans. Inform. Theory*, November 2014).
141. N. Merhav, "Statistical physics of random binning," Technical Report, CCIT Pub. no. 871 EE Pub. no. 1828, November 2014 (also submitted to *IEEE Trans. Inform. Theory*, November 2014).
142. N. Weinberger and N. Merhav, "Simplified erasure/list decoding," Technical Report, CCIT Pub. no. 873 EE Pub. no. 1830, December 2014 (also submitted to *IEEE Trans. Inform. Theory*, December 2014).
143. R. Atar and N. Merhav, "Information-theoretic applications of the log-probability comparison bound," Technical Report, CCIT Pub. no. 874 EE Pub. no. 1831, December 2014 (also submitted to *IEEE Trans. Inform. Theory*, December 2014).
144. W. Huleihel and N. Merhav, "Exact random coding error exponents for the two-user interference channel," Technical Report, CCIT Pub. no. 880 EE Pub. no. 1837, March 2015 (also submitted to *IEEE Trans. Inform. Theory*, March 2015).
145. N. Merhav, "Sequence complexity and work extraction," Technical Report, CCIT Pub. no. 883 EE Pub. no. 1840, March 2015 (also submitted to *Journal of Statistical Mechanics: Theory and Experiment*, March 2015).
146. N. Weinberger and N. Merhav, "A large deviations approach to secure lossy compression," Technical Report, CCIT Pub. no. 884 EE Pub. no. 1841, April 2015 (also submitted to *IEEE Trans. Inform. Theory*, April 2015).
147. N. Merhav, "Universal decoding for source-channel coding with side information," Technical Report, CCIT Pub. no. 885 EE Pub. no. 1842, July 2015 (also submitted to *IEEE Trans. Inform. Theory*, July 2015).



148. W. Huleihel and N. Merhav, “Codewords with memory improve achievable rate regions of the memoryless Gaussian interference channel,” Technical Report, CCIT Pub. no. 886 EE Pub. no. 1843, September 2015 (also submitted to *IEEE Trans. Inform. Theory*, August 2015).
149. N. Weinberger and N. Merhav, “Channel detection in coded communication,” Technical Report, CCIT Pub. no. 887 EE Pub. no. 1844, September 2015 (also submitted to *IEEE Trans. Inform. Theory*, September 2015).
150. N. Merhav, “The generalized stochastic likelihood decoder: random coding and expurgated bounds,” Technical Report, CCIT Pub. no. 891 EE Pub. no. 1848, December 2015 (also submitted to *IEEE Trans. Inform. Theory*, December 2015).
151. M. Bastani Parizi, E. Telatar and N. Merhav, “Exact random coding secrecy exponents for the wiretap channel,” Technical Report, CCIT Pub. no. 892 EE Pub. no. 1849, January 2016 (also submitted to *IEEE Trans. Inform. Theory*, January 2016).
152. N. Merhav, “On empirical cumulant generating functions of code lengths for individual sequences,” Technical Report, CCIT Pub. no. 896 EE Pub. no. 1853, May 2016 (also submitted to *IEEE Trans. Inform. Theory*, May 2016).
153. N. Weinberger and N. Merhav, “Lower bounds on parameter modulation–estimation under bandwidth constraints,” Technical Report, CCIT Pub. no. 900, EE Pub. no. 1857, June 2016 (also submitted to *IEEE Trans. Inform. Theory*, June 2016).
154. N. Merhav, “Universal decoding using a noisy codebook,” Technical Report, CCIT Pub. no. 901, EE Pub. no. 1858, September 2016 (also submitted to *IEEE Trans. Inform. Theory*, September 2016).
155. A. Ünsal, R. Knopp, and N. Merhav, “Converse bounds on modulation–estimation performance for the Gaussian multiple–access channel,” Technical Report, CCIT Pub. no. 903, EE Pub. no. 1860, September 2016 (also submitted to *IEEE Trans. Inform. Theory*, September 2016).
156. N. Merhav, “Reliability of universal decoding based on vector–quantized codewords,” Technical Report, CCIT Pub. no. 904, EE Pub. no. 1861, September 2016 (also submitted to *IEEE Trans. Inform. Theory*, September 2016).
157. N. Merhav, “Relations between work and entropy production for general information–driven, finite–state engines,” Technical Report, CCIT Pub. no. 906, EE Pub. no. 1863, November 2016 (also submitted to *Journal of Statistical Mechanics: Theory and Experiment*, November, 2016).

158. R. Averbuch and N. Merhav, “Exact random coding exponents and universal decoders for the asymmetric broadcast channel,” Technical Report, CCIT Pub. no. 909, EE Pub. no. 1866, February 2017 (also, submitted to *IEEE Trans. Inform. Theory*, February 2017).
159. N. Merhav, “Lower bounds on exponential moments of the quadratic error in parameter estimation,” Technical Report, CCIT Pub. no. 910, EE Pub. no. 1867, February 2017 (also, submitted to *IEEE Trans. Inform. Theory*, March 2017).
160. W. Huleihel, S. Salamatian, N. Merhav, and M. Médard, “Gaussian intersymbol interference channels with mismatch,” Technical Report, CCIT Pub. no. 911, EE Pub. no. 1868, June 2017 (also, submitted to *IEEE Trans. Inform. Theory*, June 2017).
161. N. Merhav, “Ensemble performance of biometric authentication systems based on secret key generation,” Technical Report, CCIT Pub. no. 912, EE Pub. no. 1869, July 2017 (also, submitted to *IEEE Trans. Inform. Theory*, July 2017).
162. N. Merhav, “Error exponents of typical random codes,” Technical Report, CCIT Pub. no. 913, EE Pub. no. 1870, August 2017 (also, submitted to *IEEE Trans. Inform. Theory*, August 2017).
163. R. Averbuch, N. Weinberger and N. Merhav, “Expurgated bounds for the asymmetric broadcast channel,” Technical Report, CCIT Pub. no. 916, EE Pub. no. 1873, December 2017 (also, submitted to *IEEE Trans. Inform. Theory*, December 2017).
164. B. Tondi, N. Merhav and M. Barni, “Detection games under fully active adversaries,” Technical Report, CCIT Pub. no. 918, EE Pub. no. 1875, February 2018 (also, submitted to *IEEE Trans. Inform. Theory*, February 2018).
165. N. Merhav, “Trade-offs between weak-noise estimation performance and outage exponents in non-linear modulation,” Technical Report, CCIT Pub. no. 920, EE Pub. no. 1877, February 2018 (also, submitted to *IEEE Trans. Inform. Theory*, February 2018).
166. N. Merhav, “False-accept/false-reject trade-offs in biometric authentication systems,” Technical Report, CCIT Pub. no. 924, May 2018 (also, submitted to *IEEE Trans. Inform. Theory*, May 2018.)

## Research Grants

1. Allon Fellowship personal research grant, by the Council for Higher Education in Israel, 1990–1993, \$15,000.
2. M. Feder and N. Merhav, “Universal sequential decision schemes and their applications,” Wolfson’s Research Award administered by The Israel Academy of Sciences and Humanities, 1993–1996, £63,000.

3. M. Feder and N. Merhav, “Information-theoretic aspects in universal prediction and statistical inference,” the *Israel Science Foundation* (ISF), 1996–1999, 345,820 NIS.
4. M. Feder and N. Merhav, “Minimax–universal composite hypothesis testing and applications,” the *Israel Science Foundation* (ISF), 1999–2002, \$120,000 (total).
5. M. Feder and N. Merhav, “Universal coding and decoding for communication over unknown channels,” the *Israel Science Foundation* (ISF), 2005–2008, 277,000 NIS (first year).
6. M. Barni and N. Merhav, “Digital watermarking of still images in the presence of desynchronization attacks: theoretical analysis and development of practical algorithms,” the Italian Research Ministry (MIUR), 2006–2009.
7. O. Somekh (under the supervision of N. Merhav), “Cooperation in hybrid wireless networks,” Marie Curie grant, the European Commission, 2005–2009.
8. N. Merhav, “Real–time and delay–limited source coding with side information,” the *Israel Science Foundation* (ISF), 204,000 NIS, 2008–2012.
9. N. Merhav, “Statistical–mechanical methods in information theory,” the *Israel Science Foundation* (ISF), 200,000 NIS, 2012–2016.
10. N. Merhav, “Typical random codes,” the *Israel Science Foundation* (ISF), 250,000 NIS 2018–2022.

### Other Funded Research Projects

1. N. Merhav, “Estimating of the number signals in the presence of noise with unknown statistics,” The Fund for the Promotion of Research at the Technion, 1990–1993.
2. N. Merhav, “Relations between universal data compression and computational learning theory,” The Fund for the Promotion of Research at the Technion, 1995–1997.
3. Consortium on Ground Stations for Satellite Communications, under the auspices of the S. Neaman Institute for Advanced Studies in Science and Technology, 1993–1997. Research projects:
  - (a) Universal lossless data compression for nonstationary sources.
  - (b) Universal lossy data compression for satellite communication channels (in collaboration with M. Feder).
4. N. Merhav, “Filtering and prediction of individual sequences in the presence of noise,” The Fund for the Promotion of Research at the Technion, 1998–2001.

5. Consortium on Software Radio, under the auspices of the S. Neaman Institute for Advanced Studies in Science and Technology, 1999–2000. Research project: “A new decoding method for unknown ISI channels,” (in collaboration with M. Feder).
6. N. Merhav, “On large-deviations tradeoffs between code-length and distortion in certain lossy source coding problems,” the Fund for the Promotion of Research at the Technion, 2002–2005.

### Graduate Students

1. Ronen Shevach, “Handwritten character recognition using a hidden Markov model,” M.Sc., April 1993.
2. David Hirshberg, “Robust methods for model order estimation,” M.Sc., May 1993.
3. Eran Gureshnik, “Methods of designing combined source–channel coders with minimum distortion,” M.Sc., October 1993. [currently, product–line manager at CopperGate].
4. Amir Shatz, “Robust techniques in speech recognition,” M.Sc., December 1993.
5. Jeremy Stein, “Universal delay estimation for discrete channels,” M.Sc., February 1995. Primary advisor: Prof. Jacob Ziv.
6. David Zelig, “Rake receiver in severe intersymbol interference conditions,” M.Sc., June 1995. Consultant: Dr. Amos Dothan.
7. Ronen Korman, “Design of power limited signals for mismatched Gaussian channels,” M.Sc., July 1995.
8. Yossi Erlich, “On HMM–based speech recognition using the MCE approach,” M.Sc., February 1996. Secondary advisor: Dr. Dan Chazan.
9. Gil I. Shamir, “Universal coding for classes of non-stationary sources,” M.Sc., June 1997. Secondary advisor: Prof. Jacob Ziv.
10. Nir Zonshine, “On the amount of statistical side information required for prediction,” M.Sc., June 1998.
11. Sharon Levy, “A survey - iterative methods in digital communication,” M.Sc., December 1998. Secondary advisor: Prof. Shlomo Shamai (Shitz).
12. Anelia Baruch, “Universal algorithms for sequential decision in the presence of noisy observations,” M.Sc., May 1999.
13. Tsachy Weissman, “Universal prediction in the presence of noise,” M.Sc. (passed to direct track to Ph.D.), September 1999.

14. Gil I. Shamir, “Universal coding for classes of nonstationary sources: lower bounds and optimal schemes,” Ph.D., April 2000. Primary advisor: Prof. Daniel J. Costello Jr., Notre Dame University, Notre Dame, Indiana, USA. [Was an Assistant Professor at the EE Department of the University of Utah, Salt Lake City; currently, with Google Pittsburg.]
15. Evgeny Levitan, “A universal approach to hypothesis testing with application to classification with training sequences,” M.Sc., May 2001.
16. Tsachy Weissman, “Universal prediction in the presence of noise,” Ph.D. (direct track), September 2001 [now, a full Professor at Stanford University].
17. Ilan Hen, “The threshold effect in the estimation of chaotic sequences,” M.Sc., February 2002 [currently, CEO of Densbits].
18. Zeev Litichever, “Classification of transition sounds with application to automatic speech recognition,” M.Sc., May 2002. Primary advisor: Dr. Dan Chazan. [currently, a senior algorithm developer at Negevtech].
19. Asaf Cohen, “Lower bounds on the error probability of a given block code,” M.Sc., November 2002.
20. Anelia Somekh–Baruch, “Information–theoretic analysis of watermarking systems,” Ph.D., May 2003 [currently, a faculty member in Bar Ilan University].
21. Erez Sabbag, “Large deviations performance of zero–delay finite–memory lossy source codes and source–channel codes,” M.Sc., November 2003.
22. Alina Maor, “On joint information embedding and data compression,” M.Sc., May 2004.
23. Liat Berger, “Encoding and decoding under channel uncertainty,” M.Sc., May 2004.
24. Guy Keshet, “Channel coding in the presence of side information: theory and applications,” M.Sc., October 2006. Primary advisor: Dr. Yossi Steinberg [currently with TraceSpan Communications.]
25. Gilad Bukai, “Estimation of channel parameters using feedback,” M.Sc., February, 2007.
26. Asaf Cohen, “Topics in scanning of multidimensional data,” Ph.D., April 2007. Consultant: Dr. Tsachy Weissman, Stanford University. [currently a faculty member at Ben Gurion University, after post–doc at CalTech.]
27. Yaniv Akirav, “Topics in universal coding and decoding under channel uncertainty,” M.Sc., June 2008.

28. Yonatan Kaspi, “Error exponents for broadcast channels with degraded message sets,” M.Sc., May 2009.
29. Alina Maor, “Topics in multiuser source coding,” Ph.D., December 2009 [currently with Hewlett–Packard Laboratories – Israel (HPLI)].
30. Avraham Reani, “Efficient on–line schemes for encoding individual sequences with side information at the decoder,” M.Sc., February 2010.
31. Oren Zeitlin, “Error exponents of fixed block binary messaging through DMCs,” M.Sc., January 2011 [substituting the primary advisor, Prof. Tsachy Weissman, who has been on leave since 2009].
32. Erez Sabbag, “Topics in channel reliability and error exponent analysis,” Ph.D., April 2011 [currently with Densbits, Haifa Israel].
33. Yonatan Kaspi, “Limited delay and causal coding with side information,” Ph.D., April 2013 [currently a post-doc at UCSD].
34. Shai Ginzach, “Sequential hypothesis testing and channel coding with feedback,” M.Sc., June 2015 [currently with Rafael – Advanced Defense Systems]. Primary advisor: Prof. Igal Sason.
35. Dror Vinkler (BGU), “Analogy between gambling and measurement–based work extraction,” M.Sc., November 2015. Primary advisor: Prof. Haim Permuter, Ben Gurion University, Beer Sheva.
36. Avraham Reani, “Causal and delay–limited coding in the presence of side information,” Ph.D., June 2016. [currently with Worldquant].
37. Wasim Huleihel, “On the relations between information theory, estimation theory and statistical mechanics,” Ph.D., August 2016. [currently, a post–doc at MIT].
38. Nir Weinberger, “Large deviations aspects in coding problems,” Ph.D., January 2017. [currently, a post–doc at Tel Aviv University].
39. Ran Averbuch, “Exact random coding error exponents and universal decoders for the degraded broadcast channel,” M.Sc., November 2017.

#### In progress

40. Ran Averbuch, “Typical random codes,” Ph.D. candidate, starting on October 2017.

### **Undergraduate Research Projects**

1. Tsachy Weissman, “Optimization of pulse shape and offset for OQPSK with time limited pulses,” October 1997.
2. Erez Carmi, “Compression of steering vectors using simplified physical models,” November 1997.

3. Asaf Cohen, "A lower bound on the error probability for signals in Gaussian noise," December 2000.
4. Eyal En Gad, "Channel shaping to maximize minimum distance," July 2007.
5. Omer Yair, "Upper Bounds on the entropy rate of a hidden Markov model via variation principles," June 2011.
6. Asaf Noy, "Statistical physics and mismatched estimation: theory and applications," July 2012.