Curriculum Vitae

TSACHY WEISSMAN

Date: August 2017

Academic Degrees:

Technion—Israel Institute of Technology

Ph.D. Electrical Engineering, September 2001.

B.Sc. Electrical Engineering, 1997 (Summa Cum Laude).

Academic Appointments:

Stanford University

9/15 - present : Full Professor, Department of Electrical Engineering

10/11 - present : Incumbent of the STMicroelectronics chair in the School of Engineering

7/10 - 8/15 : Associate Professor (with tenure), Department of Electrical Engineering

7/03 - 6/10: Assistant Professor, Department of Electrical Engineering (with 2-year leave '07 to '09)

10/02 - 6/03: Postdoctoral Fellow, Department of Statistics

Affiliations: Information Systems Lab, Stanford Neurosciences Institute, Bio-X

Technion—Israel Institute of Technology

7/07 - 9/09: Associate Professor (with tenure), Department of Electrical Engineering

10/01 - 3/02: Lecturer, Department of Electrical Engineering

Swiss Federal Institute of Technology (ETH)

7/07 - 8/07 : Visiting Professor, Institute for Information and Signal Processing

Industry Appointments

9/13 - present : Member of Technical Advisory Board, Binatix, Palo Alto, CA, USA.

7/12 - present : Member of Technical Advisory Board, Guardant Health, Redwood City, CA, USA.

7/07 - 7/09 : Member of Technical Advisory Board, ConicIT, Herzliya, Israel.

7/03 - present : Visiting Scientist, Hewlett-Packard Laboratories, Palo Alto, CA.

4/02 - 6/03: Researcher, Hewlett-Packard Laboratories, Palo Alto, CA.

Entertainment

9/13 - present : Senior Technical Advisor to HBO show "Silicon Valley".

Research Interests:

Information theory, statistical signal processing, and their applications, with recent emphasis on biological applications, in genomics in particular. Lossless and lossy compression. Delay-constrained and complexity-constrained compression and communication. Network information theory. Feedback communications. Directed information. The interplay between estimation and information theory. Entropy. Denoising, filtering, prediction, sequential decision making, and learning. Connections with probability, statistics, and computer science.

Teaching[1]:

Technion:

1996–1997 Department of Mathematics, Technion.
Leading sections ('metargel') in: Calculus 1M, Calculus 2M, Introduction to Probability.

1997–2001 Department of Electrical Engineering, Technion.
Leading sections ('metargel') in: Signals and Systems, Introduction to Digital Communications, Introduction to Statistical Signal Processing in Discrete Time, Coded Communications.

2000–2001 Department of Electrical Engineering, Technion.
Project supervision, Image Processing Lab: Supervised six projects in the areas of Image and Video processing and compression.

2001-2002 Department of Electrical Engineering, Technion.
Course Taught: Random Signals.

2007- Department of Electrical Engineering, Technion.
Courses Taught:
Undergraduate Studies:

- •Random Signals

Graduate Studies:

- •Noise Removal – An Information Theoretic View*
- •Information Theory

Stanford:

2003- Department of Electrical Engineering, Stanford.
Courses Taught:
Undergraduate Studies:

- •Introduction to Probabilistic Systems Analysis
- •Introduction to Statistical Signal Processing

Graduate Studies:

- •Information Theory
- •Statistical Signal Processing*
- •Universal Schemes in Information Theory*
- •Inference, Estimation and Information Processing*

[1] Asterisks indicate courses I have taught or currently teaching, and have also initiated and prepared.

PhD Students

Primary Advisees[2]

Current:

1. **Jiao, Jiantao** [Stanford]. Thesis Topic: Estimation of Directed Information. Expected graduation Summer of 2018.
2. **Han, Yanjun** [Stanford]. Thesis Topic: Distribution estimation and applications. Expected graduation Summer of 2020.
3. **Fisher - Hwang, Irena** [Stanford]. Thesis Topic: Genomic data processing. Expected graduation Summer of 2020.
4. **Shriram Tatwawadi, Kedar** [Stanford]. Thesis Topic: Big data compression. Expected graduation Summer of 2020.
5. **Chandak, Shubham** [Stanford]. Thesis Topic: DNA as a storage medium. Expected graduation Summer of 2021.
6. **Quek, Yihui** [Stanford]. Thesis Topic: Information Theoretic aspects of Nonequilibrium Distributions. Expected graduation Summer of 2022.
7. **Mann, Ariana** [Stanford]. Thesis Topic: Information Theoretic aspects of Deep Learning. Expected graduation Summer of 2022.
8. **Mardia, Jay** [Stanford]. Thesis Topic: Robust high dimensional statistical estimation. Expected graduation Summer of 2022.

Former:

1. **Gemelos, George** [Stanford]. Thesis Topic: Discrete denoising under channel uncertainty. Graduated June 2006. Currently Vice President, Research - Gene Security Network.
2. **Sivaramakrishnan, Kamakshi** [Stanford]. Thesis Topic: Universal Denoising of discrete-time continuous-amplitude signals. Graduated in Summer of 2007. Currently Founder and CEO at Drawbridge.
3. **Moon, Taesup** [Stanford]. Thesis Topic: Learning from noisy data with applications to filtering and denoising. Graduated in Summer of 2008. Currently a researcher at Samsung.
4. **Permuter, Haim** [Stanford]. Thesis Topic: Capacity of finite-state channels with time-invariant feedback. Graduated in Summer of 2008. Currently Associate Professor at Ben-Gurion University of the Negev, Israel.
5. **Jalali, Shirin** [Stanford]. Thesis Topic: Implementable Algorithms for Lossy Source Coding. Graduated in Summer of 2010. Currently visiting researcher at Princeton.
6. **Asnani, Himanshu** [Stanford]. Thesis Topic: Action and actuation in communication and compression. Graduated summer of 2014. Currently researcher at Ericsson.

[2]Students for whom I formally served or am serving as primary advisor.

7. **Misra, Vinith** [Stanford]**.** Thesis Topic: Communication over individual noise sequences. Graduated summer of 2014. Currently researcher at IBM.

8. **No, Albert** [Stanford]**.** Thesis Topic: Compression via the Extremes. Graduated in Fall 2015. Currently research at Roche.

9. **Venkat, Kartik** [Stanford]**.** Thesis Topic: Relations between information and estimation, and their applications. Graduated in Fall of 2015. Currently at PDT Partners.

10. **Ochoa, Idoia** [Stanford]**.** Thesis Topic: Compression of genomic data. Graduated in Summer of 2016. Currently Assistant Professor at University of Illinois at Urbana–Champaign.

Secondary Advisees[3]

Current:

1. **Kipnis, Alon** [Stanford]**.** (supervision joint with A. Goldsmith). Thesis Topic: Rate-Distortion-Sampling Theory. Expected graduation: Summer 2017.

2. **Carmon, Yair** [Stanford]**.** (supervision joint with J. Ducci). Thesis Topic: Deep learning: from fundamental limits to improved algorithms. Expected graduation Summer of 2020.

Former:

1. **Sigurjonsson, Styrmir** [Stanford]**.** (supervision joint with T. Cover). Thesis Topic: Multiple user channels with state information. Graduated June 2006. Currently at Straumur Investment Bank, Finland.

2. **Zhang, Rui** [Stanford]**.** (supervision joint with J. Cioffi). Thesis Topic: Coding and discrete denoising for burst noise channels. Graduated January 2007. Currently Assistant Professor at I^2R, Singapore.

3. **Cohen, Asaf** [Technion]**.** (supervision joint with N. Merhav). Thesis Topic: Sequential Decision Making for Multidimensional Data. Graduated May 2007. Currently Assistant Professor at Ben-Gurion University of the Negev, Israel.

4. **Cuff, Paul** [Stanford]**.** (supervision joint with T. Cover). Thesis Topic: Communication requirements for coordinated action. Graduated Summer of 2009. Currently Assistant Professor at Princeton University.

5. **Zhao, Lei** [Stanford]**.** (supervision joint with T. Cover). Thesis Topic: Active Compression. Graduated Summer 2011. Currently analyst at Citibank.

6. **Chia, Yeow-Khiang** [Stanford]**.** (supervision joint with A. El Gamal). Thesis Topic: Multi-Terminal Information Theory with Side Information Vending. Graduated December 2011. Currently Assistant Professor at Singapore Institute for Infocomm Research (I^2R).

[3]Students for whom I served or am serving formally as secondary advisor but my involvement in their studies and research is comparable to or exceeds that of the primary advisor.

7. **Manolakos, Alexandros** [Stanford]**.** (supervision joint with A. Goldsmith). Thesis Topic: Communication with Noisy Feedback. Graduated Summer 2015.

Master's Students

Primary Advisees

Former:

1. **Zeitlin, Oren** [Technion]**.** Thesis Topic: Error Exponents of Fixed Block Binary Messaging through DMCs. Graduated June 2011.

Secondary Advisees

Former:

1. **Carmon, Yair** [Technion]**.** (supervision joint with S. Shamai). Thesis Topic: Information-Estimation Analysis of the Inter-symbol Interference Channel. Expected graduation December 2014.

Postdoctoral Advisees

Current:

1. **Pavlichin, Dmitri** [Stanford]**.** Collaboration Topics: Genomic compression with local access, Non-commutativity in Information Theory. Started August 2014.
2. **Wang, Lele** [Stanford]**.** Collaboration Topics: Compression with random access and computation in the compressed domain. Started October 2016.

Former:

1. **Baron, Dror** [Technion]**.** Collaboration Topic: MCMC for lossy compression of analog sources: Theory, Algorithms and Applications. January 2009 through February 2011. Currently Assistant Professor at North Carolina State University.
2. **Courtade, Thomas** [Stanford]**.** Collaboration Topics: Multi-terminal information theory under logarithmic loss, and its applications. July 2012 to December 2013. Currently Assistant Professor at UC Berkeley.
3. **Ingber, Amir** [Stanford]**.** Collaboration Topics: Limits of channel coding under bit error rate criterion. The boundary between information theory and practical communication. Compression with queries. December 2011 to November 2013. Currently Senior Research Scientist at Yahoo! research.
4. **Wang, Zhiying** [Stanford]**.** Collaboration Topics: Genomic compression, distributed coding, communication via histograms. July 2013 to July 2015. Currently Assistant Professor at UC Irvine.
5. **Liu, Peng** [Stanford]**.** Collaboration Topics: Information theoretic language models, with applications to prediction and compression. Started Spring 2015.

6. **Hernaez, Mikel** [Stanford]**.** Collaboration Topics: Genomic compression: lossy, distributed, and for queries. November 2013 to January 2015. Currently Assistant Professor at UIUC.

7. **Saeedi, Shirin** [Stanford]**.** Collaboration Topics: Genomic processing, multi-terminal information theory. August 2014- September 2015. Currently Assistant Professor at UPENN.

8. **Mukherjee, Pritam** [Stanford]**.** Collaboration Topics: Information theoretic physical layer security, Network information theory for wireless networks. October 2016 - September 2017. Currently postdoctoral research at Stanford medical school.

Awards, Honors, and Scholarhsips

- Technion presidential awards for excellence during undergraduate studies, 1993-1997.
- The B.Sc. Summa Cum Laude.
- Scholarships for excellence from the Technion graduate school, 1997, 1999, 2000.
- Wolf Foundation award, 1998.
- Miriam and Aaron Gutwirth Memorial Fellowship for Outstanding Excellence, 1999.
- Prize of the Committee for Planning and Budgeting of the Israeli Science Ministry, 2000.
- Intel award for exceptional achievements in graduate studies, 2000.
- Charles Clore foundation scholarship, 2000.
- Technion Prize for excellence in teaching, 2001.
- Viterbi Fellow: For Ph.D. studies in Spring Semester 2001 and for post-doctoral studies in the Academic Year 2001-2002.
- Rothschild foundation scholarship for post-doctoral studies in the academic year 2002-2003.
- Robert N. Noyce Faculty Scholar of the School of Engineering, Stanford University, for the years 2003-2005.
- NSF CAREER award, 2005 [shortlisted for the PECASE, but was ineligible due to immigration status].
- The 2006 Joint Com/IT Societies Best Paper Award for: "Universal Discrete Denoising: Known Channel," T. Weissman, E. Ordentlich, G. Seroussi, S. Verdú and M. Weinberger (see list of publications for paper details).
- Student Paper Award granted to Asaf Cohen (co-supervised with N. Merhav) at the 24th IEEE Convention of the Electrical and Electronic Engineers, Eilat, Israel ("Electricity 2006"), November 2006, for: "Universal scanning of mixing random fields and performance of the Peano-Hilbert scan," cf. Item 47 in Conference Proceedings for details.
- Horev Fellowship for Leaders in Science and Technology, 2007.
- Viterbi Award for Excellence in Research, 2008.
- The Henry Taub Award for Excellence in Research, 2009.
- Special citation in the Technological Innovations Competition for the academic year 2008-2009, for the project "Reinforcement Learning via Universal Prediction", by Yair Carmon, which I supervised.
- Student authored paper award finalist for H. Asnani, H.H. Permuter and T. Weissman, "To Feed or Not to Feed Back," International Symposium on Information Theory, Saint-Petersburg, Russia, July 31 - August 5, 2011, cf. Item 92 in Conference Proceedings for details.

- Google Research Award, 2011.
- The STMicroelectronics Faculty Scholar Award, 2011. Awarded to "faculty members who stretch the boundaries of their disciplines, define new research paradigms, and build the base upon which Stanford School of Engineering's reputation will rest in the coming decades" (citation from the award announcement).
- Student authored paper award for T. Courtade and T. Weissman, "Multiterminal Source Coding under Logarithmic Loss," International Symposium on Information Theory, Cambridge, MA, July 1 - July 6, 2012, cf. Item 101 in Conference Proceedings for details.
- Student authored paper award for K. Venkat and T. Weissman, "Pointwise Relations between Information and Estimation," International Symposium on Information Theory, Cambridge, MA, July 1 - July 6, 2012, cf. Item 102 in Conference Proceedings for details.
- Election to IEEE Fellow grade (Information Theory Society) with the citation: "For contributions to Shannon theory and its applications to source coding, feedback communication, and statistical signal processing", November 2012.
- Google Research Award, 2013.
- Yahoo! Faculty Research and Engagement Award, 2013.
- 2nd place winner for I. Ochoa, A. Ingber and T. Weissman, "Efficient similarity queries via lossy compression," New Directions in the Science of Information workshop, UC Berkeley, Berkeley, CA, November 2013.
- 2014 Paul Baran Young Scholar Award for my PhD student Himanshu Asnani, for his PhD thesis research.
- Google Research Award, 2015: "Impacting Machine Learning via Sound New Mutual Information Estimation".
- Yahoo! Faculty Research Award, 2015.
- 2015 Paul Baran Young Scholar Award for my PhD student Kartik Venkat, for his PhD thesis research.
- 2016 Thomas M. Cover Dissertation award for the best doctoral dissertation contributing to the mathematical foundations of any of the information sciences within the purview of the Information Theory Society, to my student Kartik Venkat for his dissertation "Relations Between Information and Estimation: A Unified View".
- Student authored paper award for Y. Han, J. Jiao and T. Weissman, "Minimax Rate-Optimal Estimation of KL Divergence between Discrete Distributions," International Symposium on Information Theory and its Applications (ISITA2016), Monterey, CA, October 30 - November 2, 2016.
- Google Research Award, 2016: "Boosting performance - complexity tradeoffs in video compression: from fundamental limits to practical schemes".

Research Grants

- NSF ITR grant for project 'Universal Discrete Denoising', joint with A. Dembo (Stanford) and S. Verdú (Princeton), 2003-2005.
- Intel grant for project 'Delay- and Complexity-Constrained Source Coding', 2005.
- HP Labs grant for project 'Source Coding via Linear Programming', 2006.
- NSF ITR grant for project 'Toward a Unified view of Universality in Information Proceesing', 2005-2009.
- NSF ITR grant for project 'The Role of Feedback in Two-Way Communication Networks', joint with Y.H. Kim (UCSD), 2007-2009.
- ISF grant for project 'Beyond Stationarity in Information Processing: Theory and Algorithms', 2008-2011.
- NSF Early-concept Grant for Exploratory Research (EAGER) for project 'Information Theoretic Aspects of Action and Actuation', 2010-2012.
- NSF project 'Emerging Frontiers of Science of Information', 2010-2015.
- Google Research Award: 'Towards Optimum Rate-Distortion-Complexity Performance in Lossy Compression: Theory, Algorithms and Applications,' 2011-2012.
- Hewlett Packard Labs Innovation Research Award: 'Biozon - an extensive biological web infrastructure for advancing research in biology and medicine,' 2012-2015.
- NSF award for project 'CC-NIE Integration: Bringing SDN based Private Cloud to University Research', joint with N. McKeown and H. Zebker, 2013-2014.
- Google Research Award: 'Modern Data Processing: Fundamental Limits and Practical Algorithms,' joint with S. Verdu (Princeton), 2013-2014.
- NSF CIF: 'Compressed databases for similarity queries: fundamental limits and algorithms', joint with S. Verdu (Princeton), 2013-2015.
- Yahoo! Faculty Research and Engagement Award: 'Compressive similarity queries', 2013-2014.
- Binatix Faculty Grant: 'Time-series prediction via Information Measure Estimation', 2014-2015.
- NIH grant for project 'Genomic Compression: From Information Theory to Parallel Algorithms', joint with O. Milenkovic (UIUC), 2015-2017.
- NSF CIF: 'Inference of Information Measures on Large Alphabets: Fundamental Limits, Fast Algorithms, and Applications', joint with Y. Wu (UIUC), 2015-2017.
- Ford grant for project 'Data Compression for Autonomous Vehicles', 2016-2018.
- Siemens grant for project 'Application of Reinforcement Learning to Self-Organizing Manufacturing Systems', 2016-2018.
- Siemens grant for project 'Data compression for sensor measurements', 2018-2019.

Professional and Educational Affiliations and Services:

- IEEE, Information Theory Society: Student Member 1999-2001, Member 2001-2007, Senior Member 2007-2012, Fellow 2012-present.
- Technical program committees:
  - IEEE International Symposium on Information Theory (ISIT 2005)
  - IEEE International Symposium on Information Theory (ISIT 2007)
  - Data Compression Conference (DCC 2008)
  - IAPR Workshop on Cognitive Information Processing (CIP 2008)
  - IEEE International Symposium on Information Theory (ISIT 2009)
  - Data Compression Conference (DCC 2009)
  - Control over Communication Channels Workshop (ConCom 2009)
  - IEEE Information Theory Workshop (ITW 2010), also organizer of invited session in that workshop
  - IEEE International Symposium on Information Theory (ISIT 2011)
  - IEEE International Symposium on Information Theory (ISIT 2012)
  - IEEE International Symposium on Information Theory (ISIT 2014)
  - IEEE International Symposium on Information Theory (ISIT 2015)
  - IEEE Information Theory Workshop (ITW 2015), also organizer of invited session in that workshop
- Reviewer for: Trans. on Information Theory, Trans. on Signal Processing, Signal Processing Letters, Trans. on PAMI, SIAM Journal on Discrete Mathematics, Comm. in Information and Systems, Annals of Applied Probability, Annals of Statistics, Science, Foundations and Trends in Communications and Information Theory, Springer Verlag (book reviews), as well as for various conferences including ISIT, DCC, Allerton, COLT, NIPS, ICIP, ITW, IAPR
- The Mathematical Association of America (MAA): Member 2006-present.
- NSF panelist for review of proposals, Theoretical Foundations division (served multiple times).
- Panelist at Allerton Conference, September 2006, in panel "to postdoc or not to postdoc ?"
- Served on paper award committee of the IEEE Information Theory society, 2009.
- Member of editorial board of the Transactions on Information Theory. Associate Editor for Shannon Theory, since 2010.
- Member of editorial board of Foundations and Trends in Communications and Information Theory, since 2012.
- Guest editor: Proceedings of IEEE Special Issue on Principles and Applications of Science of Information, February 2017.

Departmental Activities

Stanford:

- Initiated and organized the Information Systems Colloquium from 2003 to 2007.
- Mentoring students via the Research Experience for Undergraduates (REU) program in the summers of 2004, 2005 and 2006.
- Member of Graduate Admissions Committee, 2004-2005, 2005-2006, 2009-2010, 2010-2011, 2011-2012.
- Member of Quals Appeals Committee, 2006-2007.
- Served as temporary advisor for many graduate students.
- Served as member of PhD committee for many students.
- Hosting and mentoring students via the Undergraduate Visiting Researcher (UGVR) program every summer since 2011.
- Broad area faculty search committee, 2012-2013.
- Initiated (jointly with visitor S. Verdú) and running the Information Theory Forum, 2012–.
- Academic Affairs Committee, 2013-2014, 2014-2015, 2015-2016, 2016-2017, 2017-2018.
- Serving as mentor to junior faculty Prof. Ayfer Ozgur.
- External member of an evaluation committee for an MS&E target-of-opportunity case 2015.
- Founded the Stanford Compression Forum and serving as its director, 2015–.
- Serving on Natural Sciences' committee for long-range planning on quantum science and engineering.

Technion:

- Graduate studies committee, 2007-2009
- Member of subcommittee for admission to Master's studies 2008-2009
- Served as member of PhD committee for several students (at least 8 that I can recall)
- Technion representative on the committee for the ACC award

Workshop Organization

- Co-organizer (with M. Gastpar, B. Prabhakar, D. Tse) of Bay Area Signals, Information, and Control Symposium (BASICS), April 2005 (at Stanford), April 2006 (at Berkeley).
- Co-organizer (with A. El Gamal) of the Kailath Lecture and Colloquia, June 2005, July 2006 (both at Stanford).
- Organizer of workshop on feedback communications, Stanford, July 2006.
- Co-organizer (with B. Marcus and K. Petersen) of the workshop "Entropy of Hidden Markov Processes and Connections to Dynamical Systems", at Banff International Research Station, Sept. 30th- Oct. 5th, 2007.
- Co-organizer (with V. Misra) of the inaugural Stanford Compression Forum workshop, at Stanford, January 22nd, 2015.
- Co-organizer (with V. Misra, I. Ochoa, and M. Hernaez) of the second Stanford Compression Forum workshop, at Stanford, February 18th-19th, 2016.

PRESENTATIONS

Major Invited Presentations

1. "Universal Discrete Denoising: Known Channel," *Princeton-Rutgers Distinguished Seminar Series on Communications and Information Theory during the 2002-2003 academic year,* Princeton, NJ, November 2002.

2. "Recent Trends in Denoising", tutorial given at 2007 IEEE International Symposium on Information Theory (ISIT).

3. "An Information Theorist Cleans Up Discrete Data", mini-course (5 2-hour lectures) given at ETH Zurich, July 2007.

4. "The Science Behind Communications and Data Storage", plenary talk at conference on 'Israel's contribution to the information technology revolution', held at the Israeli Knesset (parliament), March 2008, on the national science day.

5. "Where is the Action in Information Theory?", plenary talk of the International workshop on Control over Communication Channels (ConComm 2009), Seoul, South Korea, June 27th, 2009.

6. "Mutual Information, Relative Entropy, and the Costs of Causality and of Mismatch in Estimation", plenary talk at the IEEE Information Theory Workshop, Ramat-Gan, Israel March 2011.

7. "Fundamental limits and algorithms for some modern data processing problems", keynote address at the annual Science of Information Center summit, Purdue University, December 2012.

8. "Directed Information Estimation", tutorial given at ETH Zurich, May 2012.

9. "Modern Estimation via Classical Data Compression and Communication", tutorial at the Science of Information Summer School, Stanford University, May 30 to June 1, 2012.

10. "Relations between Information and Estimation, and Applications", plenary talk at the 17th INFORMS Applied Probability Society Conference (APS 2013), San Jose, Costa Rica, July 15-17th, 2013.

11. "Two Tales of Information and Estimation", Distinguished Colloquium at the Pacific Institute for the Mathematical Sciences (PIMS), University of British Columbia, Vancouver, Canada, October 2013.

12. "Science meets Fiction", invited talk at the International MINTEEE Conference, Berlin-Brandenburg Academy of Sciences and Humanities, Berlin, Germany, November 2016.

13. "Statistical inference of and with information theoretic quantities via compression", Distinguished Colloquium at UC Santa Barbara, March 2017.

14. "Who's Afraid of Lossy Compression of Genomic Data?", Invited talk at The Beckman Symposium on Technology Innovation and Human Genomics, February 2018.

Other Invited Presentations

1. "On Universal Compression of Multi-Dimensional Data Arrays Using Self-Similar Curves," in the *38th Annu. Allerton Conf. Communication, Control, and Computing,* Monticello, IL, October 2000.

2. "On Causal Source Codes with Side Information," in the *40th Annu. Allerton Conf. Communication, Control, and Computing,* Monticello, IL, October 2002.

3. "Context-Based Denoising: Universally Optimal, Practical Schemes, " *7th Purdue International Symposium*, Purdue University, June 2003.

4. "On the Optimality of Symbol by Symbol Filtering and Denoising, " invited talk for a session on Shannon Theory and Statistics, *IEEE Information Theory Workshop*, Hong Kong, July 2003.

5. "Asymptotics for the entropy rate of a hidden Markov process", invited talk at *2004 IEEE Inf. Th. workshop*, San Antonio, Texas, October 2004.

6. "On Coding with Feedback in the Presence of Side Information", Bay Area Signals, Information, and Control Symposium (BASICS), April 2005.

7. "The DUDE framework for Discrete Denoising and (some of) its applications", IBM T.J. Watson research center, special invited colloquia series, May 2007.

8. "Cleaning Up Discrete Data: An Information Theoretic Approach", Google, Mountain View, 'Tech-Talks' series, June 2007.

9. "Overview on entropy rate of hidden Markov processes", *entropy of hidden Markov processes and connections to dynamical systems* workshop, Banff International Research Station, September 2007.

10. "An Information Theorist Cleans Up Discrete Data", IBM Haifa research center, November 2007.

11. "The DUDE framework for continuous tone image denoising", HP Labs, Haifa research center, December 2007.

12. "Rate-Distortion, Noise Removal, and MCMC", Workshop on Information Theory and Wireless Communications, McMaster University, Hamilton, Ontario, Canada, July 6, 2008

13. "Rate Distortion via Markov Chain Monte Carlo", Information Theory Colloquium, HP Labs, Palo Alto, August 2008.

14. "Where is the Action in Information Theory?", Workshop on Foundations of the Digital Wireless World, Center for Communication and Information Technologies (CCIT), Technion, Haifa, May 2009.

15. "Harnessing Extreme Value Theory to an Information Theoretic Problem", Invited lecture in a workshop on Extreme Values at The William Davidson Faculty of Industrial Engineering and Management, Technion, Haifa, Israel, December 2009.

16. "Iterative Schemes for Discrete Lossy Compression", IBM Haifa research center, December 2009.

17. "To Observe or Not to Observe the Channel State," invited talk at 48th Annual Allerton Conference on Communication, Control, and Computing, Monticello, IL, October 2010.

18. "New Estimators of Directed Information", invited talk at workshop on Information Theory and Applications, UCSD, San Diego, February 2012.

19. "Directed Information: A bit about Significance, Estimation, and Applications", invited talk at the 46th Annual Conference on Information Sciences and Systems, Princeton, March 2012.

20. "Directed Information Estimation", invited talk at the 1st Munich Workshop on Bidirectional Communication and Directed Information, May 2012.

21. "Relations between Information and Estimation in the presence of Feedback", invited talk at workshop on Information and Control in Networks, organized by the Linnaeus excellence center LCCC at Lund University, Sweden, October 2012.

22. "Compression under Logarithmic Loss", invited talk at the 2012 IEEE Convention celebrating 50 Years of the IEEE-Israel Section, Eilat, Israel, November 2012.

23. "Lossy Compression for BigData: First Steps", invited lecture at IBM Research - Haifa Seminar Series, Haifa, Israel, November 2012.

24. "On fundamental limits under logarithmic loss", invited talk at workshop on Information Theory and Applications, UCSD, San Diego, February 2013.

25. "Compression for Similarity Queries", New Directions in the Science of Information workshop, UC Berkeley, Berkeley, CA, November 2013.

26. "Directed Information Optimization and Capacity of the POST Channel with and without Feedback", invited talk at workshop on sequential and adaptive information theory, McGill University, Montreal, Canada, November 7-9, 2013.

27. "Capacity of a POST Channel with and without Feedback", invited talk at the 2013 Workshop On Coding and Information Theory (WCI 2013), The University of Hong Kong, December 11-13, 2013.

28. "Why and How to Estimate Mutual Information?", invited talk at the Joint Workshop on Coding and Communications (JWCC) 2014, Casa Fuster, Barcelona, November 13-15, 2014.

29. "Chained relative entropy and mutual information", invited talk at the Information Theory Symposium of ICSEE 2016, Eilat, Israel, November 2016.

Department Seminars and Colloquia

1. "Prediction Relative to a Set of Experts in the Presence of Noise," Learning Club Guest Lecture Series, Hebrew University, November 1999.

2. "Twofold Universal Prediction Schemes for Noisy Data, " Wharton Business School, University of Pennsylvania, Philadelphia, PA, October 2000.

3. "Universal Schemes for Attaining the Finite-State Predictability in the Presence of Noise," Statistics Seminar, Stanford University, March 2001.
4. "Scanning and Prediction in Multi-Dimensional Data Arrays," Hebrew University Statistics Seminar, November 2001.
5. "DUDE: A New Approach for Recovering Noise-Corrupted Data, " Wharton Business School, University of Pennsylvania, Philadelphia, PA, November 2002.
6. *HP/MIT Seminar Series,* MIT, Boston, December 2002.
7. "On optimal filtering and entropy rate of a hidden Markov process," Berkeley EECS department, Networking, Communications and DSP Seminar series, December 2003.
8. "Discrete Universal Filtering Through Incremental Parsing," Princeton EE dept., April 2004.
9. Wharton statistics department, University of Pennsylvania, April 2004.
10. "Universal Minimax Discrete Denoising under Channel Uncertainty," Electrical and computer engineering department, UC San Diego, June 2004.
11. "New bounds on the entropy rate of hidden Markov processes," Department of Electrical Engineering, Technion
12. Department of Electrical Engineering-Systems, Tel-Aviv university, Israel, March 2005.
13. "Discrete Denoising for Channels with Memory," Department of Industrial Engineering, Technion, March 2005.
14. Department of Statistics, Tel-Aviv University, Israel, March 2005.
15. "Source Coding with Limited Side Information Lookahead at the Decoder," Princeton EE Dept., December 2005
16. Advanced Network Colloquium Series at University of Maryland, January 2006.
17. Technion EE Dept., January 2006.
18. Berkeley Networking, Communications and DSP Seminar, February 2006.
19. "Robustness and Sensitivity of the Schalkwijk-Kailath Scheme", Kailath colloquium, Stanford, July 2006.
20. "The Role of Noisy Feedback in Communication", Princeton and MIT EE departments colloquia, November 2006.
21. "Discrete Denoising with Shifts", Technion Statistics Colloquium, November 2007.
22. "Lossy Compression via Markov Chain Monte Carlo", Information Theory and Communication Colloquium at Technion, Haifa, Israel, March 2008.
23. Signal Processing and Communication Colloquium at Tel Aviv University, April 2008.

24. "Discrete to Analog and Back: The DUDE Framework for Denoising Discrete and Analog Data", Signal Processing and Systems Colloquium at Technion, Haifa, Israel, May 2008.

25. "How to Clean Up Discrete Data", Statistics Colloquium, Hebrew University, Jerusalem, Israel, June 2008.

26. "Iterative Schemes for Lossy Compression of an Unknown Source", Computer Science Colloquium, Hebrew University, Jerusalem, Israel, June 2009.

27. "Mutual Information, Relative Entropy, and the Relationship Between Causal and Non-Causal Mismatched Estimation in AWGN Channels", ISL colloquium, Stanford University, November 2009.

28. Networking, Communications, and DSP Seminar, EECS dept., Berkeley, November 2009.

29. Joint seminar in Probability and Stochastic Processes of the departments of Mathematics, Electrical Engineering and Industrial Engineering, Technion, Haifa, Israel, December 2009.

30. UCSD ECE lecture series on Information Theory and its Applications.

31. "Mutual Information, Relative Entropy, and the Costs of Causality and of Mismatch in Estimation", invited talk in the Networking, Communications, and DSP Colloquium, EECS dept., UC Berkeley.

32. Communication, Control and Signal Processing Seminar at EECS dept., University of Maryland, College Park, April 2011.

33. "On Information, Estimation, Causality, Mismatch, and Delay", invited talk at the Neyman seminar, Statistics dept., UC Berkeley, January 2012.

34. "On Estimation of Directed Information", Stanford Statistics Seminar, March 2012.

35. "Some relations between Information and Estimation", Stanford Information Theory Forum, February 2013.

36. "Some Relations Between Information and Estimation", ee-cs-math joint colloquium, Ben Gurion University, Beer-Sheva, Israel, June 2013.

37. "Operational Extremality of Gaussianity", Technion EE colloquium, Haifa, Israel, July 2013.

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