

# Curriculum Vitae

NERI MERHAV ID#54146790

**Date:** January 10, 2012

## Personal Data:

Date and place of birth: March 16, 1957, Haifa, Israel  
Marital Status: Married + 3 children  
Citizenship: Israeli  
Permanent Address: 24 Naamat Street, Haifa 34670, Israel  
Home Phone No.: +972-(4)-8254552  
Office Phone No.: +972-(4)-8294737  
Cellular Phone No.: +972-(54)-5274737  
E-mail address: merhav@ee.technion.ac.il  
URL address: <http://webee.technion.ac.il/people/merhav/>

## 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
- Electrical Engineering M (basic circuit theory)
- Introduction to Digital Signal Processing
- Introduction to Random Signal Processing
- Random Signals
- Introduction to Coding Theory

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

- Ergodic Theory and Information Measures\*
- Information Theory
- Coded Communications

---

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

- Universal Methods in Lossless Data Compression\* (jointly with Prof. J. Ziv)
- Rate–Distortion Theory, Quantization and Lossy Data Compression\*
- Information Theory and Statistical Physics\*.

### 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, machine 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 processing (in association with Abraham Lempel, Marcelo Weinberger, Gadiel Seroussi, Ron Roth, and Vasudev Bhaskaran).
- 1995–96 Hewlett–Packard Laboratories, Palo Alto, CA – Sabbatical year:  
Image and Video compression, compressed domain image manipulation (in association with Abraham Lempel, Marcelo Weinberger, 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 and Technion 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 & Signal Processing Seminar.

1994–95	Consultant of students under discussion.
1994–95, 96–99	Coordinator of EE graduate courses in the field of Communications.
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–ongoing	Member of the Ollendorf Center committee.
2008–ongoing	Member of development, resources and finance committee.
2009–ongoing	Member of the graduate studies committee.
2011–ongoing	Member of the committee for acceptance of 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.

#### **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.

## Active Participation in International Conferences:

### Invited Presentations

1. IEEE Workshop on Information Theory, Ithaca, New York, June 1989: “Estimation of model order in exponential families.”
2. IEEE Workshop on Information Theory, 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. 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 (ITA) Workshop, 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 (ITA) Workshop, 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 (ITA) Workshop, 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 (ITA) Workshop, San Diego, California, February 5–10: “Data processing inequalities based on certain structured class of information measures with application to estimation theory.”

### 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.”

### **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. 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.
19. 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. Alon 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. 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."
18. 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).
19. 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.”

20. 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.”

## LIST OF PUBLICATIONS<sup>2</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*, 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.
4. N. Merhav and J. Ziv, “On universally efficient estimation of the first-order autoregressive parameter, and universal data compression,” *IEEE Trans. Inform. Theory*, vol. 36, no. 6, pp. 1245–1254, November 1990.
5. N. Merhav, “Universal coding with minimum probability of code word length overflow,” *IEEE Trans. Inform. Theory*, vol. 37, no. 3, pp. 556–563, May 1991.
6. N. Merhav and J. Ziv, “A Bayesian approach for classification of Markov sources,” *IEEE Trans. Inform. Theory*, vol. 37, no. 4, pp. 1067–1071, July 1991.

---

<sup>2</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.

7. N. Merhav and Y. Ephraim, "Maximum likelihood hidden Markov modeling using a dominant sequence of states," *IEEE Trans. Acoust., Speech, and Signal Processing*, vol. ASSP-39, no. 9, pp. 2111–2115, September 1991.
8. N. Merhav and Y. Ephraim, "A Bayesian classification approach with application to speech recognition," *IEEE Trans. Acoust., Speech, and Signal Processing*, vol. ASSP-39, no. 10, pp. 2157–2166, October 1991.
9. N. Merhav and Y. Ephraim, "Hidden Markov modeling using a dominant sequence of states with application to speech recognition," *Computers, Speech and Language*, vol. 5, no. 4, pp. 327–339, October 1991.
10. N. Merhav, "Universal classification for hidden Markov models," *IEEE Trans. Inform. Theory*, vol. 37, no. 6, pp. 1586–1594, November 1991.
11. J. Ziv and N. Merhav, "Estimating the number of states of a finite-state source," *IEEE Trans. Inform. Theory*, vol. 38, no. 1, pp. 61–65, January 1992.
12. N. Merhav and D. L. Neuhoff, "Variable-to-fixed length codes provide better large deviations performance than fixed-to-variable length codes," *IEEE Trans. Inform. Theory*, vol. 38, no. 1, pp. 135–140, January 1992.
13. 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. **Received the 1993 Paper Award of the IEEE IT Society.**
14. O. Zeitouni, J. Ziv, and N. Merhav, "When is the generalized likelihood ratio test optimal?" *IEEE Trans. Inform. Theory*, vol. 38, no. 5, pp. 1597–1602, September 1992.
15. Y. Ephraim and N. Merhav, "Lower and upper bounds on the minimum mean square error in composite source signal estimation," *IEEE Trans. Inform. Theory*, vol. 38, no. 6, pp. 1709–1724, November 1992.
16. N. Merhav and C.-H. Lee, "A minimax classification approach with application to robust speech recognition," *IEEE Trans. Speech and Audio Processing*, vol. SAP-1, no. 1, pp. 90–100, January 1993.
17. N. Merhav and C.-H. Lee, "On the asymptotic statistical behavior of empirical cepstral coefficients," *IEEE Trans. Signal Processing*, vol. SP-41, no. 5, pp. 1990–1993, May 1993.
18. N. Merhav, M. Feder, and M. Gutman, "Some properties of sequential predictors for binary Markov sources," *IEEE Trans. Inform. Theory*, vol. 39, no. 3, pp. 887–892, May 1993.
19. N. Merhav, "Universal decoding for memoryless Gaussian channels with a deterministic interference," *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1261–1269, July 1993.

20. J. Ziv and N. Merhav, "A measure of relative entropy between individual sequences with application to universal classification," *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1270–1279, July 1993.
21. N. Merhav and M. Feder, "Universal schemes for sequential decision from individual data sequences," *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1280–1291, July 1993.
22. N. Merhav, "On the minimum description length principle for sources with piecewise constant parameters," *IEEE Trans. Inform. Theory*, vol. 39, no. 6, pp. 1962–1967, November 1993.
23. M. Feder and N. Merhav, "Relations between entropy and error probability," *IEEE Trans. Inform. Theory*, vol. 40, no. 1, pp. 259–266, January 1994.
24. M. J. Weinberger, N. Merhav, and M. Feder, "Optimal sequential probability assignment for individual sequences," *IEEE Trans. Inform. Theory*, vol. 40, no. 2, pp. 384–396, March 1994.
25. N. Merhav, "Bounds on achievable convergence rates of parameter estimators via universal coding," *IEEE Trans. Inform. Theory*, vol. 40, no. 4, pp. 1210–1215, July 1994.
26. N. Merhav, G. Kaplan, A. Lapidoth, and S. Shamai (Shitz), "On information rates for mismatched decoders," *IEEE Trans. Inform. Theory*, vol. 40, no. 6, pp. 1953–1967, November 1994.
27. N. Merhav and M. Feder, "A strong version of the redundancy–capacity theorem of universal coding," *IEEE Trans. Inform. Theory*, vol. 41, no. 3, pp. 714–722, May 1995.
28. N. Merhav, "A comment on 'A rate of convergence result for a universal  $D$ –semifaithful code'," *IEEE Trans. Inform. Theory*, vol. 41, no. 4, pp. 1200–1202, July 1995.
29. R. Meir and N. Merhav, "On the stochastic complexity of learning realizable and unrealizable rules," *Machine Learning*, vol. 19, no. 3, pp. 241–261, 1995.
30. Y. Ephraim, N. Merhav, and H. L. Van Trees, "Min-Norm interpretations and consistency of MUSIC, MODE and ML," *IEEE Trans. Signal Processing*, vol. SP-43, no. 12, pp. 2937–2942, December 1995.
31. D. Hirshberg and N. Merhav, "Robust methods for model order estimation," *IEEE Trans. on Signal Processing*, vol. SP-44, no. 3, pp. 620–628, March 1996.
32. M. Feder and N. Merhav, "Hierarchical universal coding," *IEEE Trans. Inform. Theory*, vol. 42, no. 5, pp. 1354–1364, September 1996.

33. J. Stein, J. Ziv, and N. Merhav, "Universal delay estimation for discrete channels," *IEEE Trans. on Inform. Theory*, vol. 42, Part II, no. 6, pp. 2085-2093, November 1996.
34. N. Merhav and V. Bhaskaran, "Fast inverse motion compensation algorithms for MPEG-2 and for partial DCT information," *J. Visual Communication and Image Representation*, vol. 7, no. 4, pp. 395-410, December 1996.
35. N. Merhav, "On list size exponents in rate-distortion coding," *IEEE Trans. on Inform. Theory*, vol. 43, no. 2, pp. 765-769, March 1997.
36. N. Merhav and V. Bhaskaran, "Fast algorithms for DCT-domain down-sampling and inverse motion compensation," *IEEE Trans. on Circuits and Systems for Video Technology*, vol. 7, no. 3, pp. 468-476, June 1997.
37. N. Merhav and J. Ziv, "On the amount of statistical side information required for lossy data compression," *IEEE Trans. Inform. Theory*, vol. 43, no. 4, pp. 1112-1121, July 1997.
38. N. Merhav, "How many information bits does a decoder need about the channel statistics?" *IEEE Trans. Inform. Theory*, vol. 43, no. 5, pp. 1707-1714, September 1997.
39. E. Arikan and N. Merhav, "Guessing subject to distortion," *IEEE Trans. Inform. Theory*, vol. 44, no. 3, pp. 1041-1056, May 1998.
40. N. Merhav and R. Kresch, "Approximate convolution using DCT coefficient multipliers," *IEEE Trans. on Circuits and Systems for Video Technology*, vol. CSVT-8, no. 4, pp. 378-385, August 1998.
41. E. Arikan and N. Merhav, "Joint source-channel coding and guessing with application to sequential decoding," *IEEE Trans. Inform. Theory*, vol. 44, no. 5, pp. 1756-1769, September 1998.
42. N. Merhav and M. Feder, "Universal prediction," (invited paper) *IEEE Trans. Inform. Theory*, vol. 44, no. 6, pp. 2124-2147, October 1998. (Commemorative issue for fifty years of Information Theory.) Also, in *Information Theory: 50 Years of Discovery*, pp. 80-103, Eds. S. Verdú and S. McLaughlin, IEEE Press, 1999.
43. N. Merhav, R. M. Roth, and E. Arikan, "Hierarchical guessing with a fidelity criterion," *IEEE Trans. Inform. Theory*, vol. 45, no. 1, pp. 330-337, January 1999.
44. N. Merhav, "Multiplication-free approximate algorithms for compressed domain linear operations on images," *IEEE Trans. Image Processing*, vol. 8, no. 2, pp. 247-254, February 1999.
45. R. Kresch and N. Merhav, "Fast DCT-domain filtering using the DCT and the DST," *IEEE Trans. on Image Processing*, vol. 8, no. 6, pp. 821-833, June 1999.

46. G. I. Shamir and N. Merhav, "Low-complexity sequential lossless coding for piecewise stationary memoryless sources," *IEEE Trans. Inform. Theory*, vol. 45, no. 5, pp. 1498–1519, July 1999.
47. N. Merhav and E. Arikan, "The Shannon cipher system with a guessing wiretapper," *IEEE Trans. Inform. Theory*, vol. 45, no. 6, pp. 1860–1866, September 1999.
48. N. Merhav, G. Seroussi, and M. J. Weinberger, "Optimal prefix codes for sources with two-sided geometric distributions," *IEEE Trans. Inform. Theory*, vol. 46, no. 1, pp. 121–135, January 2000.
49. N. Merhav, G. Seroussi, and M. J. Weinberger, "Coding of sources with two-sided geometric distributions and unknown parameters," *IEEE Trans. Inform. Theory*, vol. 46, no. 1, pp. 229–236, January 2000.
50. N. Merhav, "On random coding error exponents of watermarking systems," *IEEE Trans. Inform. Theory*, vol. 46, no. 2, pp. 420–430, March 2000.
51. N. Merhav, "Universal detection of messages via finite-state channels," *IEEE Trans. Inform. Theory*, vol. 46, no. 6, pp. 2242–2246, September 2000.
52. Y. Steinberg and N. Merhav, "Identification codes in the presence of side information with application to watermarking," *IEEE Trans. Inform. Theory*, vol. 47, no. 4, pp. 1410–1422, May 2001.
53. T. Weissman, N. Merhav, and A. Somekh-Baruch, "Twofold universal prediction schemes for achieving the finite-state predictability of a noisy individual binary sequence," *IEEE Trans. Inform. Theory*, vol. 47, no. 5, pp. 1849–1866, July 2001.
54. T. Weissman and N. Merhav, "Universal prediction of binary individual sequences in the presence of noise," *IEEE Trans. Inform. Theory*, vol. 47, no. 6, pp. 2151–2173, September 2001.
55. T. Weissman and N. Merhav, "Tradeoffs between the excess-code-length exponent and the excess-distortion exponent in lossy source coding," *IEEE Trans. Inform. Theory*, vol. 48, no. 2, pp. 396–415, February 2002.
56. T. Weissman and N. Merhav, "On limited-delay lossy coding and filtering of individual sequences," *IEEE Trans. Inform. Theory*, vol. 48, no. 3, pp. 721–733, March 2002.
57. M. Feder and N. Merhav, "Universal composite hypothesis testing: a competitive minimax approach," (invited paper) *IEEE Trans. Inform. Theory*, special issue in memory of Aaron D. Wyner, vol. 48, no. 6, pp. 1504–1517, June 2002.

58. Y. Ephraim and N. Merhav, "Hidden Markov processes," (invited paper) *IEEE Trans. Inform. Theory*, special issue in memory of Aaron D. Wyner, vol. 48, no. 6, pp. 1518–1569, June 2002.
59. N. Merhav, E. Ordentlich, G. Seroussi, and M. J. Weinberger, "On sequential strategies for loss functions with memory," *IEEE Trans. Inform. Theory*, vol. 48, no. 7, pp. 1947–1958, July 2002.
60. E. Levitan and N. Merhav, "A competitive Neyman–Pearson approach to universal hypothesis testing with applications," *IEEE Trans. Inform. Theory*, vol. 48, no. 8, pp. 2215–2229, August 2002.
61. N. Merhav and T. Weissman, "Scanning and prediction in multi-dimensional data arrays," *IEEE Trans. Inform. Theory*, vol. 49, no. 1, pp. 65–82, January, 2003.
62. N. Merhav, "A large-deviations notion of perfect secrecy," *IEEE Trans. Inform. Theory*, vol. 49, no. 2, pp. 506–508, February 2003.
63. A. Somekh–Baruch and N. Merhav, "On the error exponent and capacity games of private watermarking systems," *IEEE Trans. Inform. Theory*, vol. 49, no. 3, pp. 537–562, March 2003.
64. N. Merhav and I. Kontoyiannis, "Source coding exponents for zero-delay coding with finite memory," *IEEE Trans. Inform. Theory*, vol. 49, no. 3, pp. 609–625, March 2003.
65. N. Merhav and S. Shamai (Shitz), "On joint source–channel coding for the Wyner–Ziv source and the Gel'fand–Pinsker channel," *IEEE Trans. Inform. Theory*, vol. 49, no. 11, pp. 2844–2855, November 2003.
66. T. Weissman and N. Merhav, "On competitive prediction and its relation to rate–distortion theory," *IEEE Trans. Inform. Theory*, vol. 49, no. 12, pp. 3185–3194, December 2003.
67. N. Merhav and M. J. Weinberger, "On universal simulation of information sources using training data," *IEEE Trans. Inform. Theory*, vol. 50, no. 1, pp. 5–20, January 2004.
68. N. Merhav, "Achievable key rates for universal simulation of random data with respect to a set of statistical tests," *IEEE Trans. Inform. Theory*, vol. 50, no. 1, pp. 21–30, January 2004.
69. A. Cohen and N. Merhav, "Lower bounds on the error probability of block codes based on improvements on de Caen's inequality," *IEEE Trans. Inform. Theory*, vol. 50, no. 2, pp. 290–310, February 2004.
70. T. Weissman and N. Merhav, "Universal prediction of random binary sequences in a noisy environment," *Annals of Applied Probability*, vol. 14, no. 1, pp. 54–89, February 2004.

71. A. Somekh–Baruch and N. Merhav, “On the capacity game of public watermarking systems,” *IEEE Trans. Inform. Theory*, vol. 50, no. 3, pp. 511–524, March 2004.
72. Y. C. Eldar and N. Merhav, “A competitive minimax approach to robust linear estimation,” *IEEE Trans. on Signal Processing*, vol. 52, no. 7, pp. 1931–1946, July 2004.
73. Y. Steinberg and N. Merhav, “On successive refinement for the Wyner–Ziv problem,” *IEEE Trans. Inform. Theory*, vol. 50, no. 8, pp. 1636–1654, August 2004.
74. I. Hen and N. Merhav, “On the threshold effect in the estimation of chaotic sequences,” *IEEE Trans. Inform. Theory*, vol. 50, no. 11, pp. 2894–2904, November 2004.
75. A. Somekh–Baruch and N. Merhav, “On the capacity game of private fingerprinting systems under collusion attacks,” *IEEE Trans. Inform. Theory*, vol. 51, no. 3, pp. 884–899, March 2005 (Correction: *IEEE Trans. Inform. Theory*, vol. 54, no. 11, pp. 5263–5264, November 2008).
76. Y. C. Eldar and N. Merhav, “Robust linear estimation under a minimax MSE–ratio criterion,” *IEEE Trans. Signal Processing*, vol. 53, no. 4, pp. 1335–1347, April 2005.
77. A. Maor and N. Merhav, “On joint information embedding and lossy compression,” *IEEE Trans. Inform. Theory*, vol. 51, no. 8, pp. 2998–3008, August 2005.
78. A. Maor and N. Merhav, “On joint information embedding and lossy compression in the presence of a stationary memoryless attack channel,” *IEEE Trans. Inform. Theory*, vol. 51, no. 9, pp. 3166–3175, September 2005.
79. N. Merhav and M. J. Weinberger, “Addendum to ”On universal simulation of information sources using training data”,” *IEEE Trans. Inform. Theory*, vol. 51, no. 9, pp. 3381–3383, September 2005.
80. I. Hen and N. Merhav, “On the error exponent of trellis source coding,” *IEEE Trans. Inform. Theory*, vol. 51, no. 11, pp. 3734–3741, November 2005.
81. T. Weissman and N. Merhav, “On causal source codes with side information,” *IEEE Trans. Inform. Theory*, vol. 51, no. 11, pp. 4003–4013, November 2005.
82. N. Merhav, “On joint coding for watermarking and encryption,” *IEEE Trans. Inform. Theory*, vol. 52, no. 1, pp. 190–205, January 2006.
83. N. Merhav and E. Ordentlich, “On causal and semi-causal codes for joint information embedding and source coding,” *IEEE Trans. Inform. Theory*, vol. 52, no. 1, pp. 213–226, January 2006.

84. N. Merhav and J. Ziv, "On the Wyner–Ziv problem for individual sequences," *IEEE Trans. Inform. Theory*, vol. 52, no. 3, pp. 867–873, March 2006.
85. Y. Steinberg and N. Merhav, "On hierarchical joint source–channel coding with degraded side information," *IEEE Trans. Inform. Theory*, vol. 52, no. 3 pp. 886–903, March 2006.
86. N. Merhav, "On the Shannon cipher system with a capacity–limited key–distribution channel," *IEEE Trans. Inform. Theory*, vol. 52, no. 3, pp. 1269–1273, March 2006.
87. A. Maor and N. Merhav, "Two–way joint source–channel coding with a fidelity criterion," *IEEE Trans. Inform. Theory*, vol. 52, no. 4, pp. 1483–1494, April 2006.
88. N. Merhav and T. Weissman, "Coding for the feedback Gel'fand–Pinsker channel and the feedforward Wyner–Ziv source," *IEEE Trans. Inform. Theory*, vol. 52, no. 9, pp. 4207–4211, September 2006.
89. T. Weissman, E. Ordentlich, M. J. Weinberger, A. Somekh–Baruch, and N. Merhav, "Universal filtering via prediction," *IEEE Trans. Inform. Theory*, vol. 53, no. 4, pp. 1253–1264, April 2007.
90. N. Merhav and M. Feder, "Minimax universal decoding with an erasure option," *IEEE Trans. Inform. Theory*, vol. 53, no. 5, pp. 1664–1675, May 2007.
91. A. Somekh–Baruch and N. Merhav, "Achievable error exponents for the private fingerprinting game," *IEEE Trans. Inform. Theory*, vol. 53, no. 5, pp. 1827–1838, May 2007.
92. J. Ziv and N. Merhav, "On context–tree prediction of individual sequences," *IEEE Trans. Inform. Theory*, vol. 53, no. 5, pp. 1860–1866, May 2007.
93. N. Merhav and S. Shamai (Shitz), "Information rates subject to state masking," *IEEE Trans. Inform. Theory*, vol. 53, no. 6, pp. 2254–2261, June 2007.
94. A. Cohen, N. Merhav, and T. Weissman, "Scanning and sequential decision making for multi–dimensional data: part I – the noiseless case," *IEEE Trans. Inform. Theory*, vol. 53, no. 9, pp. 3001–3020, September 2007.
95. G. Keshet, Y. Steinberg, and N. Merhav, "Channel coding in the presence of side information," (invited paper) *Foundations and Trends in Communications and Information Theory*, vol. 4, no. 6, pp. 445–586, 2007.
96. N. Merhav and E. Sabbag, "Optimal watermark embedding and detection strategies under limited detection resources," *IEEE Trans. Inform. Theory*, vol. 54, no. 1, pp. 255–274, January 2008.

97. A. Maor and N. Merhav, "On successive refinement with causal side information at the decoders," *IEEE Trans. Inform. Theory*, vol. 54, no. 1, pp. 332–343, January 2008.
98. A. D'Angelo, M. Barni and N. Merhav, "Stochastic image warping for improved watermark de-synchronization," *EURASIP Journal on Information Security*, vol. 2008, Article ID 345184, 14 pages, 2008. doi:10.1155/2008/354184.
99. N. Merhav, "Shannon's secrecy system with informed receivers and its application to systematic coding for wiretapped channels," *IEEE Trans. Inform. Theory*, special issue on *Information-Theoretic Security*, vol. 54, no. 6, pp. 2723–2734, June 2008.
100. N. Merhav, "An identity of Chernoff bounds with an interpretation in statistical physics and applications in information theory," *IEEE Trans. Inform. Theory*, vol. 54, no. 8, pp. 3710–3721, August 2008.
101. N. Merhav, "The random energy model in a magnetic field and joint source-channel coding," *Physica A: Statistical Mechanics and Its Applications*, vol. 387, issue 22, pp. 5662–5674, September 15, 2008. doi:10.1016/j.physa.2008.05.040
102. N. Merhav, "Error exponents of erasure/list decoding revisited via moments of distance enumerators," *IEEE Trans. Inform. Theory*, vol. 54, no. 10, pp. 4439–4447, October 2008.
103. N. Merhav, G. Seroussi, and M. J. Weinberger, "Universal delay-limited simulation," *IEEE Trans. Inform. Theory*, vol. 54, no. 12, pp. 5525–5533, December 2008.
104. A. Cohen, T. Weissman, and N. Merhav, "Scanning and sequential decision making for multi-dimensional data: part II – the noisy case," *IEEE Trans. Inform. Theory*, vol. 54, no. 12, pp. 5609–5631, December 2008.
105. N. Merhav, "Relations between random coding exponents and the statistical physics of random codes," *IEEE Trans. Inform. Theory*, vol. 55, no. 1, pp. 83–92, January 2009.
106. N. Merhav and M. J. Weinberger, "Universal simulation with fidelity criteria," *IEEE Trans. Inform. Theory*, vol. 55, no. 1, pp. 292–302, January 2009.
107. N. Merhav, "The generalized random energy model and its application to the statistical physics of ensembles of hierarchical codes," *IEEE Trans. Inform. Theory*, vol. 55, no. 3, pp. 1250–1268, March 2009.
108. Y. Akirav and N. Merhav, "Exact characterization of the minimax loss in error exponents of universal decoders," *IEEE Trans. Inform. Theory*, vol. 55, no. 4, pp. 1440–1459, April 2009.

109. N. Merhav, “Joint source–channel coding via statistical mechanics: thermal equilibrium between the source and the channel,” *IEEE Trans. Inform. Theory*, vol. 55, no. 12, pp. 5382–5393, December 2009.
110. N. Merhav, “Statistical physics and information theory,” (invited paper) *Foundations and Trends in Communications and Information Theory*, vol. 6, nos. 1–2, pp. 1–212, 2009.
111. R. Etkin, N. Merhav and E. Ordentlich, “Error exponents of optimum decoding for the interference channel,” *IEEE Trans. Inform. Theory*, vol. 56, no. 1, pp. 40–56, January 2010.
112. N. Merhav and Y. Kafri, “Bose–Einstein condensation in large deviations with applications to information systems,” *Journal of Statistical Mechanics: Theory and Experiment*, P02011, February 2010. doi: 10.1088/1742-5468/2010/02/P02011
113. N. Merhav, “On the statistical physics of directed polymers in a random medium and their relation to tree codes,” *IEEE Trans. Inform. Theory*, vol. 56, no. 3, pp. 1345–1350, March 2010.
114. N. Merhav, D. Guo, and S. Shamai (Shitz), “Statistical physics of signal estimation in Gaussian noise: theory and examples of phase transitions,” *IEEE Trans. Inform. Theory*, vol. 56, no. 3, pp. 1400–1416, March 2010.
115. P. Comesaña, N. Merhav, and M. Barni, “Asymptotically optimum universal one–bit watermarking for Gaussian coartexts and Gaussian attacks,” *IEEE Trans. Inform. Theory*, vol. 56, no. 6, pp. 2804–2815, June 2010.
116. A. Maor (Varshavsky) and N. Merhav, “On successive refinement for the Kaspi/Heegard–Berger problem,” *IEEE Trans. Inform. Theory*, vol. 56, no. 8, pp. 3930–3945, August 2010.
117. A. Martín, N. Merhav, G. Seroussi, and M. J. Weinberger, “Twice–universal simulation of Markov sources and individual sequences,” *IEEE Trans. Inform. Theory*, vol. 56, no. 9, pp. 4245–4255, September 2010.
118. N. Merhav, “Physics of the Shannon limits,” *IEEE Trans. Inform. Theory*, vol. 56, no. 9, pp. 4274–4285, September 2010.
119. E. Sabbag and N. Merhav, “Achievable error exponents for channels with side information – erasure and list decoding,” *IEEE Trans. Inform. Theory*, vol. 56, no. 11, pp. 5424–5431, November 2010.
120. N. Merhav and Y. Kafri, “Statistical properties of entropy production derived from fluctuation theorems,” *Journal of Statistical Mechanics: Theory and Experiment*, P12022, December 2010. doi: 10.1088/1742-5468/2010/12/P12022

121. Y. Kaspi and N. Merhav, “Error exponents for broadcast channels with degraded message sets,” *IEEE Trans. Inform. Theory*, vol. 57, no. 1, pp. 101–123, January 2011.
122. N. Merhav, “A statistical–mechanical view on source coding: physical compression and data compression,” *Journal of Statistical Mechanics: Theory and Experiment*, P01029, January 2011. doi: 10.1088/1742-5468/2011/01/P01029
123. N. Merhav, “Rate–distortion function via minimum mean square error estimation,” *IEEE Trans. Inform. Theory*, vol. 57, no. 6, pp. 3196–3206, June 2011.
124. N. Merhav, “Optimum estimation via gradients of partition functions and information measures: a statistical–mechanical perspective,” *IEEE Trans. Inform. Theory*, vol. 57, no. 6, pp. 3887–3898, June 2011.
125. N. Merhav, “Data processing theorems and the second law of thermodynamics,” *IEEE Trans. Inform. Theory*, vol. 57, no. 8, pp. 4926–4939, August 2011.
126. N. Merhav, “Subset–sum phase transitions and data compression,” *Journal of Statistical Mechanics: Theory and Experiment*, P09017, September 2011, doi: 10.1088/1742-5468/2011/09/P01029
127. A. Somekh–Baruch and N. Merhav, “Exact random coding error exponents for erasure decoding,” *IEEE Trans. Inform. Theory*, vol. 57, no. 10, pp. 6444–6454, October 2011.
128. A. Reani and N. Merhav, “Efficient on–line schemes for encoding individual sequences with side information at the decoder,” *IEEE Trans. Inform. Theory*, vol. 57, no. 10, pp. 6860–6876, October 2011.
129. N. Merhav, “Threshold effects in parameter estimation as phase transitions in statistical mechanics,” *IEEE Trans. Inform. Theory*, vol. 57, no. 10, pp. 7000–7010, October 2011.

### Unpublished Journal Articles

#### In Press

130. N. Merhav, “Relations between redundancy patterns of the Shannon code and wave diffraction patterns of partially disordered media,” to appear in *IEEE Trans. Inform. Theory*.

#### Submitted

131. N. Merhav, “On optimum strategies for minimizing exponential moments of a loss function,” submitted to *Communications in Information and Systems*, November 2011.

132. Y. Kaspı and N. Merhav, “Structure theorems for real–time variable–rate coding with and without side information,” submitted to *IEEE Trans. Inform. Theory*, August 2011.
133. N. Merhav, “Data processing inequalities based on a certain structured class of information measures with application to estimation theory,” submitted to *IEEE Trans. Inform. Theory*, September 2011.
134. N. Merhav, “Perfectly secure encryption of individual sequences,” submitted to *IEEE Trans. Inform. Theory*, December 2011.
135. Y. Ephraim, B. L. Mark, and N. Merhav, “Consistency of the maximum likelihood parameter estimator for bivariate Markov chains,” submitted to *Stochastic Models*, January 2012.

### Conference Proceedings<sup>3</sup>

- \*1. N. Merhav and D. Chazan, “A stabilizing scheme for difference equations,” *Proc. Fourteenth Convention of Electrical & Electronics Engineers in Israel*, pp. 3.1.4, Tel Aviv, March 1985.
- \*2. N. Merhav and D. Malah, “Adaptive maximum entropy coding,” *Proc. EUSIPCO-86*, The Hague, The Netherlands, pp. 743–745, September 1986.
- \*3. N. Merhav and Y. Ephraim, “Approximate Bayesian classification based on hidden Markov modeling,” *Proc. ISIT 1990*, p. 97, San Diego, CA, January 1990.
4. J. Ziv and N. Merhav, “Estimating the number of states of a finite-state source,” *Proc. AAAI Spring Symposium on the Theory and Applications of Minimal-Length Encoding*, pp. 80–84, March 1990. (Also, in *Proc. ISIT 1990*, p. 31, San Diego, CA, January, 1990, and *IEEE Trans. Inform. Theory*, vol. 38, no. 1, pp. 61–65, January 1992.)
5. N. Merhav, “Universal coding with minimum probability of length overflow,” *Proc. AAAI Spring Symposium on the Theory and Applications of Minimal-Length Encoding*, pp. 85–89, March 1990. (Also, in *IEEE Trans. Inform. Theory*, vol. 37, no. 3, pp. 556–563, May 1991.)
6. M. Feder, N. Merhav, and M. Gutman, “Universal prediction of individual sequences,” *Proc. Seventeenth Convention of Electrical & Electronics Engineers in Israel*, pp. 223–226, Ramat–Gan, May 1991. (Also, in *IEEE Trans. Inform. Theory*, vol. 38, no. 4, pp. 1258–1270, July 1992.)
7. N. Merhav and Y. Ephraim, “A Bayesian classification approach with application to speech recognition,” *Proc. IEEE Int. Conf. on Acoust., Speech and Signal Processing*, pp. 529–532, May 1991. (Also, in *IEEE*

---

<sup>3</sup>Conference papers marked by asterisks do not have journal versions.

- Trans. Acoust., Speech and Signal Processing*, vol. ASSP-39, no. 10, pp. 2157–2166, October 1991.)
8. N. Merhav and Y. Ephraim, “Hidden Markov modeling using the most likely state sequence,” *Proc. IEEE Int. Conf. on Acoust., Speech and Signal Processing*, pp. 469–472, May 1991. (Also, in *IEEE Trans. Acoust., Speech and Signal Processing*, vol. ASSP-39, no. 9, pp. 2111–2115, September 1991.)
  9. Y. Ephraim and N. Merhav, “Lower and upper bounds on the mean square error on composite source estimation,” *Proc. IEEE Int. Symp. on Information Theory*, p. 163, June 1991. (Also, in *IEEE Trans. Inform. Theory*, vol. 38, no. 6, pp. 1709–1724, November 1992.)
  10. N. Merhav and C.-H. Lee, “A minimax classification approach with application to robust speech recognition,” *Proc. IEEE Int. Symp. on Information Theory*, p. 285, June 1991. (Also, in *IEEE Trans. Speech and Audio Processing*, vol. SAP-1, no. 1, pp. 90–100, January 1993.)
  11. O. Zeitouni, J. Ziv, and N. Merhav, “When is the generalized likelihood ratio test optimal?” *Proc. IEEE Int. Symp. on Information Theory*, p. 355, June 1991. (Also, in *IEEE Trans. Inform. Theory*, vol. 38, no. 5, pp. 1597–1602, September 1992.)
  - \*12. J. Ziv and N. Merhav, “Universal classification of individual sequences via finite-state classifiers,” in *Sequences II*, pp. 313–325, edited by R. Capocelli, A. De Santis, and U. Vaccaro, Springer-Verlag, 1993.
  13. N. Merhav and M. Feder, “Universal sequential learning and decision from individual data sequences,” *Proc. 5th ACM Workshop on Computational Learning Theory*, pp. 413–427, July 1992. (Also, in *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1280–1292, July 1993.)
  14. J. Ziv and N. Merhav, “A measure of relative entropy between individual sequences with application to universal classification,” *Proc. IEEE Int. Symp. on Information Theory*, p. 352, January 1993. (Also, in *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1270–1279, July 1993.)
  15. N. Merhav, G. Kaplan, A. Lapidoth, and S. Shamai (Shitz), “On information rates for mismatched decoders,” *Proc. IEEE Int. Symp. on Information Theory*, p. 266, January 1993. (Also, in *IEEE Trans. Inform. Theory*, vol. 40, no. 6, pp. 1953–1967, November 1994.)
  16. N. Merhav and M. Feder, “Universal schemes for sequential decision from individual data sequences,” *Proc. IEEE Int. Symp. on Information Theory*, p. 420, January 1993. (Also, in *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1280–1292, July 1993.)
  17. N. Merhav, “Universal decoding for memoryless Gaussian channels with a deterministic interference,” *Proc. IEEE Int. Symp. on Infor-*

- mation Theory*, p. 265, January 1993. (Also, in *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1261-1269, July 1993.)
18. M. Feder and N. Merhav, "On the relation between entropy and error probability," *Proc. IEEE Int. Symp. on Information Theory*, p. 72, January 1993. (Also, in *IEEE Trans. Inform. Theory*, vol. 40, no. 1, pp. 259-266, January 1994).
  19. Y. Ephraim, N. Merhav, and H. L. Van Trees, "Min-norm interpretations and consistency of MUSIC, MODE, and ML," *Proc. 27th Annual Conference on Information Sciences and Systems*, John Hopkins University, pp. 667-673, March 1993. (Also, in *IEEE Trans. Signal Processing*, vol. SP-43, no. 12, pp. 2937-2942, December 1995.)
  20. M. Weinberger, N. Merhav, and M. Feder, "Optimal sequential probability assignment for individual sequences," *Proc. IEEE Int. Symp. on Information Theory*, p. 384, June 1994. (Also, in *IEEE Trans. Inform. Theory*, vol. 40, no. 2, pp. 384-396, March 1994).
  21. N. Merhav, "Bounds on achievable convergence rates of parameter estimators via universal coding," *Proc. IEEE Int. Symp. on Information Theory*, p. 36, June 1994. (Also, in *IEEE Trans. Inform. Theory*, vol. 40, no. 4, pp. 1210-1215, July 1994).
  - \*22. N. Merhav and M. Feder, "On the cost of universality of block codes for individual sequences," *Proc. IEEE Int. Symp. on Information Theory*, p. 263, June 1994.
  23. N. Merhav and M. Feder, "The minimax redundancy is a lower bound for most sources," *Proc. DCC-94*, pp. 52-61. (Also, in *IEEE Trans. Inform. Theory*, vol. 41, no. 3, pp. 714-722, May 1995).
  - \*24. A. Shatz and N. Merhav, "A non-parametric minimax approach for robust speech recognition," *Proc. 12th IAPR Int'l Conf. on Pattern Recognition*, pp. C.15-C.19, Jerusalem, October 1994.
  25. N. Merhav and M. Feder, "A stronger version of the redundancy-capacity theorem of universal coding," *Proc. 1994 IEEE-IMS Workshop on Information Theory and Statistics*, p. 12, Alexandria, Virginia, October 1994. (Also, in *IEEE Trans. Inform. Theory*, vol. 41, no. 3, pp. 714-722, May 1995).
  - \*26. M. Feder and N. Merhav, "Universal coding for arbitrarily varying sources," *Proc. Israeli-French Workshop on Coding and Information Integrity*, Tel Aviv, December 1994. Also, *Proc. DCC-95*, pp. 82-91, 1995, and *Proc. International Symposium on Information Theory*, p. 16, September 1995.
  - \*27. M. Feder and N. Merhav, "Strong lower bounds in universal coding for general classes and for hierarchies of source classes," *Proc. 1995 IEEE Information Theory Workshop*, pp. 7.2, Rydzyna, Poland, June 1995.

28. R. Meir and N. Merhav, "Stochastic complexity of learning realizable and unrealizable rules," *Proc. 1995 IEEE Information Theory Workshop*, pp. 6.5, Rydzyna, Poland, June 1995. (Also, in *Machine Learning*, vol. 19, pp. 241-261, 1995).
29. N. Merhav and V. Bhaskaran, "A transform domain approach to spatial domain image scaling," *Proc. Second HP Image and Data Compression Conference*, October 1995. Also, in *Proc. IEEE Int. Conf. on Acoust., Speech and Signal Processing*, vol. IV, pp. 2405-2408, 1996.
30. N. Merhav and V. Bhaskaran, "A fast algorithm for DCT-Domain inverse motion compensation," *Proc. Second HP Image and Data Compression Conference*, October 1995. Also, in *Proc. IEEE Int. Conf. on Acoust., Speech and Signal Processing*, vol. IV, pp. 2309-2312, 1996.
31. N. Merhav and J. Ziv, "How many information bits does a vector quantizer need about the source statistics?" *Proc. IEEE Information Theory Workshop*, p. 55, June 1996. (Also, in *IEEE Trans. Inform. Theory*, vol. 43, no. 4, pp. 1112-1121, July 1997.).
32. E. Arikan and N. Merhav, "Guessing subject to distortion," *Proc. IEEE Information Theory Workshop*, p. 64, June 1996. (Also, *IEEE Trans. Inform. Theory*, vol. 44, no. 3, pp. 1041-1056, May 1998).
33. N. Merhav, G. Seroussi, and M. J. Weinberger, "Modeling and low complexity adaptive coding for image prediction residuals," *Proc. IEEE Int. Conf. on Image Processing*, vol. 2, pp. 353-356, September 1996 (invited. Also, in *IEEE Trans. Inform. Theory*, January 2000.).
34. R. Kresch and N. Merhav, "Fast DCT-domain filtering using the DCT and the DST," *Proc. 19th Convention of Electrical and Electronics Engineers in Israel*, pp. 399-402, November 1996. (Also, in *IEEE Trans. on Image Processing*, vol. 8, no. 6, pp. 821-833, June 1999.)
35. N. Merhav, "How many information bits does a decoder need about the channel statistics?" *Proc. 1997 IEEE International Symposium on Information Theory*, p. 370, June-July, 1997. (Also, *IEEE Trans. Inform. Theory*, vol. 43, no. 5, pp. 1707-1714, September 1997.).
36. E. Arikan and N. Merhav, "Joint source-channel coding and guessing," *Proc. 1997 IEEE International Symposium on Information Theory*, p. 162, June-July, 1997. (also, in *IEEE Trans. Inform. Theory*, vol. 44, no. 5, pp. 1756-1769, September 1998.)
37. N. Merhav, G. Seroussi, and M. J. Weinberger, "Universal probability assignment in the class of two-sided geometric distributions," *1997 IEEE International Symposium on Information Theory*, p. 70, June-July, 1997. (Also, in *IEEE Trans. Inform. Theory*, January 2000.)
38. N. Merhav, G. Seroussi, and M. J. Weinberger, "Optimal prefix codes for two-sided geometric distributions," *Proc. 1997 IEEE International*

*Symposium on Information Theory*, p. 71, June–July, 1997. (Also, in *IEEE Trans. Inform. Theory*, January 2000.)

39. N. Merhav, R. M. Roth, and E. Arikan, “Hierarchical guessing with a fidelity criterion,” *Proc. Winter 1998 Information Theory Workshop*, pp. 62–63, San Diego, California, February 1998. (Also, in *IEEE Trans. Inform. Theory*, vol. 45, no. 1, pp. 330–337, January 1999.)
- \*40. N. Merhav and M. Feder, “Universal prediction for indexed classes of sources,” *Proc. Nonlinear Time Series for Learning, Prediction, and Control*, June–July, 1998.
41. N. Merhav and E. Arikan, “The Shannon cipher system with a guessing wiretapper,” *Proc. 1998 IEEE International Symposium on Information Theory*, p. 83, August 1998. (Also, in *IEEE Trans. Inform. Theory*, vol. 45, no. 6, pp. 1860–1866, September 1999.)
42. G. I. Shamir and N. Merhav, “Low complexity sequential lossless coding for piecewise stationary memoryless sources,” *Proc. 1998 IEEE International Symposium on Information Theory*, p. 47, August 1998. (Also, in *IEEE Trans. Inform. Theory*, vol. 45, no. 5, pp. 1498–1519, July 1999.)
- \*43. A. Baruch and N. Merhav, “Universal filtering of individual sequences corrupted by noise,” *Proc. 1998 IEEE International Symposium on Information Theory*, p. 331, August 1998.
44. M. Feder and N. Merhav, “Minimax-universal composite hypothesis testing,” *Proc. Information Theory Workshop on Detection, Estimation, Classification and Imaging*, p. 62, February 1999. (Also, in *IEEE Trans. Inform. Theory*, vol. 48, June 2002.)
- \*45. T. Weissman and N. Merhav, “On prediction of individual noisy sequences relative to a set of experts under general loss functions,” *Proc. COLT ‘99*, pp. 19–28, Santa Cruz, July 1999.
- \*46. G. I. Shamir, D. J. Costello, and N. Merhav, “Asymptotically optimal low complexity sequential lossless coding for regular piecewise stationary memoryless sources,” *1999 IEEE Information Theory Workshop*, South Africa, June 1999.
47. N. Merhav and V. Bhaskaran, “A multiplication-free approximate algorithm for the inverse discrete cosine transform,” *Proc. Int. Conference on Image Processing*, 1999. (Also, in *IEEE Trans. Image Processing*, vol. 8, no. 2, pp. 247–254, February 1999.)
- \*48. A. Baruch and N. Merhav, “Universal filtering and prediction of individual sequences corrupted by noise,” *Proc. of the 37th Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, October 1999.

49. N. Merhav, "Universal detection of messages via finite-state channels," *Proc. 21st Convention of Electrical & Electronics Engineers in Israel*, pp. 357–360, Tel Aviv, April 2000. (Invited. Also, in *IEEE Trans. Inform. Theory*, vol. 46, no. 6, pp. 2242–2246, September 2000.)
50. T. Weissman and N. Merhav, "Universal prediction of individual binary sequences in the presence of arbitrarily varying, memoryless, additive noise," *Proc. ISIT 2000*, p. 97, Sorrento, Italy, June 2000. (Also, in *IEEE Trans. Inform. Theory*, vol. 47, no. 6, pp. 2151–2173, September 2001).
- \*51. A. Baruch and N. Merhav, "Universal filtering and prediction of individual sequences corrupted by noise using the Lempel–Ziv algorithm," *Proc. ISIT 2000*, p. 99, Sorrento, Italy, June 2000.
52. Y. Steinberg and N. Merhav, "Identification in the presence of side information with application to watermarking," *Proc. ISIT 2000*, p. 45, Sorrento, Italy, June 2000. (Also, in *IEEE Trans. Inform. Theory*, vol. 47, no. 4, pp. 1410–1422, May 2001.)
53. N. Merhav, E. Ordentlich, G. Seroussi, and M. J. Weinberger, "On sequential strategies for loss functions with memory," *Proc. ISIT 2000*, p. 70, Sorrento, Italy, June 2000. (Also, in *IEEE Trans. Inform. Theory*, vol. 48, no. 7, pp. 1947–1958, July 2002).
54. A. Somekh–Baruch and N. Merhav, "On the watermarking game of the random coding error exponent with large deviations distortion constraints," *Proc. ISIT 2001*, p. 7, Washington, D.C., June 2001. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 3, pp. 537–562, March 2003.)
55. E. Levitan and N. Merhav, "A competitive Neyman–Pearson approach to universal hypothesis testing with applications," *Proc. ISIT 2001*, p. 16, Washington, D.C., June 2001. (Also, in *IEEE Trans. Inform. Theory*, vol. 48, no. 8, pp. 2215–2229, August 2002.)
56. T. Weissman and N. Merhav, "On limited–delay lossy coding of individual sequences," *Proc. ISIT 2001*, p. 167, Washington, D.C., June 2001. (Also, in *IEEE Trans. Inform. Theory*, vol. 48, no. 3, pp. 721–733, March 2002.)
- \*57. N. Merhav, E. Ordentlich, G. Seroussi, and M. J. Weinberger, "On the use of randomized experts in sequential strategies for loss functions with memory," *Proc. ISIT 2001*, p. 336, Washington, D.C., June 2001. (Also, in *IEEE Trans. Inform. Theory*, vol. 48, no. 7, pp. 1947–1958, July 2002.)
58. N. Merhav and T. Weissman, "Scanning and prediction in multi-dimensional data arrays," *Proc. ISIT 2002*, p. 317, Lausanne, Switzerland, June–July 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 1, pp. 65–82, January 2003.)

59. N. Merhav and M. J. Weinberger, "On universal simulation of information sources using training data," *Proc. ISIT 2002*, p. 435, Lausanne, Switzerland, June–July 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 1, pp. 5–20, January 2004.)
60. N. Merhav and I. Kontoyiannis, "Source coding exponents for zero-delay coding with finite memory," *Proc. ISIT 2002*, p. 462, Lausanne, Switzerland, June–July 2002. (Also, in *IEEE Trans. on Inform. Theory*, vol. 49, no. 3, pp. 609–525, March 2003.)
61. A. Somekh–Baruch and N. Merhav, "On the capacity game of public watermarking systems," *Proc. ISIT 2002*, p. 223, Lausanne, Switzerland, June–July 2002. (Also, *Proc. 22nd Convention of the Electrical and Electronic Engineers in Israel*, pp. 24–26, Tel Aviv University, Israel, December 2002, and in *IEEE Trans. Inform. Theory*, vol. 50, no. 3, pp. 511–524, March 2004.)
62. I. Hen and N. Merhav, "On the threshold effect in the estimation of chaotic sequences," *Proc. 22nd IEEE Convention of the Electrical and Electronic Engineers in Israel*, pp. 29–31, Tel Aviv University, Israel, December 2002 (Also, in *Proc. ISIT 2003*, p. 228, Yokohama, Japan, June–July, 2003. and in *IEEE Trans. Inform. Theory*, vol. 50, no. 11, pp. 2894–2904, November 2004.)
63. A. Cohen and N. Merhav, "New lower bounds on the error probability of a given block code," *Proc. 22nd IEEE Convention of the Electrical and Electronic Engineers in Israel*, pp. 138–140, Tel Aviv University, Israel, December 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 2, pp. 290–310, February 2004).
64. N. Merhav and S. Shamai (Shitz), "On joint source–channel coding for the Wyner–Ziv source and the Gel'fand–Pinsker channel," in *Proc. 40th Allerton Conference on Communication, Control, and Computing*, October 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 11, pp. 2844–2855, November 2003).
65. T. Weissman and N. Merhav, "On causal source coding with side information," in *Proc. 40th Allerton Conference on Communication, Control, and Computing*, October 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 51, no. 11, pp. 4003–4013, November 2005).
66. A. Cohen and N. Merhav, "New lower bounds on the error probability for signals over an AWGN channel," *Proc. ISIT 2003*, p. 10, Yokohama, Japan, June–July, 2003. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 2, pp. 290–310, February 2004).
67. N. Merhav, "On achievable key rates for universal simulation of random data with respect to a set of statistical tests," *Proc. ISIT 2003*, p. 340, Yokohama, Japan, June–July, 2003. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 1, pp. 21–30, January 2004).

68. T. Weissman and N. Merhav, "On competitive prediction and its relation to rate-distortion theory and channel capacity theory," *Proc. ISIT 2003*, p. 81, Yokohama, Japan, June–July, 2003. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 12, pp. 3185–3194, December 2003.)
69. A. Somekh–Baruch and N. Merhav, "On achievable information rates for the fingerprinting game under collusion attacks," *Proc. ISIT 2003*, p. 191, Yokohama, Japan, June–July, 2003. (Also, in *IEEE Trans. Inform. Theory*, vol. 51, no. 3, pp. 884–889, March 2005).
70. Y. C. Eldar and N. Merhav, "Robust linear estimation with covariance uncertainties," *Proc. 2003 Workshop on Statistical Signal Processing*, St. Louis, MI, September–October 2003. (Also, in *IEEE Trans. Signal Processing*, vol. 52, no. 7, pp. 1931–1946, July 2004)
- \*71. E. Ordentlich, T. Weissman, M. J. Weinberger, A. Somekh–Baruch, and N. Merhav, "Discrete universal filtering through incremental parsing," *Proc. DCC 2004*, Snowbird, UT, March 2004.
72. A. Maor and N. Merhav, "On joint information embedding and lossy compression," *Proc. ISIT 2004*, p. 194, Chicago, IL, June–July, 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 51, no. 8, pp. 2998–3008, August 2005).
73. Y. Steinberg and N. Merhav, "On successive refinement for the Wyner–Ziv problem," *Proc. ISIT 2004*, p. 362, Chicago, IL, June–July, 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 8, pp. 1636–1654, August 2004.)
74. Y. Steinberg and N. Merhav, "On hierarchical joint source–channel coding," *Proc. ISIT 2004*, p. 363, Chicago, IL, June–July, 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 52, no. 3, pp. 886–903, March 2006.)
75. N. Merhav and E. Ordentlich, "On causal and semi-causal codes for joint information embedding and source coding," *Proc. ISIT 2004*, p. 196, Chicago, IL, June–July, 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 52, no. 1, pp. 213–226, January 2006.)
- \*76. A. Somekh–Baruch and N. Merhav, "On the random coding error exponents of the single-user and the multiple-access Gel'fand–Pinsker channels," *Proc. ISIT 2004*, p. 448, Chicago, IL, June–July, 2004.
- \*77. E. Sabbag and N. Merhav, "Large deviations performance of predictors for Markov sources," *Proc. ISIT 2004*, p. 11, Chicago, IL, June–July, 2004.
78. A. Maor and N. Merhav, "On joint information embedding and lossy compression in the presence of a stationary memoryless attack channel," *Proc. 23rd IEEE Convention of the Electrical and Electronic Engineers in Israel*, pp. 205–208, HaSharon Hotel, Herzliya, Israel,

- September 6–7, 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 51, no. 9, pp. 3166–3175, September 2005).
79. N. Merhav, “On joint coding for watermarking and encryption,” in *Proc. 7th International Workshop on Information Hiding*, pp. 1–10, Barcelona, Spain, June 2005. (Also, in *Lecture Notes in Computer Science*, Springer Verlag, vol. 3727/2005, and in *IEEE Trans. Inform. Theory*, vol. 52, no. 1, pp. 190–205, January 2006.)
- \*80. N. Merhav, “An information–theoretic view of watermark embedding–detection and geometric attacks,” the Watermarking Virtual Laboratory Challenge (WaCha 2005), Barcelona, Spain, June 2005.
81. I. Hen and N. Merhav, “On the error exponent of trellis source coding,” *Proc. ISIT 2005*, pp. 1922–1926, Adelaide, Australia, September 2005. (Also, *IEEE Trans. Inform. Theory*, vol. 51, no. 11, pp. 3743–3741, November 2005).
82. A. Maor and N. Merhav, “Two–way joint source–channel coding with a fidelity criterion,” *Proc. ISIT 2005*, pp. 631–635, Adelaide, Australia, September 2005. (Also, in *IEEE Trans. Inform. Theory*, vol. 52, no. 3, pp. 1483–1494, April 2006.)
83. N. Merhav and T. Weissman, “Coding for the feedback Gel’fand–Pinsker channel and the feedforward Wyner–Ziv source,” *Proc. ISIT 2005*, pp. 1506–1510, Adelaide, Australia, September 2005. (Also, in *IEEE Trans. Inform. Theory*, vol. 52, no. 9, pp. 4207–4211, September 2006.)
84. N. Merhav, G. Seroussi, and M. J. Weinberger, “Universal delay–limited simulation,” *Proc. ISIT 2005*, pp. 765–769, Adelaide, Australia, September 2005. (Also, in *IEEE Trans. Inform. Theory*, vol. 54, no. 12, pp. 5525–5533, December 2008.)
85. A. Somekh–Baruch and N. Merhav, “Achievable error exponents for the private fingerprinting game,” in *Proc. Canadian Workshop on Information Theory*, 2005. (Also, in *IEEE Trans. Inform. Theory*, vol. 53, no. 5, pp. 1827–1838, May 2007.)
86. J. Ziv and N. Merhav, “On context–tree prediction of individual sequences,” in *Proc. 2006 IEEE Information Theory Workshop (ITW 2006)*, Punta del Este, Uruguay, March 2006. (Also, in *IEEE Trans. Inform. Theory*, vol. 53, no. 5, pp. 1860–1866, May 2007.)
87. N. Merhav and E. Sabbag, “Optimal watermark embedding and detection strategies under limited detection resources,” *Proc. ISIT 2006*, pp. 173–177, Seattle, Washington, U.S.A., July 2006. (Also, in *IEEE Trans. Inform. Theory*, vol. 54, no. 1, pp. 255–274, January 2008).
88. N. Merhav and S. Shamai (Shitz), “Information rates subjected to state masking,” *Proc. ISIT 2006*, pp. 1184–1188, Seattle, Washington,

- U.S.A., July 2006. (Also, in *IEEE Trans. Inform. Theory*, vol. 53, no. 6, pp. 2254–2261, June 2007).
89. N. Merhav and M. J. Weinberger, “Universal simulation with a fidelity criterion,” *Proc. ISIT 2006*, pp. 2521–2525, Seattle, Washington, U.S.A., July 2006. (Also, in *IEEE Trans. Inform. Theory*, vol. 55, no. 1, pp. 292–302, January 2009).
  90. A. Cohen, N. Merhav, and T. Weissman, “Universal scanning and sequential decision making for multi-dimensional data,” *Proc. ISIT 2006*, pp. 431–435, Seattle, Washington, U.S.A., July 2006.
  91. A. Maor and N. Merhav, “On hierarchical joint source–channel coding with causal side information at the decoders,” *Proc. ISIT 2006*, pp. 2148–2152, Seattle, Washington, U.S.A., July 2006.
  92. N. Merhav, “On the Shannon cipher system with a capacity limited key distribution channel,” *Proc. 44th Annual Allerton Conference on Communication, Control, and Computing*, Monticello, IL, U.S.A., September 2006.
  93. Y. Akirav and N. Merhav, “Competitive minimax universal decoding for several ensembles of random codes,” in *The 24th IEEE Convention of the Electrical and Electronic Engineers in Israel*, Eilat, Israel, November 2006.
  94. A. Cohen, N. Merhav, and T. Weissman, “Universal scanning of mixing random fields and performance of the Peano–Hilbert scan,” in *The 24th IEEE Convention of the Electrical and Electronic Engineers in Israel*, Eilat, Israel, November 2006. **Received the Best Student Paper Award.**
  95. N. Merhav and M. Feder, “Universal decoding with an erasure option,” *Proc. ISIT 2007*, pp. 1726–1730, Nice, France, June 2007 (also, in *IEEE Trans. Inform. Theory*, vol. 53, no. 5, pp. 1664–1675, May 2007).
  96. N. Merhav, “Shannon’s secrecy system with informed receivers and its application to systematic coding for wiretapped channels,” *Proc. ISIT 2007*, pp. 2481–2485, Nice, France, June 2007 (also, *IEEE Trans. Inform. Theory*, special issue on *Information–Theoretic Security*, vol. 54, no. 6, pp. 2723–2734, June 2008).
  - \*97. A. Martin, N. Merhav, G. Seroussi, and M. J. Weinberger, “Twice–universal simulation of Markov sources and individual sequences,” *Proc. ISIT 2007*, pp. 2876–2880, Nice, France, June 2007.
  98. E. Sabbag and N. Merhav, “Optimum watermark embedding and detection strategies under *Proc. ISIT 2007*, pp. 2446–2450, Nice, France, June 2007.
  99. A. Cohen, N. Merhav, and T. Weissman, “Scanning, filtering and prediction for random fields corrupted by Gaussian noise,” *Proc. ISIT 2007*, pp. 691–695, Nice, France, June 2007.

100. A. Maor and N. Merhav, "On successive refinement for the Kaspi/Heegard-Berger problem," *Proc. ISIT 2007*, pp. 1466–1470, Nice, France, June 2007.
- \*101. M. Barni, A. D'Angelo, and N. Merhav, "Expanding the class of watermark de-synchronization attacks," *2007 ACM Multimedia and Security Workshop*, pp. 195–204, Dallas, Texas, U.S.A., September 2007.
102. P. Comesaña, M. Barni, and N. Merhav, "Asymptotically optimum embedding strategy for one-bit watermarking under Gaussian attacks," *Proc. 2008 SPIE Conference*, February 2008.
103. N. Merhav, "An identity of Chernoff bounds with an interpretation in statistical physics and applications in information theory," *Proc. ISIT 2008*, pp. 499–503, Toronto, Canada, July 2008. (Also, in *IEEE Trans. Inform. Theory*, vol. 54, no. 8, pp. 3710–3721, August 2008).
104. N. Merhav, "Relations between random coding exponents and the statistical physics of random codes," *Proc. ISIT 2008*, pp. 504–508, Toronto, Canada, July 2008. (Also, in *IEEE Trans. Inform. Theory*, vol. 55, no. 1, pp. 83–92, January 2009).
105. Y. Akirav and N. Merhav, "Exact characterization of the minimax loss in error exponents of universal decoders," *Proc. ISIT 2008*, pp. 1773–1777, Toronto, Canada, July 2008 (Also, in *IEEE Trans. Inform. Theory*, vol. 55, no. 4, pp. 1450–1459, April 2009).
- \*106. Y. Kaspi and N. Merhav, "Error exponents for degraded broadcast channels and degraded message sets," *Proc. ISIT 2008*, pp. 1518–1522, Toronto, Canada, July 2008.
107. R. Etkin, N. Merhav and E. Ordentlich, "Error exponents of optimum decoding for the interference channel," *Proc. ISIT 2008*, pp. 1778–1782, Toronto, Canada, July 2008 (Also, in *IEEE Trans. Inform. Theory*, vol. 56, no. 1, pp. 40–56, January 2010).
- \*108. G. Bukai and N. Merhav, "Channel estimation using feedback," *Proc. ISIT 2008*, pp. 1243–1247, Toronto, Canada, July 2008.
- \*109. E. Sabbag and N. Merhav, "Error exponents for the Gel'fand-Pinsker channel with an erasure/list option," *Proc. ISIT 2008*, pp. 1778–1782, Toronto, Canada, July 2008.
- \*110. Y. Kaspi and N. Merhav, "Error exponents of optimum decoding for the degraded broadcast channel using moments of type class enumerators," *Proc. 2008 IEEE 25-th Convention of Electrical and Electronics Engineers in Israel*, December 2008.
111. N. Merhav, "Joint source-channel coding via statistical mechanics: thermal equilibrium between the source and the channel," *Proc. ISIT 2009*, pp. 2136–2140, Seoul, South Korea, June–July 2009.

112. N. Merhav, "On the statistical physics of directed polymers in a random medium and their relation to tree codes," *Proc. ISIT 2009*, pp. 354–358, Seoul, South Korea, June–July 2009.
113. Y. Kaspı and N. Merhav, "Error exponents of optimum decoding for the degraded broadcast channel using moments of type–class enumerators," *Proc. ISIT 2009*, pp. 2507–2511, Seoul, South Korea, June–July 2009.
114. A. Reani and N. Merhav, "Efficient on–line schemes for encoding individual sequences with side information at the decoder," *Proc. ISIT 2009*, pp. 1025–1029, Seoul, South Korea, June–July 2009.
115. N. Merhav, "Physics of the Shannon limits," *Proc. 2009 IEEE Workshop on Information Theory (ITW 2009)*, pp. 384–388, Taormina, Sicily, Italy, October 2009 (also, submitted to *IEEE Trans. Inform. Theory*, March 2009).
- \*116. N. Merhav, "On the physics of rate–distortion theory," *Proc. ISIT 2010*, pp. 71–75, June 2010, Austin, Texas, U.S.A.
117. N. Merhav, "Optimum estimation via partition functions and information measures," *Proc. ISIT 2010*, pp. 1473–1477, June 2010, Austin, Texas, U.S.A.
118. A. Somekh–Baruch and N. Merhav, "Exact random coding exponents for erasure decoding," *Proc. ISIT 2010*, pp. 260–264, June 2010, Austin, Texas, U.S.A.
- \*119. Y. Kaspı and N. Merhav, "Structure theorem for real–time variable–rate lossy source encoders and memory–limited decoders with side information," *Proc. ISIT 2010*, pp. 86–90, Austin, Texas, U.S.A., June 2010.
- \*120. Y. Kaspı and N. Merhav, "Revisiting Gallager’s error exponent analysis technique," to appear in *2010 IEEE 26–th Convention of Electrical and Electronics Engineers in Israel (IEEEI)*, Eilat, Israel, November 2010. **Received the Best Student Paper Award** in the category of Information Theory.
121. N. Merhav, "Threshold effects in parameter estimation as phase transitions in statistical mechanics," *Proc. IEEE Workshop on Information Theory*, pp. 603–607, Paraty, Brazil, October 16–20, 2011.
122. Y. Kaspı and N. Merhav, "Structure theorems for real–time variable–rate coding with side information," *Proc. Forty–Ninth Annual Allerton Conference on Communication, Control, and Computing*, Allerton Retreat Center, Monticello, Illinois, U.S.A., September 28–30, 2011,
123. N. Merhav, "Relations between redundancy patterns of the Shannon code and wave diffraction patterns of partially disordered media," submitted to *ISIT 2012*, Cambridge, MA, U.S.A., July 2012.

124. N. Merhav, "On optimum strategies for minimizing the exponential moments of a loss function," submitted to *ISIT 2012*, Cambridge, MA, U.S.A., July 2012.
125. N. Merhav, "Data processing inequalities based on a certain structured class of information measures with application to estimation theory," submitted to *ISIT 2012*, Cambridge, MA, U.S.A., July 2012.
126. N. Merhav, "Perfectly secure encryption of individual sequences," submitted to *ISIT 2012*, Cambridge, MA, U.S.A., July 2012.
127. A. Reani and N. Merhav, "Data processing lower bounds for scalar lossy source codes with side information at the decoder," submitted to *ISIT 2012*, Cambridge, MA, U.S.A., July 2012.
128. Y. Kaspi and N. Merhav, "On real-time and causal secure source coding," submitted to *ISIT 2012*, Cambridge, MA, U.S.A., July 2012.
129. E. Sabbag and N. Merhav, "Error exponents of optimum erasure/list and ordinary decoding for channels with side information," submitted to *ISIT 2012*, Cambridge, MA, U.S.A., July 2012.

### Invited Reviews and Survey Papers

1. N. Merhav and M. Feder, "Universal prediction," Commemorative issue for fifty years of Information Theory, October 1998 (see no. 42 in the list of journal papers). Also, in *Information Theory: 50 Years of Discovery*, pp. 80–103, eds. S. Verdú and S. McLaughlin, IEEE Press, 1999.
2. Y. Ephraim and N. Merhav, "Hidden Markov processes," *IEEE Trans. Inform. Theory*, special issue in memory of Aaron D. Wyner, June 2002 (see no. 58 in the list of journal papers).
3. G. Keshet, Y. Steinberg, and N. Merhav, "Channel coding in the presence of side information," *Foundations and Trends in Communications and Information Theory*, vol. 4, no. 6, pp. 445–586, 2007 (see no. 95 in the list of journal papers).
4. N. Merhav, "Statistical physics and information theory," (invited paper) *Foundations and Trends in Communications and Information Theory*, vol. 6, nos. 1–2, pp. 1–212, 2009. (see no. 110 in the list of journal papers).

### Other Articles

1. M. Feder, N. Merhav, and M. Gutman, "Reflections on "universal prediction of individual sequences"," *IEEE Information Theory Society Newsletter*, vol. 44, no. 1, pp. 5–10, March 1994 (invited).

2. N. Merhav, "Another look at the physics of large deviations with application to rate-distortion theory," August 2009, unpublished. Available on-line at: [http://arxiv.org/PS\\_cache/arxiv/pdf/0908/0908.3562v1.pdf](http://arxiv.org/PS_cache/arxiv/pdf/0908/0908.3562v1.pdf)
3. N. Merhav, "Information Theory and Statistical Physics – Lecture Notes," June 2010, unpublished. Available on-line at: [http://arxiv.org/PS\\_cache/arxiv/pdf/1006/1006.1565v1.pdf](http://arxiv.org/PS_cache/arxiv/pdf/1006/1006.1565v1.pdf)

## Patents

1. N. Merhav and V. Bhaskaran, "Fast DCT downsampling and inverse motion compensation," U.S. Patent no. 05708732, issued on January 13, 1998.
2. N. Merhav and V. Bhaskaran, "Fast method and apparatus for filtering compressed images in the DCT domain," U.S. Patent no. 05832135, issued on March 11, 1998.
3. R. Kresch and N. Merhav, "Explicit DST-based filter operating in the DCT domain," U.S. Patent no. 06125212, issued on September 26, 2000.
4. R. Kresch and N. Merhav, "Implicit DST-based filter operating in the DCT domain," U.S. Patent no. 06134571, issued on October 17, 2000.
5. M. J. Weinberger, T. Rokicki, G. Seroussi, R. Gupta, N. Merhav, and J. Ferrandiz, "Optimizing computer performance by using data compression principles to minimize a loss function," U.S. Patent no. 06453389, issued on September 17, 2002.
6. N. Merhav and V. Bhaskaran, "Multiplier-free implementation of DCT used in image and video processing and compression," U.S. Patent no. US6473534, issued on October 29, 2002.
7. R. Kresch and N. Merhav, "Method and apparatus for performing motion estimation in the DCT domain," U.S. Patent no. US6611560, issued on August 23, 2003.
8. A. Levy and N. Merhav, "Method and system of watermarking digital data using scaled bin coding and maximum likelihood decoding," U.S. Patent no. US6721439, issued on April 13, 2004.

## Research Reports

1. N. Merhav and D. Chazan, "Solving unstable difference equations recursively," *IBM Technical Report* no. 93, May 1984.
2. N. Merhav and Y. Medan, "Development of algorithms for speech synthesis," *IBM Technical Report* no. 105, May 1985.

3. N. Merhav and D. Malah, "Adaptive maximum entropy coding," *Technion, I.I.T.* EE. Pub. no. 586, April, 1986.
4. N. Merhav and J. Ziv, "Parameter estimation for Markov sources with empirically-observed statistics," *Technion, I.I.T.* EE. Pub. no. 643, August 1987.
5. N. Merhav, M. Gutman, and J. Ziv, "On the estimation of the order of a Markov chain and universal data compression," *Technion, I.I.T.* EE. Pub. no. 648, November 1987. (Also, in *IEEE Trans. Inform. Theory*, vol. 35, no. 5, pp. 1014–1019, September 1989).
6. N. Merhav and J. Ziv, "On universally efficient estimation of a regression coefficient and universal data compression," *Technion—I.I.T.*, EE Pub. no. 659, January 1988.
7. N. Merhav and J. Ziv, "Universal algorithms for detecting a change in a stochastic process," *Technion—I.I.T.*, EE Pub. no. 663, February 1988.
8. N. Merhav and Y. Ephraim, "Maximum likelihood hidden Markov modeling using a dominant sequence of states," AT&T Bell Laboratories, TM 11226 890116-04, January 1989. (Also, in *IEEE Trans. Acoust., Speech, and Signal Processing*, vol. ASSP-39, no. 9, pp. 2111–2115, September 1991.)
9. N. Merhav and Y. Ephraim, "A Bayesian classification approach with application to speech recognition," AT&T Bell Laboratories, TM 11226 891106-24, November 1989. (Also, in *IEEE Trans. Acoust., Speech, and Signal Processing*, vol. ASSP-39, no. 10, pp. 2157–2166, October 1991.)
10. O. Zeitouni, J. Ziv, and N. Merhav, "When is the generalized likelihood ratio test optimal?" AT&T Bell Laboratories, TM 11226 900905-11, September 1990. (Also, in *IEEE Trans. Inform. Theory*, vol. 38, no. 5, pp. 1597–1602, September 1992.)
11. Y. Ephraim and N. Merhav, "Lower and upper bounds on the minimum mean square error in composite source signal estimation," AT&T Bell Laboratories, TM 11226 910809-12, August 1991. (Also, in *IEEE Trans. Inform. Theory*, vol. 38, no. 6, pp. 1709–1724, November 1992.)
12. N. Merhav, "Universal decoding for memoryless Gaussian channels with a deterministic interference," AT&T Bell Laboratories, TM 11217 910904-16, September 1991. (Also, in *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1261–1269, July 1993.)
13. N. Merhav and M. Feder, "Universal schemes for sequential decision from individual data sequences," *Technion—I.I.T.*, EE Pub. no. 804, October 1991. (Also, in *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1280–1292, July 1993.)

14. J. Ziv and N. Merhav, "A measure of relative entropy between individual sequences with application to universal classification," AT&T Bell Laboratories, TM 11217 911217-23, December 1991. (Also, in *IEEE Trans. Inform. Theory*, vol. 39, no. 4, pp. 1270-1279, July 1993.)
15. M. Feder and N. Merhav, "On the relation between entropy and error probability," Technical Report no. EE-S-92-1, Tel Aviv University, February 1992. (Also, in *IEEE Trans. Inform. Theory*, vol. 40, no. 1, pp. 259-266, January 1994).
16. N. Merhav, "Local bounds on achievable convergence rates of parameter estimators via universal coding," *Technion—I.I.T.*, EE Pub. no. 847, August 1992. (Also, in *IEEE Trans. Inform. Theory*, vol. 40, no. 4, pp. 1210-1215, July 1994).
17. N. Merhav, "On the minimum description length principle for sources with piecewise constant parameters," *Technion—I.I.T.*, EE Pub. no. 848, August 1992. (Also, in *IEEE Trans. Inform. Theory*, vol. 39, no. 6, pp. 1962-1967, November 1994).
18. R. Meir and N. Merhav, "On the stochastic complexity of learning realizable and unrealizable rules," *Technion—I.I.T.*, EE Pub. no. 929, July 1994. (Also, in *Machine Learning*, vol. 19, pp. 241-261, 1995).
19. N. Merhav and V. Bhaskaran, "A transform domain approach to spatial domain image scaling," HPL Technical Report, #HPL-94-116, December 1994.
20. N. Merhav and V. Bhaskaran, "A fast algorithm for DCT-domain inverse motion compensation," HPL Technical Report, #HPL-95-17, February 1995.
21. N. Merhav and V. Bhaskaran, "A fast algorithm for DCT-domain filtering," HPL Technical Report, #HPL-95-56, May 1995.
22. N. Merhav and J. Ziv, "On the amount of side information required for lossy data compression," *Technion - I.I.T.*, CC Pub. no. 105, EE Pub. no. 963, May 1995. (Also, in *IEEE Trans. Inform. Theory*, vol. 43, no. 4, pp. 1112-1121, July 1997.).
23. N. Merhav, "How many information bits does a decoder need about the channel statistics," *Technion - I.I.T.*, CC Pub. no. 113, EE. Pub. no. 978, July 1995. (Also, in *IEEE Trans. Inform. Theory*, vol. 43, no. 5, pp. 1707-1714, September 1997).
24. N. Merhav and V. Bhaskaran, "A fast algorithm for DCT-domain masking," HPL Technical Report, #HPL-95-104, September 1995.
25. R. Kresch and N. Merhav, "Fast DCT-domain filtering using the DCT and the DST," HPL Technical Report, #HPL-95-140, December 1995. (Also, in *IEEE Trans. on Image Processing*, vol. 8, no. 6, pp. 821-833, June 1999.)

26. R. Kresch and N. Merhav, "Approximate convolution using DCT coefficient multipliers," HPL Technical Report, #HPL-95-141, December 1995. (Also, in *IEEE Trans. on Circuits and Systems for Video Technology*, vol. CSVT-8 no. 4 pp. 378-385, August 1998).
27. M. Feder and N. Merhav, "Hierarchical universal coding," *Technion - I.I.T.*, CC Pub. no. 133, EE Pub. no. 1005, January 1996. (Also, in *IEEE Trans. on Inform. Theory*, vol. 42, no. 5, pp. 1354-1364, September 1996.)
28. N. Merhav, "On list size exponents in rate-distortion coding," *Technion - I.I.T.*, CC Pub. no. 134, EE Pub. no. 1006, January 1996. (Also, HPL Technical Report, #HPL-96-33, March 1996, and *IEEE Trans. on Inform. Theory*, vol. 43, no. 2, pp. 765-769, March 1997.)
29. E. Arikan and N. Merhav, "Guessing subject to distortion," *Technion - I.I.T.*, CC Pub. no. 141, EE Pub. no. 1015, February 1996. (Also, HPL Technical Report, #HPL-96-48, April 1996, and in *IEEE Trans. on Inform. Theory*, vol. 44, no. 3, pp. 1041-1056, May 1998.)
30. N. Merhav and V. Bhaskaran, "Fast inverse motion compensation algorithms for MPEG-2 and for partial DCT information," HPL Technical Report, #HPL-96-53, April 1996. (Also, in *J. Visual Communication and Image Representation*, vol. 7, no. 4, pp. 395-410, December 1996.)
31. R. Kresch and N. Merhav, "An implicit DST-based method for fast convolution in the DCT domain," HPL Technical Report, #HPL-96-68, May 1996.
32. N. Merhav, "Multiplication-free approximate algorithms for compressed domain linear operations on images," HPL Technical Report, #HPL-96-111, July 1996. (Also, in *IEEE Trans. Image Processing*, vol. 8, no. 2, pp. 247-254, February 1999.)
33. N. Merhav, R. M. Roth, and E. Arikan, "Hierarchical guessing with a fidelity criterion," *Technion - I.I.T.*, CC Pub no. 176 (EE Pub no. 1062), November 1996. (Also, HPL Technical Report, #HPL-97-07, January 1997, and in *IEEE Trans. Inform. Theory*, vol. 45, no. 1, pp. 330-337, January 1999.)
34. R. Kresch, N. Merhav, and V. Bhaskaran, "A motion estimation scheme based on the DCT and the DST (MECS)," HPL Technical Report, #HPL-97-62, April 1997.
35. N. Merhav and V. Bhaskaran, "A multiplication-free approximate algorithm for the inverse discrete cosine transform," HPL Technical Report, #HPL-97-63, April 1997.
36. V. Bhaskaran, N. Merhav, and R. Kresch, "Field-to-frame mode conversions in DCT domain," HPL Technical Report, #HPL-97-114, September 1997.

37. G. I. Shamir and N. Merhav, "Low complexity sequential lossless coding for piecewise stationary memoryless sources," *Technion - I.I.T.*, CC Pub. no. 219, EE Pub. no. 1121, November 1997. (Also, in *IEEE Trans. Inform. Theory*, vol. 45, no. 5, pp. 1498–1519, July 1999.)
38. N. Merhav and M. Feder, "Universal prediction," *Technion - I.I.T.*, CC Pub. no. 224, EE Pub. no. 1128, December 1997. (Also, in *IEEE Trans. Inform. Theory*, vol. 44, no. 6, pp. 2124–2147, October 1998.)
39. N. Merhav and E. Arikan, "The Shannon cipher system with a guessing wiretapper," *Technion - I.I.T.*, CC Pub. no. 229, EE Pub. no. 1133, December 1997. (Also, in *IEEE Trans. Inform. Theory*, vol. 45, no. 6, pp. 1860–1866, September 1999.)
40. N. Merhav, G. Seroussi, and M. J. Weinberger, "Lossless compression for sources with two-sided geometric distributions," HPL Technical Report, #HPL-98-70, April 1998. (Also, in *IEEE Trans. Inform. Theory*, vol. 46, no. 1, pp. 121–135, January 2000.)
41. N. Merhav, "Direct conversion between DV format DCT and ordinary DCT," HPL Technical Report, #HPL-98-140, August 1998.
42. N. Merhav, "Embedding companders in JPEG compression," HPL Technical Report, #HPL-98-141, August 1998.
43. N. Merhav, "On random coding error exponents of watermarking codes," HPL Technical Report, #HPL-98-169, October 1998. (Also, *Technion - I.I.T.*, CC Pub. no. 253, EE Pub. no. 1173, September, 1998, and in *IEEE Trans. on Inform. Theory*, vol. 46, no. 2, pp. 420–430, March 2000).
44. N. Merhav, "Universal detection of messages via finite-state channels," *Technion - I.I.T.*, CC Pub. no. 279, EE Pub. no. 1206, May 1999. (Also, in *IEEE Trans. Inform. Theory*, vol. 46, no. 6, pp. 2242–2246, September 2000).
45. T. Weissman and N. Merhav, "Universal prediction of individual binary sequences in the presence of noise," *Technion - I.I.T.*, CC Pub. no. 293, EE Pub. no. 1224, October 1999. (Also, in *IEEE Trans. on Inform. Theory*, vol. 47, no. 6, pp. 2151–2173, September 2001).
46. Y. Steinberg and N. Merhav, "Identification in the presence of side information with application to watermarking," *Technion - I.I.T.*, CC Pub. no. 304, EE Pub. no. 1237, January 2000. (Also, in *IEEE Trans. on Inform. Theory*, vol. 47, no. 4, pp. 1410–1422, May 2001).
47. T. Weissman, N. Merhav, and A. Somekh-Baruch, "Twofold universal prediction schemes for achieving the finite-state predictability of noisy individual binary sequences," *Technion - I.I.T.*, CC Pub. no. 310, EE Pub. no. 1244, May 2000 (Also, in *IEEE Trans. on Inform. Theory*, vol. 47, no. 5, pp. 1849–1866, July 2001).

48. T. Weissman and N. Merhav, "Universal prediction of random binary sequences in a noisy environment," *Technion – I.I.T.*, CC Pub. no. 313, EE Pub. no. 1247, May 2000 (Also, in *Annals of Probability*, vol. 14, no. 1, pp. 54–89, February 2004).
49. Y. Ephraim and N. Merhav, "Hidden Markov processes," *Technion – I.I.T.*, CC Pub. no. 322, EE Pub. no. 1256, August 2000 (Also, in *IEEE Trans. on Inform. Theory*, vol. 48, no. 6, pp. 1518–1569, June 2002).
50. A. Levy and N. Merhav, "An image watermarking scheme based on information–theoretic principles," HPL Technical Report, no. #HPL-2001-13, January 2001.
51. E. Levitan and N. Merhav, "A competitive Neyman–Pearson approach to universal hypothesis testing with applications," CC Pub. no. 333, EE Pub. no. 1267, December 2000. (Also, in *IEEE Trans. on Inform. Theory*, vol. 48, no. 8, pp. 2215–2229, August 2002).
52. T. Weissman and N. Merhav, "On limited–delay lossy coding and filtering of individual sequences," *Technion – I.I.T.*, CC Pub. no. 334, EE Pub. no. 1268, December 2000 (Also, in *IEEE Trans. Inform. Theory*, vol. 48, no. 3, pp. 721–733, March 2002).
53. N. Merhav, E. Ordentlich, G. Seroussi, and M. J. Weinberger, "On sequential strategies for loss functions with memory," *Technion – I.I.T.*, CC Pub. no. 338, EE Pub. no. 1272 and HPL Technical Report, no. #HPL-2001-52, February 2001 (Also, in *IEEE Trans. Inform. Theory*, vol. 48, no. 7, pp. 1947–1958, July 2002).
54. T. Weissman and N. Merhav, "Tradeoffs between the excess–code-length exponent and the excess–distortion exponent in lossy source coding," Technical Report, CCIT Pub. no. 341, EE Pub. no. 1275, Technion – I.I.T., April 2001. (Also, in *IEEE Trans. Inform. Theory*, vol. 48, no. 2, pp. 396–415, February 2002).
55. A. Somekh–Baruch and N. Merhav, "On error exponent and capacity games of private watermarking systems," Technical Report, CCIT Pub. no. 346, EE Pub. no. 1280, Technion – I.I.T., June 2001. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 3, pp. 537–562, March 2003).
56. N. Merhav and T. Weissman, "Scanning and prediction in multi-dimensional data arrays," Technical Report, CCIT Pub. no. 349, EE Pub. no. 1283, Technion – I.I.T., August 2001. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 1, pp. 65–82, January 2003).
57. N. Merhav and I. Kontoyiannis, "Source coding exponents for zero–delay coding with finite memory," Technical Report, CCIT Pub. no. 356, EE Pub. no. 1290, Technion – I.I.T., October 2001. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 3, pp. 609–625, March 2003).

58. T. Weissman and N. Merhav, "On competitive prediction and its relation to rate-distortion theory and to channel capacity theory," Technical Report, CCIT Pub. no. 372, EE Pub. no. 1309, Technion – I.I.T., February 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 12, pp. 3185–3194, December 2003).
59. N. Merhav, "A large-deviations notion of perfect secrecy," Technical Report, CCIT Pub. no. 374, EE Pub. no. 1311, Technion – I.I.T., March 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 2, pp. 506–508, February, 2002).
60. N. Merhav and S. Shamai (Shitz), "On joint source-channel coding for the Wyner-Ziv source and the Gel'fand-Pinsker channel," Technical Report, CCIT Pub. no. 383, EE Pub. no. 1321, Technion – I.I.T., May 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 49, no. 11, pp. 2844–2855, November 2003).
61. I. Hen and N. Merhav, "On the threshold effect in the estimation of chaotic sequences," Technical Report, CCIT Pub. no. 387, EE Pub. no. 1325, Technion – I.I.T., May 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 11, pp. 2894–2904, November 2004).
62. N. Merhav and M. J. Weinberger, "On universal simulation of information sources using training data," HPL Technical Report, no. 2002-263, September 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 1, pp. 5–20, January 2004).
63. N. Merhav, "Achievable key rates for universal simulation of random data with respect to a set of statistical tests," HPL Technical Report, no. 2002-271, September 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 1, pp. 21–30, January 2004).
64. A. Cohen and N. Merhav, "Lower bounds on the error probability of block codes based on improvements on de Caen's inequality," Technical Report, CCIT Pub. no. 409, EE Pub. no. 1348, Technion – I.I.T., December 2002. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 2, pp. 290–310, February 2004).
65. Y. Steinberg and N. Merhav, "On successive refinement for the Wyner-Ziv problem," Technical Report, CCIT Pub. no. 419, EE Pub. no. 1358, Technion – I.I.T., March 2003. (Also, in *IEEE Trans. Inform. Theory*, vol. 50, no. 8, pp. 1636–1654, August 2004).
66. Y. C. Eldar and N. Merhav, "A competitive minimax approach to robust linear estimation," Technical Report, CCIT Pub. no. 422, EE Pub. no. 1361, Technion – I.I.T., May, 2003. (Also, in *IEEE Trans. on Signal Processing*, vol. 52, no. 7, pp. 1931–1946, July 2004).
67. Y. C. Eldar and N. Merhav, "Robust linear estimation under a minimax MSE-ratio criterion," Technical Report, CCIT Pub. no. 449, EE Pub. no. 1390, Technion – I.I.T., October, 2003. (Also, in *IEEE Trans. on Signal Processing*, vol. 53, no. 4, pp. 1335–1347, April 2005).

68. A. Maor and N. Merhav, "On joint information embedding and lossy compression," Technical Report, CCIT Pub. no. 450, EE Pub. no. 1391, Technion – I.I.T., November 2003. (Also, in *IEEE Trans. on Inform. Theory*, vol. 51, no. 8, pp. 2998–3008, August 2005).
69. Y. Steinberg and N. Merhav, "On hierarchical joint source–channel coding," Technical Report, CCIT Pub. no. 453, EE Pub. no. 1395, Technion – I.I.T., November 2003. (Also, in *IEEE Trans. on Inform. Theory*, vol. 52, no. 3, pp. 886–903, March 2006).
70. A. Maor and N. Merhav, "On joint information embedding and lossy compression in the presence of a stationary memoryless attack channel," Technical Report, CCIT Pub. no. 464, EE Pub. no. 1408, Technion – I.I.T., January 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 51, no. 9, pp. 3166–3175, September 2005).
71. N. Merhav and E. Ordentlich, "On causal and semi-causal codes for joint information embedding and source coding," Technical Report, CCIT Pub. no. 472, EE Pub. no. 1418, Technion – I.I.T., March 2004, and HPL Technical Report, no. 2004-38, March 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 52, no. 1, pp. 213–226, January 2006).
72. N. Merhav, "On joint coding for watermarking and encryption," Technical Report, CCIT Pub. no. 482, EE Pub. no. 1430, Technion – I.I.T., May 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 52, no. 1, pp. 190–205, January 2006).
73. T. Weissman and N. Merhav, "On causal source codes with side information," Technical Report, CCIT Pub. no. 501, EE Pub. no. 1450, Technion – I.I.T., August 2004. (Also, in *IEEE Trans. Inform. Theory*, vol. 51, no. 11, pp. 4003–4013, November 2005).
74. I. Hen and N. Merhav, "On the error exponent of trellis source coding," Technical Report, CCIT Pub. no. 502, EE Pub. no. 1451, Technion – I.I.T., August 2004. (Also, *IEEE Trans. Inform. Theory*, vol. 51, no. 11, pp. 3743–3741, November 2005).
75. A. Maor and N. Merhav, "Two-way joint source–channel coding with a fidelity criterion," Technical Report, CCIT Pub. no. 515, EE Pub. no. 1465, Technion – I.I.T., January 2005 (also, in *IEEE Trans. Inform. Theory*, vol. 52, pp. 1483–1494, April 2006).
76. N. Merhav and J. Ziv, "On the Wyner–Ziv problem for individual sequences," Technical Report, CCIT Pub. no. 517, EE Pub. no. 1468, Technion – I.I.T., February 2005 (also, in *IEEE Trans. Inform. Theory*, vol. 52, no. 3, pp. 867–873, March 2006).
77. A. Somekh–Baruch and N. Merhav, "Achievable error exponents for the private fingerprinting game," Technical Report, CCIT Pub. no. 518, EE Pub. no. 1469, Technion – I.I.T., February 2005 (also, in *IEEE Trans. Inform. Theory*, vol. 53, no. 5, pp. 1827–1838, May 2007).

78. N. Merhav, "On the Shannon cipher system with a capacity-limited key-distribution channel," Technical Report, CCIT Pub. no. 530, EE Pub. no. 1481, Technion – I.I.T., May 2005 (also, in *IEEE Trans. Inform. Theory*, vol. 52, no. 3, pp. 1269–1273, March 2006).
79. J. Ziv and N. Merhav, "On context-tree prediction of individual sequences," Technical Report, CCIT Pub. no. 545, EE Pub. no. 1497, Technion – I.I.T., July 2005 (also, in *IEEE Trans. Inform. Theory*, vol. 53, no. 5, pp. 1860–1866, May 2007).
80. N. Merhav and E. Sabbag, "Optimal watermark embedding and detection strategies under limited detection resources," Technical Report, CCIT Pub. no. 564, EE Pub. no. 1516, December 2005 (also, submitted to *IEEE Trans. Inform. Theory*, December 2005).
81. T. Weissman, E. Ordentlich, Marcelo J. Weinberger, A. Somekh-Baruch, and N. Merhav, "Universal filtering via prediction," Technical Report, CCIT Pub. no. 577, EE Pub. no. 1529, March 2006 (also, *IEEE Trans. Inform. Theory*, vol. 53, no. 4, pp. 1253–1264, April 2007).
82. N. Merhav and S. Shamai (Shitz), "Information rates subjected to state masking," Technical Report, CCIT Pub. no. 580, EE Pub. no. 1532, March 2006 (also, in *IEEE Trans. Inform. Theory*, vol. 53, no. 6, pp. 2254–2261, July 2007).
83. N. Merhav and M. Feder, "Universal decoding with an erasure option," Technical Report, CCIT Pub. no. 583, EE Pub. no. 1535, April 2006 (also, in *IEEE Trans. Inform. Theory*, vol. 53, pp. 1664–1675, May 2007).
84. A. Maor and N. Merhav, "On successive refinement with causal side information at the decoders," Technical Report, CCIT Pub. no. 602, EE Pub. no. 1559, October 2006 (also, submitted to *IEEE Trans. Inform. Theory*, October 2006).
85. N. Merhav, "Shannon's secrecy system with informed receivers and its application to systematic coding for wiretapped channels," Technical Report, CCIT Pub. no. 604, EE Pub. no. 1561, November 2006 (also, *IEEE Trans. Inform. Theory*, vol. 54, no. 6, pp. 2723–2734, June 2008).
86. N. Merhav, "An identity of Chernoff bounds with an interpretation in statistical physics and applications in information theory," Technical Report, CCIT Pub. no. 614, EE Pub. no. 1571, February 2007 (also, in *IEEE Trans. Inform. Theory*, vol. 54, no. 8, pp. 3710–3722, August 2008).
87. Y. Akirav and N. Merhav, "Competitive minimax universal decoding for several ensembles of random codes," Technical Report, CCIT Pub. no. 633, EE Pub. no. 1590, August 2007 (also, in *IEEE Trans. Inform. Theory*, vol. 55, no. 4, pp. 1450–1459, April 2009).

88. N. Merhav, “Relations between random coding exponents and the statistical physics of random codes,” Technical Report, CCIT Pub. no. 634, EE Pub. no. 1591, August 2007 (also, HPL Technical Report 2007-149, September 2007, and in *IEEE Trans. Inform. Theory*, vol. 55, no. 1, pp. 83–92, January 2009).
89. N. Merhav and M. J. Weinberger, “Universal simulation with fidelity criteria,” Technical Report, CCIT Pub. no. 636, EE Pub. no. 1593, August 2007 (also, HPL Technical Report, 2007-148, September 2007, and in *IEEE Trans. Inform. Theory*, vol. 55, no. 1, pp. 292–302, January 2009).
90. N. Merhav, “Error exponents of erasure/list decoding revisited via moments of distance enumerators,” Technical Report, CCIT Pub. no. 647, EE Pub. no. 1604, November 2007 (also, in *IEEE Trans. Inform. Theory*, vol. 54, no. 10, pp. 4439–4447, October 2008).
91. N. Merhav, “The generalized random energy model and its application to the statistical physics of ensembles of hierarchical codes,” Technical Report, CCIT Pub. no. 676, EE Pub. no. 1633, December 2007 (also in *IEEE Trans. Inform. Theory*, vol. 55, no. 3, pp. 1250–1268, March 2009).
92. N. Merhav, “The random energy model in a magnetic field and joint source–channel coding,” Technical Report, CCIT Pub. no. 691, EE Pub. no. 1648, March 2008 (also in *Physica A: Statistical Mechanics and Its Applications*, vol. 387, issue 22, pp. 5662–5674, September 2008).
93. N. Merhav, “Joint source–channel coding via statistical mechanics: thermal equilibrium between the source and the channel,” Technical Report, CCIT Pub. no. 706, EE Pub. no. 1663, October 2008 (also in *IEEE Trans. Inform. Theory*, vol. 55, no. 12, pp. 5382–5393, December 2009).
94. N. Merhav, “On the statistical physics of directed polymers in a random medium and their relation to tree–structured lossy compression,” Technical Report, CCIT Pub. no. 710, EE Pub. no. 1667, December 2008 (also in *IEEE Trans. Inform. Theory*, vol. 56, no. 3, pp. 1345–1350, March 2010).
95. A. Maor and N. Merhav, “On successive refinement for the Kaspi/Heegard–Berger problem,” Technical Report, CCIT Pub. no. 711, EE Pub. no. 1668, December 2008 (also in *IEEE Trans. Inform. Theory*, vol. 56, no. 8 pp. 3930–3945, August 2010).
96. N. Merhav, D. Guo, and S. Shamai (Shitz), “Statistical physics of signal estimation in white Gaussian noise: theory and examples of phase transitions,” Technical Report, CCIT Pub. no. 714, EE Pub. no. 1671, December 2008 (also in *IEEE Trans. Inform. Theory*, vol. 56, no. 3, pp. 1400–1416, March 2010).

97. E. Sabbag and N. Merhav, “Achievable error exponents for channels with side information – erasure and list decoding,” Technical Report, CCIT Pub. no. 721, EE Pub. no. 1678, March 2009 (also, in *IEEE Trans. Inform. Theory*, vol. 56, no. 11, pp. 5424–5431, November 2011).
98. N. Merhav, “Physics of the Shannon limits,” Technical Report, CCIT Pub. no. 725, EE Pub. no. 1682, March 2009 (also, in *IEEE Trans. Inform. Theory*, vol. 56, no. 9, pp. 4274–4255, September 2010).
99. Y. Kaspı and N. Merhav, “Error exponents for broadcast channels with degraded message sets,” Technical Report, CCIT Pub. no. 734, EE Pub. no. 1691, May 2009 (also in *IEEE Trans. Inform. Theory*, vol. 57, no. 1, pp. 101–123, January 2011).
100. A. Reani and N. Merhav, “Efficient on–line schemes for encoding individual sequences with side information at the decoder,” Technical Report, CCIT Pub. no. 738, EE Pub. no. 1695, August 2009 (also in *IEEE Trans. Inform. Theory*, vol. 57, no. 10, pp. 6860–6876, October 2011).
101. N. Merhav, “Another look at the physics of large deviations with application to rate–distortion theory,” Technical Report, CCIT Pub. no. 742, EE Pub. no. 1699, August 2009.
102. A. Martı́n, N. Merhav, G. Seroussi, and M. J. Weinberger, “Twice–universal simulation of Markov sources and individual sequences,” Technical Report, CCIT Pub. no. 746, EE Pub. no. 1703, September 2009 (also, in *IEEE Trans. Inform. Theory*, vol. 56, no. 9, pp. 4245–4255, September 2009).
103. N. Merhav, “Optimum estimation via gradients of partition functions and information measures: a statistical–mechanical perspective,” Technical Report, CCIT Pub. no. 750, EE Pub. no. 1707, November 2009 (also, submitted to *IEEE Trans. Inform. Theory*, November 2009).
104. N. Merhav and Y. Kafri, “Bose–Einstein condensation in the large deviations regime with applications to information system models,” Technical Report, CCIT Pub. no. 752, EE Pub. no. 1709, December 2009 (also, submitted to *Journal of Statistical Mechanics: Theory and Experiment*, December 2009).
105. N. Merhav, “Rate–distortion function via minimum mean square error estimation,” Technical Report, CCIT Pub. no. 764, EE Pub. no. 1721, April 2010 (also, submitted to *IEEE Trans. Inform. Theory*, April 2010).
106. N. Merhav, “Threshold effects in parameter estimation as phase transitions in statistical mechanics,” Technical Report, CCIT Pub. no. 766, EE Pub. no. 1723, May 2010 (also, in *IEEE Trans. Inform. Theory*, vol. 57, no. 10, pp. 7000–7010, October 2011).

107. N. Merhav, "Data processing theorems and the second law of thermodynamics," Technical Report, CCIT Pub. no. 769, EE Pub. no. 1726, July 2010 (also, in *IEEE Trans. Inform. Theory*, August 2011).
108. A. Somekh-Baruch and N. Merhav, "Exact random coding error exponents for erasure decoding," Technical Report, CCIT Pub. no. 771, EE Pub. no. 1728, August 2010 (also, in *IEEE Trans. Inform. Theory*, vol. 57, no. 10, pp. 6444–6454, October 2011).
109. N. Merhav, "A statistical-mechanical view on source coding: physical compression and data compression," Technical Report, CCIT Pub. no. 778, EE Pub. no. 1735, November 2010 (also, submitted to *Journal on Statistical Mechanics: Theory and Experiment*, November 2010).
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, submitted to *IEEE Trans. Inform. Theory*, March 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, submitted to *IEEE Trans. Inform. Theory*, April 2011).
112. N. Merhav, "Subset-sum phase transitions and data compression," Technical Report, CCIT Pub. no. 792, EE Pub. no. 1749, July 2011 (also, submitted to *Journal of Statistical Mechanics: Theory and Experiment*, July 2011).
113. Y. Kaspi 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, submitted to *IEEE Trans. Inform. Theory*, August 2011).
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, submitted to *IEEE Trans. Inform. Theory*, September 2011).
115. N. Merhav, "Perfectly secure encryption of individual sequences," Technical Report, CCIT Pub. no. 800, December 2011 (also, submitted to *IEEE Trans. Inform. Theory*, December 2011).

## Research Grants

1. Allon Fellowship personal research grant, by the Israeli Council for Higher Education, 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,” submitted to the *Israel Science Foundation* (ISF), 2011.

### 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 Pittsburgh.]
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 [currently, an Associate Professor at the EE Departments of the Technion and 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, after a post–doc at Princeton 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 in 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. Erez Sabbag, “Topics in channel reliability and error exponent analysis,” Ph.D., April 2011 [currently with Densbits].

In progress

32. Yonatan Kaspi, “Limited delay and causal coding with side information,” Ph.D. (passed the candidacy exam, December 2010).
33. Avraham Reani, Ph.D. candidate.