

Henry D. Pfister

Duke University
Rm. 305 Gross Hall
140 Science Dr.
Duke Box #90984
Durham, NC 27708

919-660-5288
henry.pfister@duke.edu
<http://pfister.ee.duke.edu>

EDUCATION

- 04/2000–03/2003 **Ph.D., University of California, San Diego, California**
Department of Electrical and Computer Engineering
Dissertation: *“On the capacity of finite-state channels and the analysis of convolutional accumulate-m codes”* under Professor Paul H. Siegel.
- 09/1997–03/2000 **M.S., University of California, San Diego, California**
Department of Electrical and Computer Engineering
under Professor Paul H. Siegel.
- 09/1990–03/1995 **B.S., University of California, San Diego, California**
Department of Physics.
-

ACADEMIC EXPERIENCE

- 07/2019–present **Full Professor** in Electrical and Computer Engineering (primary) at Duke University.
- 07/2019–present **Full Professor** in Mathematics (secondary) at Duke University.
- 08/2014–06/2019 **Associate Professor** in Electrical and Computer Engineering (primary) at Duke University.
- 08/2016–06/2019 **Associate Professor** in Mathematics (secondary) at Duke University.
- 06/2012–07/2014 **Associate Professor** in Electrical and Computer Engineering at Texas A&M University in College Station, TX.
- 08/2006–05/2012 **Assistant Professor** in Electrical and Computer Engineering at Texas A&M University in College Station, TX.
- 01/2005–12/2005 **Post-Doctoral Researcher** in the School of Computer and Communication Sciences at the Swiss Federal Institute of Technology, Lausanne.
-

INDUSTRIAL EXPERIENCE

- 05/2003–12/2004 **Senior Engineer** at Qualcomm, Inc. in San Diego, CA.
Developed practical interference cancellation for 3G CDMA systems.
-

HONORS AND AWARDS

2016 Best Paper Award at the 2016 Symposium on the Theory of Computing (STOC)

2016 Invited Lecturer for the European School of Information Theory

2015-2016 Distinguished Lecturer for the IEEE Information Theory Society

2014 Invited Lecturer for the North American School of Information Theory

2010 Outstanding Professor Award

Electrical and Computer Engineering Department, Texas A&M University

2008 National Science Foundation CAREER Award

2007 IEEE COMSOC Best Paper in Signal Processing and Coding for Data Storage

TEACHING EXPERIENCE

Undergraduate	Graduate
Probability (2011)	Advanced Channel Coding (2012,2014)
Digital Communications (2008-10,2012)	Information Theory (2011)
Digital Signal Processing (2009)	Vector Space Methods (2008-09,2016-19)
Signals and Systems (2013)	Channel Coding (2006-07,2012-13,2017)
Digital Audio Processing (2015,2017-19)	Graphical Models and Inference (2014)

SUPERVISED STUDENTS

Student	Degree	Thesis Title
Jiaai Liu	M.S. 2020	Supervised MS Project without Thesis
Zeyu Chen	M.S. 2020	Supervised MS Project without Thesis
Qizhang Feng	M.S. 2020	Supervised MS Project without Thesis
Yi Luo	M.S. 2019	Supervised MS Project without Thesis
Ye Tao	M.S. 2019	Supervised MS Project without Thesis
Sarah Brandsen	Ph.D. ~2021	TBD
Narayanan Rengaswamy	Ph.D. ~2020	Classical Coding Approaches to Quantum Applications
Mengke Lian	Ph.D. 12/19	Belief Propagation with Deep Unfolding for High-dimensional Inference in Communication Systems
Mohammad Reza Sanatkar	Ph.D. 12/16	The Dynamics of Polarized Beliefs in Networks Governed by Viral Diffusion and Media Influence
Santhosh Kumar	Ph.D. 12/15	Capacity-Achieving Coding Mechanisms: Spatial Coupling and Group Symmetries

Fatemeh Hamidi-Sepehr	Ph.D. 05/14	On the Performance Analysis of Block Codes over Unreliable Channels in Delay-Sensitive Communications
Yung-Yih Jian	Ph.D. 08/13	On the Analysis of Spatially-Coupled GLDPC Codes and the Weighted Min-Sum Algorithm
Arvind Yedla	Ph.D. 08/12	Universality for Multi-Terminal Problems via Spatial Coupling
Phong Nguyen	Ph.D. 05/12	Advanced Coding Techniques with Applications to Storage Systems
Byung-Hak Kim	Ph.D. 05/12	Joint Equalization and Decoding via Convex Optimization
Fan Zhang	Ph.D. 05/10	LDPC Codes over Large Alphabets and their Applications to Compressed Sensing and Flash Memory
Aparna Khare	M.S. 12/10	Capacity and Coding for 2D Channels
Sirish Boddikurapati	M.S. 12/09	Sequential Monte Carlo Methods with Applications to Communication Channels
Chia-Wen Wang	M.S. 07/08	Bounds on the MAP Threshold of Iterative Decoding Systems with Erasure Noise

INVITED SEMINARS

“Insight from Simple Questions: Three Examples,”

Jack Keil Wolf Lecture on Information Theory and Applications, UC San Diego, Dec. 1, 2017.

“Capacity via Symmetry: Extensions and Practical Consequences,”

MIT LIDS Seminar Series, April 4, 2017.

“Graphical Models and Inference: Insights from Spatial Coupling,”

IEEE Information Theory Society Distinguished Lecture

Lund University, Sweden, September 16th, 2016.

“Capacity Achieving Codes: There and Back Again,”

European School of Information Theory, Chalmers University, Gothenburg, Sweden, April 6th, 2016.

“Reed-Muller Codes Achieve Capacity on Erasure Channels,”

ECE Department, University of Illinois, Urbana Champaign, Nov. 16, 2015

Science of Information Day, Princeton University, Sept. 25, 2015.

“A Brief Introduction to Spatially-Coupled Codes and Threshold Saturation,”

Chinese University of Hong Kong, June 22, 2015.

“Symmetric Product Codes,”

Coding: From Practice to Theory Workshop, Simons Institute, UC Berkeley, Feb. 13, 2015.

“A Brief Introduction to Spatially-Coupled Codes and Threshold Saturation,”

North American School of Information Theory, University of Toronto, June 18-21, 2014.

“Graphical Models and Inference: Breakthroughs and Insight from Spatial Coupling,”

Duke University, March 17th, 2014.

“From BP to MAP via Spatial Coupling,”

Wireless Networking and Communication Seminar, University of Texas, Austin, Nov. 9th, 2012.

“A Simple Proof of Threshold Saturation for Coupled Scalar Recursions,”
Stanford University, August 17th, 2012,
Summer Research Institute, École Polytechnique Fédérale de Lausanne, June 7th, 2012.

“Applications of spatial coupling in communications, computer science, signal processing, and statistical physics – an overview,” CAACT Workshop: Aspects of Coding Theory,
Centre Interfacultaire Bernoulli, École Polytechnique Fédérale de Lausanne, July 25-29, 2011.

“Information Theory and Coding for Compressed Sensing,”
Center for Wireless Communications Ericsson Seminar Series, UC San Diego, March 2009.

“The Derivatives of Entropy Rate and Capacity for Finite-State Channels,”
Workshop on Entropy of Hidden Markov Processes and Connections to Dynamical Systems,
Banff International Research Station (BIRS), Banff, Canada, October 2007.

“Interleaved and Lifted Reed-Solomon Codes: New Perspectives and Constructions,”
Swiss Federal Institute of Technology, Zurich, July 2007.

“Capacity-Achieving Codes for the BEC with Bounded Complexity,”
Texas A&M University, April 2006.

“Modulation and Coding for Satellite Communications,”
SatNEx Summer School, Pisa, Italy, August 2005.

“On the Capacity of Finite-State Channels,”
Technion Institute, Haifa, Israel, March 2005.

INVITED TALKS

“Pruning Machine Learning Models for Communications,”
Workshop on Machine Learning for Communications (MLCOM), September 2020.

“Bounds on the List Size of Successive Cancellation List Decoding,”
Intl. Conference on Signal Processing and Communications, Indian Institute of Science, July 2020.

“Recent Advances in Polar Codes,”
Technical University Munich (TUM), July 2020.

“Reinforcement Learning for Channel Coding,”
International Zurich Seminar (IZS), February 2020.

“Learned Belief-Propagation Decoding with Simple Scaling and SNR Adaptation,”
Information Theory and Applications Workshop, San Diego, February 2019.

“Decoding Reed–Muller Codes Using Minimum-Weight Parity Checks,”
Information Theory and Applications Workshop, San Diego, February 2018.

“Sharp Thresholds for Weakly Symmetric Boolean Functions and Capacity-Achieving Cyclic Codes,”
Information Theory and Applications Workshop, San Diego, February 2017.

“Near-Optimal Finite-Length Scaling for Polar Codes over Large Alphabets,”
Information Theory and Applications Workshop, San Diego, February 2016.

“Symmetric product codes,”
Information Theory and Applications Workshop, San Diego, February 2015.

“Practical aspects of spatially-coupled codes,”
Information Theory and Applications Workshop, San Diego, February 2014.

“Spatial coupling, potential functions, and the Maxwell construction,”
Information Theory and Applications Workshop, San Diego, February 2013.

“On the queueing behavior of Gilbert-Elliott channels in the rare-transition regime,”
Information Sciences and Systems (CISS), Princeton, March 2012.

“Spatial coupling and information crystallization,”
Information Theory and Applications Workshop, San Diego, February 2012.

“Achieving universality in practice via spatial coupled systems,”
Information Theory and Applications Workshop, San Diego, February 2011.

“A rate-distortion perspective on multiple decoding attempts for Reed-Solomon codes,”
Information Theory and Applications Workshop, San Diego, February 2010.

“Compressed sensing and linear codes over real numbers,”
Information Theory and Applications, San Diego, February 2008.

“Rediscovering our roots: Coding theory and Reed-Solomon codes,”
AMS Joint Mathematics Meetings, Special Session on Coding Theory, New Orleans, January 2007.

“Capacity-achieving ensembles of accumulate-repeat-accumulate codes for the erasure channel with bounded complexity,”
Information Theory and Applications Workshop, San Diego, February 2006.

PROFESSIONAL SERVICE

Co-Chair Technical Prog. Committee, *IEEE Intl. Symp. on Inform. Theory*, Melbourne, Australia, 2021

Technical Program Committee, *10th Intl. Symposium on Turbo Codes*, Hong Kong, China, 2018

Technical Program Committee, *IEEE Inform. Theory Workshop*, Guangzhou, China, 2018

General Chair, IEEE ITSOC North American School of Information Theory, Duke University, 2016

Associate Editor in Coding Theory, *IEEE Transactions on Information Theory*, 2013-2016

Technical Program Committee, *IEEE Intl. Symp. on Inform. Theory*, Vail, Colorado, 2018

Technical Program Committee, *IEEE Intl. Symp. on Inform. Theory*, Hong Kong, China, 2015

Technical Program Committee, *8th Intl. Symposium on Turbo Codes*, Bremen, Germany, 2014

Technical Program Committee, *IEEE Intl. Symp. on Inform. Theory*, Istanbul, Turkey, 2013
Technical Program Committee, *7th Intl. Symposium on Turbo Codes*, Gothenburg, Sweden, 2012
Technical Program Committee, *IEEE Intl. Symp. on Inform. Theory*, Cambridge, MA, 2012
Technical Program Committee, *IEEE GLOBECOM*, Houston, TX, 2011
Co-Chair *IEEE GLOBECOM Workshop on Emerging Memory Technologies*, Miami, FL, 2010
Technical Program Committee, *IEEE Intl. Symp. on Inform. Theory*, Austin, TX, 2010
Co-Chair General Symposium, *IEEE GLOBECOM*, New Orleans, 2008
Technical Program Committee, *5th Intl. Symposium on Turbo Codes*, Lausanne, Switzerland, 2008
Technical Program Committee, *IEEE Inform. Theory Workshop*, Lake Tahoe, 2007
Technical Program Committee, *IEEE Intl. Symp. on Inform. Theory*, Nice, France, 2007
Reviewer for IEEE Transactions on Information Theory (> 30 papers since 2011)
Reviewer for IEEE Communications Letters (4 papers since 2011)
Reviewer for IEEE Transactions on Communications (9 papers since 2008)
Reviewer for NSF Research Proposals (4 panels and 3 special requests since 2009)

RESEARCH FUNDING

National Science Foundation CISE Program, PI, 2019-2022

“Efficient Inference Tools for Quantum Systems: Algorithms, Applications, and Analysis”

National Science Foundation CISE Program, PI, 2019-2022

“Improving Quantum Computing and Classical Communication using Discrete Sets”

National Science Foundation CISE Program, PI, 2017-2020

“Capacity via Symmetry”

National Science Foundation ECCS Program, PI, 2016-2019

“Advanced Coding Techniques for Next-Generation Optical Communications”

National Science Foundation CISE CCF Program, PI, 2013-2016

“Design and Analysis of Spatially-Coupled Coding Systems”

National Science Foundation CISE CCF Program, PI, 2012-2015

“Design and Analysis of Novel Compressed Sensing Algorithms via Connections with Coding Theory”

National Science Foundation CISE CCF Program, co-PI, 2008-2011

“Fundamental Limits in Delay-Constrained Wireless Communication”

Texas Higher Education Coordinating Board ARP, co-PI, 2008-2010

“Enabling Delay-Sensitive Multihop Wireless Communications”

National Science Foundation ECCS GOALI Program, co-PI, 2008-2011

“Advanced Coding and Signal Processing for Magnetic Recording: From Theory to Implementation”

National Science Foundation CAREER Award, PI, 2008-2013

“Information Theory and Iterative Decoding for Finite-State Channels”

Qatar National Research Fund, co-PI, 2007-2010

“Universal Signaling Schemes for Multimedia Transmission over Wireless Networks”

PATENTS AND PUBLISHED PATENT APPLICATIONS

US 8959418B1	Forward error correction
US 2011/0069735	Method and apparatus for canceling pilot int. in a wireless comm. system
US 2010/0050001	Peer-to-peer communications
US 2006/0142041	Adaptation of transmit subchannel gains in a system with int. cancellation
US 2006/0141935	Joint interference cancellation of pilot, overhead and traffic channels
US 2006/0141934	Traffic interference cancellation
US 2006/0141933	Channel estimation for interference cancellation
US 2006/0007895	Method and apparatus for canceling pilot int. in a wireless comm. system
US 2005/0207384	Signal acquisition in peer-to-peer spread-spectrum communications
US 2005/0135262	Low-complexity, capacity-achieving code for communication systems
US 2005/0111383	Peer-to-peer communications
US 2005/0013350	Method and apparatus for canceling pilot int. in a wireless comm. system

BOOK CHAPTERS AND THESES

- [B1] H. D. Pfister, *On the Capacity of Finite State Channels and the Analysis of Convolutional Accumulate-m Codes*. PhD thesis, University of California, San Diego, CA, USA, March 2003.
- [B2] G. Reeves and H. Pfister, “Understanding phase transitions via mutual information and MMSE.” to appear in *Information-Theoretic Methods in Data Science*, Cambridge Press, arXiv preprint arXiv:1907.02095, 2020.
-

PEER-REVIEWED JOURNAL PAPERS

- [J1] T. Can, N. Rengaswamy, R. Calderbank, and H. D. Pfister, “Kerdock codes determine unitary 2-designs,” *IEEE Trans. Inform. Theory*, 2020.
- [J2] N. Rengaswamy, R. Calderbank, M. Newman, and H. D. Pfister, “On optimality of CSS codes for transversal T,” *IEEE J. Select. Areas Inform. Theory*, 2020.
- [J3] V. Oliari, S. Goossens, C. Häger, G. Liga, R. M. Bütler, M. van den Hout, S. van der Heide, H. D. Pfister, C. M. Okonkwo, and A. Alvarado, “Revisiting efficient multi-step nonlinearity compensation with machine learning: An experimental demonstration,” *J. Lightwave Technol.*, 2020.
- [J4] N. Rengaswamy, R. Calderbank, and H. D. Pfister, “Unifying the Clifford hierarchy via symmetric matrices over rings,” *Phys. Rev. A*, vol. 100, no. 2, p. 022304, 2019.

- [J5] C. Schmidt, H. D. Pfister, and L. Zdeborová, “Minimal sets to destroy the k -core in random networks,” *Phys. Rev. E*, vol. 99, no. 2, p. 022310, 2019.
- [J6] H. D. Pfister and R. Urbanke, “Near-optimal finite-length scaling for polar codes over large alphabets,” *IEEE Trans. Inform. Theory*, vol. 65, no. 9, pp. 5643–5655, 2019.
- [J7] G. Reeves and H. D. Pfister, “The replica-symmetric prediction for random linear estimation with Gaussian matrices is exact,” *IEEE Trans. Inform. Theory*, vol. 65, no. 4, pp. 2252–2283, 2019.
- [J8] I. Yoo, M. F. Imani, T. Slesman, H. D. Pfister, and D. R. Smith, “Enhancing capacity of spatial multiplexing systems using reconfigurable cavity-backed metasurface antennas in clustered MIMO channels,” *IEEE Trans. Commun.*, 2018.
- [J9] C. Häger and H. D. Pfister, “Approaching miscorrection-free performance of product and generalized product codes,” *IEEE Trans. Commun.*, vol. 66, 2018.
- [J10] P. Charbonneau, Y. C. Li, H. D. Pfister, and S. Yaida, “Cycle-expansion method for the lyapunov exponent, susceptibility, and higher moments,” *Physical Review E*, vol. 96, no. 3, p. 032129, 2017.
- [J11] Y. Y. Jian, H. D. Pfister, and K. R. Narayanan, “Approaching capacity at high rates with iterative hard-decision decoding,” *IEEE Trans. Inform. Theory*, vol. 63, pp. 5752–5773, Sept. 2017.
- [J12] C. Häger, H. D. Pfister, A. Graell i Amat, and F. Brännström, “Density evolution for deterministic generalized product codes on the binary erasure channel at high rates,” *IEEE Trans. Inform. Theory*, 2017.
- [J13] S. Kudekar, S. Kumar, M. Mondelli, H. D. Pfister, E. Şaşıoğlu, and R. Urbanke, “Reed-Muller codes achieve capacity on erasure channels,” *IEEE Trans. Inform. Theory*, vol. 63, no. 7, pp. 4298–4316, 2017.
- [J14] O. Sabag, H. H. Permuter, and H. D. Pfister, “A single-letter upper bound on the feedback capacity of unifilar finite-state channels,” *IEEE Trans. Inform. Theory*, vol. 63, no. 3, pp. 1392–1409, 2017.
- [J15] F. Hamidi-Sepehr, J.-F. Chamberland, and H. D. Pfister, “On the performance of block codes over finite-state channels in the rare-transition regime,” *IEEE Trans. Commun.*, vol. 63, pp. 3974–3990, Nov. 2015.
- [J16] F. Hamidi-Sepehr, H. D. Pfister, and J.-F. Chamberland, “Delay-sensitive communication over fading channels: Queueing behavior and code parameter selection,” *IEEE Trans. Vehicular Technology*, vol. 64, pp. 3957–3970, Sept. 2015.
- [J17] S. Kumar, A. J. Young, N. Macris, and H. D. Pfister, “Threshold saturation for spatially-coupled LDPC and LDGM codes on BMS channels,” *IEEE Trans. Inform. Theory*, vol. 60, pp. 7389–7415, Dec. 2014.
- [J18] A. Yedla, Y.-Y. Jian, P. S. Nguyen, and H. D. Pfister, “A simple proof of Maxwell saturation for coupled scalar recursions,” *IEEE Trans. Inform. Theory*, vol. 60, pp. 6943–6965, Nov. 2014.
- [J19] Y.-Y. Jian and H. D. Pfister, “Convergence of weighted min-sum decoding via dynamic programming on trees,” *IEEE Trans. Inform. Theory*, vol. 60, pp. 943–963, Feb. 2014.

- [J20] S. Kumar, J.-F. Chamberland, and H. D. Pfister, "First-passage time and large-deviation analysis for erasure channels with memory," *IEEE Trans. Inform. Theory*, vol. 59, pp. 5547–5565, Sept. 2013.
- [J21] A. Yedla, H. D. Pfister, and K. R. Narayanan, "Code design for the noisy Slepian-Wolf problem," *IEEE Trans. Commun.*, vol. 61, pp. 2535–2545, June 2013.
- [J22] P. Parag, J.-F. Chamberland, H. D. Pfister, and K. R. Narayanan, "Code-rate selection, queueing behavior, and the correlated erasure channel," *IEEE Trans. Inform. Theory*, vol. 59, pp. 397–407, Jan. 2013.
- [J23] F. Zhang and H. D. Pfister, "Verification decoding of high-rate LDPC codes with applications in compressed sensing," *IEEE Trans. Inform. Theory*, vol. 58, pp. 5042–5048, Aug. 2012.
- [J24] B.-H. Kim and H. D. Pfister, "Joint decoding of LDPC codes and finite-state channels via linear-programming," *IEEE J. Select. Topics in Signal Processing*, vol. 5, pp. 1563–1576, Dec. 2011.
- [J25] F. Zhang and H. D. Pfister, "Analysis of verification-based decoding on the q -ary symmetric channel for large q ," *IEEE Trans. Inform. Theory*, vol. 57, pp. 6754–6770, Oct. 2011.
- [J26] P. S. Nguyen, H. D. Pfister, and K. R. Narayanan, "On multiple decoding attempts for Reed-Solomon codes: A rate-distortion approach," *IEEE Trans. Inform. Theory*, vol. 57, pp. 668–691, Feb. 2011.
- [J27] H. D. Pfister, "The capacity of finite-state channels in the high-noise regime," in *Entropy of Hidden Markov Processes and Connections to Dynamical Systems: Papers from the Banff International Research Station Workshop* (B. Marcus, K. Petersen, and T. Weissman, eds.), London Mathematical Society Lecture Note Series, Cambridge University Press, 2011.
- [J28] M. P. Wilson, K. Narayanan, H. D. Pfister, and A. Sprintson, "Joint physical layer coding and network coding for bi-directional relaying," *IEEE Trans. Inform. Theory*, vol. 56, pp. 5641–5654, Nov. 2010.
- [J29] H. D. Pfister and P. H. Siegel, "Joint iterative decoding of LDPC codes for channels with memory and erasure noise," *IEEE J. Select. Areas Commun.*, vol. 26, pp. 320–337, Feb. 2008.
- [J30] H. D. Pfister and I. Sason, "Accumulate-repeat-accumulate codes: Capacity-achieving ensembles of systematic codes for the erasure channel with bounded complexity," *IEEE Trans. Inform. Theory*, vol. 53, pp. 2088–2115, June 2007.
- [J31] J. B. Soriaga, H. D. Pfister, and P. H. Siegel, "Determining and approaching achievable rates of binary intersymbol interference channels using multistage decoding," *IEEE Trans. Inform. Theory*, vol. 53, pp. 1416–1429, April 2007. **IEEE COMSOC 2007 Best Paper in Data Storage.**
- [J32] J. Hou, J. E. Smee, H. D. Pfister, and S. Tomasin, "Implementing interference cancellation to increase the EV-DO rev A reverse link capacity," *IEEE Commun. Magazine*, vol. 44, pp. 96–102, Feb. 2006.
- [J33] H. D. Pfister, I. Sason, and R. Urbanke, "Capacity-achieving ensembles for the binary erasure channel with bounded complexity," *IEEE Trans. Inform. Theory*, vol. 51, pp. 2352–2379, July 2005.

- [J34] J. B. Soriaga, H. D. Pfister, and P. H. Siegel, "On the low-rate Shannon limit for binary intersymbol interference channels," *IEEE Trans. Commun.*, vol. 51, pp. 1962–1964, Dec. 2003.
- [J35] J. Hou, P. H. Siegel, L. B. Milstein, and H. D. Pfister, "Capacity-approaching bandwidth-efficient coded modulation schemes based on low-density parity-check codes," *IEEE Trans. Inform. Theory*, vol. 49, pp. 2141–2155, Sept. 2003.
- [J36] H. D. Pfister and P. H. Siegel, "The serial concatenation of rate-1 codes through uniform random interleavers," *IEEE Trans. Inform. Theory*, vol. 49, pp. 1425–1438, June 2003.
-

PEER-REVIEWED CONFERENCE PAPERS

- [C1] M. C. Coşkun and H. D. Pfister, "Bounds on the list size of successive cancellation list decoding," in *International Conference on Signal Processing and Communications (SPCOM)*, 2020.
- [C2] S. Brandsen, K. D. Stubbs, and H. D. Pfister, "Reinforcement learning with neural networks for quantum multiple hypothesis testing," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 1897–1902, 2020.
- [C3] S. Brandsen, M. Lian, K. D. Stubbs, N. Rengaswamy, and H. D. Pfister, "Adaptive procedures for discriminating between arbitrary tensor-product quantum states," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 1933–1938, 2020.
- [C4] M. C. Coşkun, J. Neu, and H. D. Pfister, "Successive cancellation inactivation decoding for modified Reed-Muller and eBCH codes," in *Proc. IEEE Int. Symp. Inform. Theory*, 2020.
- [C5] A. Buchberger, C. Häger, H. D. Pfister, L. Schmalen, and A. Graell i Amat, "Pruning neural belief propagation decoders," in *Proc. IEEE Int. Symp. Inform. Theory*, 2020.
- [C6] M. Lian, C. Häger, and H. D. Pfister, "Decoding Reed-Muller codes using redundant code constraints," in *Proc. IEEE Int. Symp. Inform. Theory*, 2020.
- [C7] N. Rengaswamy, R. Calderbank, M. Newman, and H. D. Pfister, "Classical coding problem from transversal T gates," in *Proc. IEEE Int. Symp. Inform. Theory*, 2020.
- [C8] N. Rengaswamy, K. P. Seshadreesan, S. Guha, and H. D. Pfister, "Quantum advantage via qubit belief propagation," in *Proc. IEEE Int. Symp. Inform. Theory*, 2020.
- [C9] C. Häger, H. D. Pfister, R. M. Büttler, G. Liga, and A. Alvarado, "Model-based machine learning for joint digital backpropagation and PMD compensation," in *Proc. OSA Optical Fiber Commun. Conf.*, Optical Society of America, 2020.
- [C10] F. Carpi, C. Häger, M. Martalò, R. Raheli, and H. D. Pfister, "Reinforcement learning for channel coding: Learned bit-flipping decoding," in *Proc. Annual Allerton Conf. on Commun., Control, and Comp.*, 2019.
- [C11] I. Tal, H. D. Pfister, A. Fazeli, and A. Vardy, "Polar codes for the deletion channel: Weak and strong polarization," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 1362–1366, 2019.
- [C12] T. Can, N. Rengaswamy, R. Calderbank, and H. D. Pfister, "Kerdock codes determine unitary 2-designs," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 2908–2912, 2019.

- [C13] M. Lian, F. Carpi, C. Häger, and H. D. Pfister, “Learned belief-propagation decoding with simple scaling and SNR adaptation,” in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 161–165, 2019.
- [C14] C. Häger, H. D. Pfister, R. M. Bütler, G. Liga, and A. Alvarado, “Revisiting multi-step nonlinearity compensation with machine learning,” in *Proc. European Conf. Optical Communication (ECOC)*, 2019.
- [C15] A. Sheikh, A. Graell i Amat, G. Liva, C. Häger, and H. D. Pfister, “On low-complexity decoding of product codes for high-throughput fiber-optic systems,” in *Proc. Int. Symp. on Turbo Codes & Iterative Inform. Proc.*, 2018. [Online]. arXiv preprint arXiv:1806.10903.
- [C16] M. Lian, C. Häger, and H. D. Pfister, “What can machine learning teach us about communications?,” in *Proc. IEEE Inform. Theory Workshop*, (Guangzhou, China), 2018.
- [C17] C. Häger and H. D. Pfister, “Wideband time-domain digital backpropagation via subband processing and deep learning,” in *Proc. European Conf. Optical Communication (ECOC)*, 2018.
- [C18] C. Fougstedt, C. Häger, L. Svensson, H. D. Pfister, and P. Larsson-Edefors, “ASIC implementation of time-domain digital backpropagation with deep-learned chromatic dispersion filters,” in *Proc. European Conf. Optical Communication (ECOC)*, (Rome, Italy), Sept. 2018.
- [C19] Y. Luo and H. Pfister, “Adversarial defense of image classification using a variational auto-encoder.” submitted to CVPR 2019, arXiv preprint arXiv:1812.02891, 2018.
- [C20] C. Häger and H. D. Pfister, “Deep learning of the nonlinear Schrödinger equation in fiber-optic communications,” in *Proc. IEEE Int. Symp. Inform. Theory*, 2018. [Online]. Available: <http://arxiv.org/abs/1804.02799>.
- [C21] N. Rengaswamy, R. Calderbank, S. Kadhe, and H. D. Pfister, “Synthesis of logical Clifford operators via symplectic geometry,” in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 791–795, IEEE, 2018.
- [C22] E. Santi, C. Häger, and H. D. Pfister, “Decoding Reed-Muller codes using minimum-weight parity checks,” in *Proc. IEEE Int. Symp. Inform. Theory*, 2018. [Online]. Available: <http://arxiv.org/abs/1804.10319>.
- [C23] G. Reeves, H. D. Pfister, and A. Dytso, “Mutual information as a function of matrix SNR for linear Gaussian channels,” in *Proc. IEEE Int. Symp. Inform. Theory*, 2018.
- [C24] C. Häger and H. D. Pfister, “Nonlinear interference mitigation via deep neural networks,” in *Proc. OSA Optical Fiber Commun. Conf.*, 2018.
- [C25] C. Häger and H. D. Pfister, “Miscorrection-free decoding of staircase codes,” in *Proc. European Conf. Optical Communication (ECOC)*, (Gothenburg, Sweden), Sept. 2017.
- [C26] S. Kumar, R. Calderbank, and H. D. Pfister, “Reed-Muller codes achieve capacity on the quantum erasure channel,” in *Proc. IEEE Int. Symp. Inform. Theory*, (Barcelona, Spain), pp. 1750–1754, 2016.
- [C27] S. Kumar, R. Calderbank, and H. D. Pfister, “Beyond double transitivity: Capacity-achieving cyclic codes on erasure channels,” in *Proc. IEEE Inform. Theory Workshop*, pp. 241–245, Sept 2016.

- [C28] G. Reeves and H. D. Pfister, “The replica-symmetric prediction for compressed sensing with Gaussian matrices is exact,” in *Proc. IEEE Int. Symp. Inform. Theory*, (Barcelona, Spain), pp. 665–669, 2016.
- [C29] H. D. Pfister and R. Urbanke, “Near-optimal finite-length scaling for polar codes over large alphabets,” in *Proc. IEEE Int. Symp. Inform. Theory*, (Barcelona, Spain), pp. 215–219, 2016.
- [C30] C. Häger, H. D. Pfister, A. Graell i Amat, and F. Brännström, “Deterministic and ensemble-based spatially-coupled product codes,” in *Proc. IEEE Int. Symp. Inform. Theory*, (Barcelona, Spain), pp. 2114–2118, 2016.
- [C31] O. Sabag, H. H. Permuter, and H. D. Pfister, “Single-letter bounds on the feedback capacity of unifilar finite-state channels,” in *IEEE International Conference on the Science of Electrical Engineering (ICSEE)*, pp. 1–5, IEEE, 2016.
- [C32] O. Sabag, H. H. Permuter, and H. D. Pfister, “A single-letter upper bound on the feedback capacity of unifilar finite-state channels,” in *Proc. IEEE Int. Symp. Inform. Theory*, (Barcelona, Spain), pp. 310–314, 2016.
- [C33] S. Kudekar, S. Kumar, M. Mondelli, H. D. Pfister, and R. L. Urbanke, “Comparing the bit-MAP and block-MAP decoding thresholds of Reed-Muller codes on BMS channels,” in *Proc. IEEE Int. Symp. Inform. Theory*, (Barcelona, Spain), pp. 1755–1759, 2016.
- [C34] S. Kudekar, S. Kumar, M. Mondelli, H. D. Pfister, E. Şaşıoğlu, and R. Urbanke, “Reed-Muller codes achieve capacity on erasure channels,” in *Proc. of the Annual ACM Symp. on Theory of Comp.*, 2016. **STOC Best Paper Award**.
- [C35] C. Häger, H. D. Pfister, A. Graell i Amat, and F. Brännström, “Density evolution and error floor analysis for staircase and braided codes,” in *Proc. OSA Optical Fiber Commun. Conf.*, 2016.
- [C36] M. Mondelli, S. Kudekar, S. Kumar, H. Pfister, E. Şaşıoğlu, and R. Urbanke, “Reed-Muller codes: Thresholds and weight distribution,” in *Proc. IEEE Intl. Zurich Seminar on Commun.*, (Zurich, Switzerland), p. 50, 2016.
- [C37] C. Häger, H. D. Pfister, A. Graell i Amat, F. Brännström, and E. Agrell, “A deterministic construction and density evolution analysis for generalized product codes,” in *Proc. IEEE Intl. Zurich Seminar on Commun.*, (Zurich, Switzerland), 2016.
- [C38] N. Rengaswamy and H. D. Pfister, “Cyclic polar codes,” in *Proc. IEEE Int. Symp. Inform. Theory*, (Hong Kong, China), pp. 1287–1291, June 2015.
- [C39] S. Li, Y.-C. Huang, T. Liu, and H. D. Pfister, “On the limits of treating interference as noise for two-user symmetric Gaussian interference channels,” in *Proc. IEEE Int. Symp. Inform. Theory*, (Hong Kong, China), pp. 1711–1715, June 2015.
- [C40] C. Häger, A. Amat, H. D. Pfister, A. Alvarado, F. Brännström, and E. Agrell, “On parameter optimization for staircase codes,” in *Proc. OSA Optical Fiber Commun. Conf.*, pp. 1–3, March 2015.
- [C41] H. D. Pfister, S. Emmadi, and K. Narayanan, “Symmetric product codes,” in *Proc. Annual Workshop on Inform. Theory and its Appl.*, pp. 282–290, Feb. 2015.

- [C42] H. D. Pfister and K. R. Narayanan, "An introduction to spatially-coupled codes via practical examples," in *General Assembly and Scientific Symposium (URSI GASS)*, pp. 1–4, 2014.
- [C43] A. Vem, Y.-C. Huang, K. R. Narayanan, and H. D. Pfister, "Multilevel lattices based on spatially-coupled LDPC codes with applications," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 2336–2340, 2014.
- [C44] S. Kumar, A. Vem, K. Narayanan, and H. D. Pfister, "Spatially-coupled codes for side-information problems," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 516–520, 2014.
- [C45] Y.-Y. Jian, H. D. Pfister, K. R. Narayanan, R. Rao, and R. Mazahreh, "Iterative hard-decision decoding of braided BCH codes for high-speed optical communication," in *Proc. IEEE Global Telecom. Conf.*, (Atlanta, GA, USA), 2013.
- [C46] N. E. Tunali, K. R. Narayanan, and H. D. Pfister, "Spatially-coupled low density lattices based on construction A with applications to compute-and-forward," in *Proc. IEEE Inform. Theory Workshop*, (Sevilla, Spain), 2013.
- [C47] N. Obata, Y.-Y. Jian, K. Kasai, and H. D. Pfister, "Spatially-coupled multi-edge type LDPC codes with bounded degrees that achieve capacity on the BEC under BP decoding," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 2433–2437, July 2013.
- [C48] H. D. Pfister and P. O. Vontobel, "On the relevance of graph covers and zeta functions for the analysis of SPA decoding of cycle codes," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 3000–3004, July 2013.
- [C49] S. Kumar, A. J. Young, N. Macris, and H. D. Pfister, "A proof of threshold saturation for spatially-coupled LDPC codes on BMS channels," in *Proc. Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), pp. 176–184, Oct. 2012.
- [C50] A. Yedla, Y.-Y. Jian, P. S. Nguyen, and H. D. Pfister, "A simple proof of threshold saturation for coupled vector recursions," in *Proc. IEEE Inform. Theory Workshop*, pp. 25–29, Sept. 2012.
- [C51] K. R. Narayanan and H. D. Pfister, "Iterative collision resolution for slotted ALOHA: An optimal uncoordinated transmission policy," in *Proc. Int. Symp. on Turbo Codes & Iterative Inform. Proc.*, pp. 136–139, Aug. 2012.
- [C52] A. Yedla, Y.-Y. Jian, P. S. Nguyen, and H. D. Pfister, "A simple proof of threshold saturation for coupled scalar recursions," in *Proc. Int. Symp. on Turbo Codes & Iterative Inform. Proc.*, pp. 51–55, Aug. 2012.
- [C53] Y.-Y. Jian, H. D. Pfister, and K. R. Narayanan, "Approaching capacity at high rates with iterative hard-decision decoding," in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 2696–2700, July 2012.
- [C54] P. S. Nguyen, A. Yedla, H. D. Pfister, and K. R. Narayanan, "On the maximum a posteriori decoding thresholds of multiuser systems with erasures," in *Proc. IEEE Int. Symp. Inform. Theory*, (Cambridge, MA, USA), pp. 2711–2715, July 2012.
- [C55] P. S. Nguyen, A. Yedla, H. D. Pfister, and K. R. Narayanan, "Threshold saturation of spatially-coupled codes on intersymbol-interference channels," in *Proc. IEEE Int. Conf. Commun.*, (Ottawa, Canada), pp. 2209–2214, June 2012.

- [C56] F. Hamidi-Sepehr, H. D. Pfister, and J. F. Chamberland, "On the queueing behavior of Gilbert-Elliott channels in the rare-transition regime," in *Proc. Conf. on Inform. Sciences and Systems*, 2012.
- [C57] S. Kumar, J.-F. Chamberland, and H. D. Pfister, "Large deviations on empirical service for erasure channels with memory," in *Proc. Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), Sept. 2011.
- [C58] A. Yedla, P. S. Nguyen, H. D. Pfister, and K. R. Narayanan, "Universal codes for the Gaussian MAC via spatial coupling," in *Proc. Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), Sept. 2011.
- [C59] A. Yedla, H. D. Pfister, and K. R. Narayanan, "Universality for the noisy Slepian-Wolf problem via spatial coupling," in *Proc. IEEE Int. Symp. Inform. Theory*, (St. Petersburg, Russia), pp. 2567–2571, July 2011.
- [C60] F. Hamidi-Sepehr, Y. Cai, H. D. Pfister, and J. F. Chamberland, "Queueing behavior of the Gilbert-Elliott channel: BCH codes and Poisson arrivals," in *Proc. IEEE Int. Symp. Inform. Theory*, (St. Petersburg, Russia), pp. 1806–1810, July 2011.
- [C61] B.-H. Kim and H. D. Pfister, "An iterative joint linear-programming decoding of LDPC codes and finite-state channels," in *Proc. IEEE Int. Conf. Commun.*, (Kyoto, Japan), pp. 1–6, June 2011.
- [C62] S. Kudekar and H. D. Pfister, "The effect of spatial coupling on compressive sensing," in *Proc. Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), pp. 347–353, Oct. 2010.
- [C63] A. Yedla, H. D. Pfister, and K. R. Narayanan, "LDPC code design for transmission of correlated sources across noisy channels without CSIT," in *Proc. Int. Symp. on Turbo Codes & Iterative Inform. Proc.*, (Brest, France), pp. 474–478, Sept. 2010.
- [C64] B.-H. Kim, A. Yedla, and H. D. Pfister, "IMP: A message-passing algorithm for matrix completion," in *Proc. Int. Symp. on Turbo Codes & Iterative Inform. Proc.*, (Brest, France), pp. 469–473, Sept. 2010.
- [C65] Y.-Y. Jian and H. D. Pfister, "Convergence of weighted min-sum decoding via dynamic programming on coupled trees," in *Proc. Int. Symp. on Turbo Codes & Iterative Inform. Proc.*, (Brest, France), Sept. 2010.
- [C66] P. Parag, J.-F. Chamberland, H. D. Pfister, and K. R. Narayanan, "On the queueing behavior of random codes over a Gilbert-Elliott erasure channel," in *Proc. IEEE Int. Symp. Inform. Theory*, (Austin, TX, USA), pp. 1798–1802, June 2010.
- [C67] B.-H. Kim and H. D. Pfister, "On the joint decoding of LDPC codes and finite-state channels via linear programming," in *Proc. IEEE Int. Symp. Inform. Theory*, (Austin, TX, USA), pp. 754–758, June 2010.
- [C68] F. Zhang and H. D. Pfister, "LDPC codes for rank modulation in flash memories," in *Proc. IEEE Int. Symp. Inform. Theory*, (Austin, TX, USA), pp. 859–863, June 2010.
- [C69] P. S. Nguyen, H. D. Pfister, and K. R. Narayanan, "A rate-distortion exponent approach to multiple decoding attempts for Reed-Solomon codes," in *Proc. IEEE Int. Symp. Inform. Theory*, (Austin, TX, USA), pp. 1798–1802, June 2010.

- [C70] P. Parag, J.-F. Chamberland, H. D. Pfister, and K. R. Narayanan, "Code rate, queueing behavior and the correlated erasure channel," in *Proc. IEEE Inform. Theory Workshop*, (Cairo, Egypt), Jan. 2010.
- [C71] F. Zhang and H. D. Pfister, "Modulation codes for flash memory based on load-balancing theory," in *Proc. 47th Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), Sept. 2009.
- [C72] A. Yedla, H. D. Pfister, and K. R. Narayanan, "Can iterative decoding for erasure correlated sources be universal?," in *Proc. 47th Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), Sept. 2009.
- [C73] P. S. Nguyen, H. D. Pfister, and K. R. Narayanan, "A rate-distortion perspective on multiple decoding attempts for Reed-Solomon codes," in *Proc. 47th Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), pp. 1235–1242, Sept. 2009.
- [C74] C. Wang and H. D. Pfister, "Upper bounds on the MAP threshold of iterative decoding systems with erasure noise," in *Proc. Int. Symp. on Turbo Codes & Related Topics*, (Lausanne, Switzerland), pp. 7–12, Sept. 2008.
- [C75] F. Zhang and H. D. Pfister, "On the iterative decoding of high rate LDPC codes with applications in compressed sensing," in *Proc. 46th Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), Sept. 2008.
- [C76] F. Zhang and H. D. Pfister, "Compressed sensing and linear codes over real numbers," in *Proc. 3rd Annual Workshop on Inform. Theory and its Appl.*, (San Diego, CA, USA), Feb. 2008.
- [C77] F. Zhang and H. D. Pfister, "List-message passing achieves capacity on the q -ary symmetric channel for large q ," in *Proc. IEEE Global Telecom. Conf.*, (Washington, D.C., USA), pp. 283–287, Nov. 2007.
- [C78] S. Diggavi, M. Mitzenmacher, and H. D. Pfister, "Capacity upper bounds for the deletion channel," in *Proc. IEEE Int. Symp. Inform. Theory*, (Nice, France), June 2007.
- [C79] I. Sason and H. D. Pfister, "Capacity-achieving ensembles of accumulate-repeat-accumulate codes for the erasure channel with bounded complexity," in *Proc. 1st Annual Workshop on Inform. Theory and its Appl.*, (San Diego, CA, USA), Feb. 2006.
- [C80] H. D. Pfister, "Finite-length analysis of a capacity-achieving ensemble for the binary erasure channel," in *Proc. IEEE Inform. Theory Workshop*, (Rotorua, New Zealand), pp. 160–164, Sept. 2005.
- [C81] H. D. Pfister and I. Sason, "Accumulate-repeat-accumulate codes: Systematic codes achieving the binary erasure channel with bounded complexity," in *Proc. 43th Annual Allerton Conf. on Commun., Control, and Comp.*, (Monticello, IL, USA), Sept. 2005.
- [C82] H. D. Pfister, I. Sason, and R. Urbanke, "Capacity-achieving ensembles for the binary erasure channel with bounded complexity," in *Proc. IEEE Int. Symp. Inform. Theory*, (Chicago, IL, USA), p. 207, June 2004.
- [C83] H. D. Pfister and P. H. Siegel, "Joint iterative decoding of LDPC codes and channels with memory," in *Proc. 3rd Int. Symp. on Turbo Codes & Related Topics*, (Brest, France), pp. 15–18, Sept. 2003.

- [C84] N. K. Askar, S. C. Lin, H. D. Pfister, G. E. Rogerson, and D. S. Furuno, "Spectral keyingTM: A novel modulation scheme for UWB systems," in *IEEE UWB Syst. and Tech.*, pp. 418–422, 2003.
- [C85] J. Hou, P. H. Siegel, L. B. Milstein, and H. D. Pfister, "Design of low-density parity-check codes for bandwidth efficient modulation," in *Proc. IEEE Inform. Theory Workshop*, (Cairns, Australia), pp. 24–26, Sept. 2001.
- [C86] J. Hou, P. H. Siegel, L. B. Milstein, and H. D. Pfister, "Multilevel coding with low-density parity-check component codes," in *Proc. IEEE Global Telecom. Conf.*, (San Antonio, TX, USA), pp. 1016–1020, Nov. 2001.
- [C87] H. D. Pfister, J. B. Soriaga, and P. H. Siegel, "On the achievable information rates of finite state ISI channels," in *Proc. IEEE Global Telecom. Conf.*, (San Antonio, TX, USA), pp. 2992–2996, Nov. 2001.
- [C88] M. Öberg, H. D. Pfister, and P. H. Siegel, "Parity-accumulate codes for magnetic recording," in *Proc. Int. Magn. Conf.*, (Toronto, ON, Canada), p. 517, April 2000.
- [C89] H. D. Pfister and P. H. Siegel, "Coding theorems for generalized repeat accumulate codes," in *Int. Symp. Inform. Theory and its Appl.*, vol. 1, (Honolulu, HI, USA), pp. 21–25, IEEE, Nov. 2000.
-