

Assistant Professor (Tenure-Track)
Department of Electrical and Computer Engineering
The University of Arizona, Tucson, AZ, USA
Website: <https://ece.engineering.arizona.edu/faculty-staff/faculty/narayanan-rengaswamy>
Scholar: <https://scholar.google.com/citations?user=qkAERWAAAAAJ&hl=en>

narayananr@arizona.edu
(520) 626-0737

PROFESSIONAL EXPERIENCE

Assistant Professor (Tenure-Track), Aug. 2022 – Present

Department of Electrical and Computer Engineering, The University of Arizona, Tucson, AZ, USA

Postdoctoral Research Associate, Sep. 2020 – Aug. 2022

Department of Electrical and Computer Engineering, The University of Arizona, Tucson, AZ, USA

Research Associate, Jun. 2020 – Sep. 2020

Department of Electrical and Computer Engineering, Duke University, Durham, NC, USA

Graduate Research Intern, Jun. 2015 – Aug. 2015

Alcatel-Lucent Bell Labs, Stuttgart, Germany

Undergraduate Summer Intern, Jun. 2012 – Jul. 2012

Ericsson India Global Services Private Limited, Chennai, India

EDUCATION

Ph.D. in Electrical Engineering, Jan. 2016 – May 2020

Duke University, Durham, NC, USA

Cumulative GPA: 3.912/4

Dissertation: Classical Coding Approaches to Quantum Applications
(<https://www.youtube.com/watch?v=cvAcaujp7Wo>)

Advisors: Prof. Henry D. Pfister and Prof. Robert Calderbank

Coursework: Quantum Information Science I & II, Quantum Error Correction and Architectures, Compressed Sensing, Information Theory and Statistical Mechanics, Convex Optimization, Probabilistic Machine Learning, Basic Analysis I, Detection and Estimation Theory

M.S. in Electrical Engineering, Aug. 2013 – Dec. 2015

Texas A&M University, College Station, TX, USA

Cumulative GPA: 3.875/4

Thesis: On Cyclic Polar Codes and the Burst Erasure Performance of Spatially-Coupled LDPC Codes

Advisors: Prof. Henry D. Pfister and Prof. Krishna R. Narayanan

Coursework: Channel Coding, Statistical Communication Theory, Information Theory, Advanced Channel Coding, Computer Communication and Networking, Wireless Communications

B.Tech. in Electronics and Communication Engineering, Jun. 2009 – May 2013

Amrita University, Coimbatore, Tamilnadu, India

Cumulative GPA: 9.70/10

Project: Wireless Electrocardiogram Monitoring for Cardiac Patients on Android Platform

Advisor: Prof. E. P. Sumesh

Advanced Coursework: Wireless Communications, OFDM for Broadband Wireless Communications, Agent Based Modeling, Pattern Recognition, Convex Optimization

HONORS and ACHIEVEMENTS

National Level Finalist, NSF-ERC Perfect Pitch Competition, 2022

University of Arizona

- Represented our Center for Quantum Networks (CQN) after winning the internal competition
- Recording of my Perfect Pitch in the national finals: <https://youtu.be/75YHhf0p5L8?t=1947>

Talk at Quantum Information Processing (QIP) Conference, 2020

Duke University

- Our paper “On Optimality of CSS Codes for Transversal T ” was one of the 73 out of 283 submissions that were accepted as talks in the esteemed QIP (2020) conference;
- Talk: <https://www.koushare.com/video/videoPreview/2001.0289>

DAAD RISE Professional Scholarship, 2015

Texas A&M University

- One of the 34 scholarship recipients selected by the committee, among all the 184 applicants
- Funded 3-month summer research internship in Alcatel-Lucent Bell Labs, Stuttgart, Germany

Top Rank in Undergraduate Studies, May 2013

Amrita University

- Ranked first in the college, third in the university (among 3 engineering campuses)

Ericsson Excel Certification in Telecommunications, 2012

Amrita University

- Attended leading Ericsson researcher’s lectures, passed exam and completed an internship

Central Board of Secondary Education (CBSE) Merit Scholarship 2010-11 & 2011-12

Amrita University

Amrita TIDE Best Innovation Award, 2011-12

Amrita University

- As a team, developed an Integrated Village Development System; created a web portal for a job classifieds system
- Used Software Defined Radio (SDR) to demonstrate connectivity between places, with only partial internet dependence

FUNDING

United States Army Research Office Grant No. W911NF2410080

University of Arizona

- Co-PI, *Quantum Bayesian Estimation and Applications to Magnetometry*

NSF-ERC Center for Quantum Networks (CQN) Grant No. 1941583

University of Arizona

- The goal of this Generation-4 Engineering Research Center is to lay the foundations of the quantum internet and demonstrate high-speed quantum networking through quantum repeaters
- Senior Personnel, developing quantum error correction schemes for quantum repeaters

National Science Foundation (NSF) Grant No. 2106189

University of Arizona

- Co-PI, *CIF: Medium: QODED: Quantum codes Optimized for the Dynamics between Encoded Computation and Decoding using Classical Coding Techniques*

National Science Foundation (NSF) Grant No. 1908730

Duke University

- Ph.D. student, major contribution to the proposal, *FET: Small: Improving Quantum Computing and Classical Communication using Discrete Sets of Unitary Matrices*

PATENTS

Processing Optical Signals Using Quantum-Enhanced Communications

University of Arizona

- Provisional application for our work on Belief-Propagation with Quantum Messages (BPQM)

TEACHING

Instructor, **ECE 455/555: Introduction to Quantum Mechanics and**

Quantum Information Processing, Spring 2024

University of Arizona

Instructor, **Error Correction for Quantum Networks**, CQN Winter School, Jan. 2024

University of Arizona

Co-Instructor, Classical and Quantum Error Correction, CQN Winter School , Jan. 2023	<i>University of Arizona</i>
Instructor, ECE 340A: Introduction to Communications , Fall 2022, 2023	<i>University of Arizona</i>
Lectures on Quantum Error Correction for ECE 635, Spring 2021	<i>University of Arizona</i>
Teaching Assistant, ECE 590-09: Error Correcting Codes , Fall 2017	<i>Duke University</i>
Teaching Assistant, ECE 485: Digital Audio Processing , Spring 2017	<i>Duke University</i>
Teaching Assistant, ECE 403/404: Capstone (Senior) Design , Spring and Fall 2015	<i>Texas A&M University</i>
Student Lectures, Channel Coding , Fall 2015	<i>Texas A&M University</i>

Several other one-off lectures, informal presentations, tutorial-type talks, and one-on-one teaching sessions at all institutions

SERVICE

Hiring Committee, Fall 2022, ECE Department Faculty Position in Quantum Information Science
Graduate Recruitment and Awards Committee (GRAC), since Fall 2022, ECE Department
Executive Committee, since Fall 2023, ECE Department

Organizer, Quantum Information Knowledge (QuIK) Workshop, 2024 International Symposium on Information Theory
TPC Member, IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS 2023)
TPC Member, QCom(p) Workshop: Workshop on Quantum Communication and Computing, 16th International Conference on COMMunication Systems & NETworkS (COMSNETS 2024)
TPC Member, 10th International Conference on Nanoscale Computing and Communication (ACM NanoCom 2023)
Organizer, two special sessions on quantum codes in 2023 International Symposium on Topics in Coding (ISTC)
Posters Program Committee, 2022 IEEE International Conference on Quantum Computing and Engineering (QCE)
Organizing Committee, 2022 NSF-ERC Center for Quantum Networks (CQN) Summer Retreat Workshop
Organizer, Quantum Error Correction Working Group Meetings, since Oct. 2020

Member, IEEE and IEEE Information Theory Society (ITSoc), since May 2020

Reviewer for Journals (in **bold**) and Conferences (in *italics*):

Quantum Information Processing, since 2024

Physical Review X Quantum, since 2023

QCom(p) Workshop: Workshop on Quantum Communication and Computing, 16th International Conference on COMMunication Systems & NETworkS (COMSNETS), 2024

IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS), 2023

Designs, Codes and Cryptography, since 2023

International Symposium on Topics in Coding (ISTC), 2023

IEEE International Symposium on Information Theory (ISIT), 2023

The Theory of Quantum Computation, Communication and Cryptography (TQC), 2023

IEEE BITS the Information Theory Magazine, since 2022

IEEE Information Theory Workshop (ITW), 2022

IEEE International Symposium on Information Theory (ISIT), 2022

Quantum Information Processing (QIP), 2021

Physical Review A, since 2021

IEEE Transactions on Quantum Engineering, since 2021

IEEE Access, since 2021

IEEE Transactions on Communications, since 2020

Proceedings of the Royal Society A, since 2020

Quantum Science and Technology, since 2020

IEEE Information Theory Workshop (ITW), 2020

IEEE International Symposium on Information Theory (ISIT), 2020

Quantum, since 2019

IEEE Transactions on Vehicular Technology, since 2019

THESES

2. **N. R.**, “Classical Coding Approaches to Quantum Applications,” Ph.D. Dissertation, Duke University, 2020. [Online]. Available: <http://arxiv.org/abs/2004.06834>.
1. **N. R.**, “On Cyclic Polar Codes and the Burst Erasure Performance of Spatially-Coupled LDPC Codes,” Master’s thesis, Texas A&M University, 2015. [Online]. Available: <http://arxiv.org/abs/2004.06875>.

PEER-REVIEWED JOURNAL PAPERS

15. **N. R.**, N. Raveendran, A. Raina, and B. Vasić, “Entanglement purification with quantum LDPC codes and iterative decoding,” *Quantum*, vol. 8, p. 1233, 2024. [Online]. Available: <https://arxiv.org/abs/2210.14143>
14. N. Raveendran, J. Valls, A. K. Pradhan, **N. R.**, F. Garcia-Herrero, and B. Vasić, “Soft syndrome iterative decoding of quantum LDPC codes and hardware architectures,” *EPJ Quantum Technology*, vol. 10, no. 1, p. 45, 2023.
13. H. D. Pfister, C. Piveteau, J. M. Renes, and **N. R.**, “Belief propagation for classical and quantum systems: Overview and recent results,” *IEEE BITS the Information Theory Magazine*, pp. 1–14, 2023.
12. Y. Ouyang and **N. R.**, “Describing quantum metrology with erasure errors using weight distributions of classical codes,” *Phys. Rev. A*, vol. 107, no. 2, p. 022620, 2023. [Online]. Available: <http://arxiv.org/abs/2007.02859>
11. N. Raveendran, **N. R.**, F. Rozpędek, A. Raina, L. Jiang, and B. Vasić, “Finite rate QLDPC-GKP coding scheme that surpasses the CSS Hamming bound,” *Quantum*, vol. 6, p. 767, Jul. 2022. [Online]. Available: <https://arxiv.org/abs/2111.07029>
10. S. Brandsen, M. Lian, K. D. Stubbs, **N. R.**, and H. D. Pfister, “Adaptive procedures for discriminating between arbitrary tensor-product quantum states,” *Phys. Rev. A*, vol. 106, no. 1, p. 012408, 2022. [Online]. Available: <https://arxiv.org/abs/1912.05087>
9. X. Tan, **N. R.**, and R. Calderbank, “Approximate unitary 3-designs from transvection Markov chains,” *Designs, Codes and Cryptography*, pp. 1–24, 2022. [Online]. Available: <https://arxiv.org/abs/2011.00128>
8. J. Hu, Q. Liang, **N. R.**, and R. Calderbank, “Mitigating coherent noise by balancing weight-2 z-stabilizers,” *IEEE Transactions on Information Theory*, vol. 68, no. 3, pp. 1795–1808, 2022. [Online]. Available: <https://arxiv.org/abs/2011.00197>
7. **N. R.**, K. P. Seshadreesan, S. Guha, and H. D. Pfister, “Belief propagation with quantum messages for quantum-enhanced classical communications,” *npj Quantum Inf.*, vol. 7, no. 1, p. 97, 2021. [Online]. Available: <http://arxiv.org/abs/2003.04356>
6. T. Pllaha, **N. R.**, O. Tirkkonen, and R. Calderbank, “Un-Weyl-ing the Clifford Hierarchy,” *Quantum*, vol. 4, p. 370, 2020. [Online]. Available: <http://arxiv.org/abs/2006.14040>
5. **N. R.**, R. Calderbank, M. Newman, and H. D. Pfister, “On optimality of CSS codes for transversal T ,” *IEEE J. Sel. Areas in Inf. Theory*, vol. 1, no. 2, pp. 499–514, 2020. [Online]. Available: <http://arxiv.org/abs/1910.09333>. Presented at *QIP 2020* as a talk.
4. **N. R.**, R. Calderbank, S. Kadhe, and H. D. Pfister, “Logical Clifford synthesis for stabilizer codes,” *IEEE Trans. Quantum Engg.*, vol. 1, 2020. [Online]. Available: <http://arxiv.org/abs/1907.00310>
3. T. Can, **N. R.**, R. Calderbank, and H. D. Pfister, “Kerdock Codes Determine Unitary 2-Designs,” *IEEE Trans. Inform. Theory*, vol. 66, no. 10, pp. 6104–6120, 2020. [Online]. Available: <http://arxiv.org/abs/1904.07842>
2. **N. R.**, 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. [Online]. Available: <http://arxiv.org/abs/1902.04022>
1. V. Aref, **N. R.**, and L. Schmalen, “Finite-Length Analysis of Spatially-Coupled Regular LDPC Ensembles on Burst-Erasure Channels,” *IEEE Trans. Inform. Theory*, vol. 64, no. 5, pp. 3431 – 3449, 2018. [Online]. Available: <https://arxiv.org/abs/1611.08267>.

PREPRINTS

3. **N. R.**, A. Raina, N. Raveendran, and B. Vasić, “Distilling GHZ States using Stabilizer Codes,” *arXiv preprint arXiv:2109.06248*, 2021. [Online]. Available: <https://arxiv.org/abs/2109.06248>
2. **N. R.** and H. D. Pfister, “A semiclassical proof of duality between the classical BSC and the quantum PSC,” *arXiv preprint arXiv:2103.09225*, 2021. [Online]. Available: <http://arxiv.org/abs/2103.09225>
1. **N. R.**, R. Calderbank, S. Kadhe, and H. D. Pfister, “Synthesis of Logical Clifford Operators via Symplectic Geometry,” *arXiv preprint arXiv:1803.06987*, 2018. [Online]. Available: <http://arxiv.org/abs/1803.06987>

PEER-REVIEWED CONFERENCE PAPERS

15. A. Kang, S. Guha, **N. R.**, and K. P. Seshadreesan, “Trapped ion quantum repeaters with entanglement distillation based on quantum LDPC codes,” in *2023 IEEE International Conference on Quantum Computing and Engineering (QCE)*, vol. 1. IEEE, 2023, pp. 1165–1171.
14. A. K. Pradhan, N. Raveendran, **N. R.**, X. Xiao, and B. Vasić, “Learning to decode trapping sets in QLDPC codes,” in *2023 12th International Symposium on Topics in Coding (ISTC)*. IEEE, 2023, pp. 1–5.
13. **N. R.**, A. Raina, N. Raveendran, and B. Vasić, “GHZ distillation using quantum LDPC codes,” in *2023 12th International Symposium on Topics in Coding (ISTC)*. IEEE, 2023, pp. 1–5.
12. N. Raveendran, **N. R.**, A. K. Pradhan, and B. Vasić, “Soft syndrome decoding of quantum LDPC codes for joint correction of data and syndrome errors,” in *IEEE International Conference on Quantum Computing and Engineering (QCE)*, Sep. 2022. [Online]. Available: <https://arxiv.org/abs/2205.02341>
11. J. Hu, Q. Liang, **N. R.**, and R. Calderbank, “CSS Codes that are Oblivious to Coherent Noise,” in *Proc. IEEE Int. Symp. Inform. Theory*, 2021, pp. 1481–1486.
10. **N. R.** and H. D. Pfister, “On the Duality Between the BSC and Quantum PSC,” in *Proc. IEEE Int. Symp. Inform. Theory*, 2021, pp. 2232–2237.
9. **N. R.**, K. P. Seshadreesan, S. Guha, and H. Pfister, “A Belief Propagation-based Quantum Joint-Detection Receiver for Superadditive Optical Communications,” in *Conf. Lasers Electro-Optics*, 2021, p. FW3N.8. [Online]. Available: https://www.osapublishing.org/abstract.cfm?uri=CLEO_{_}QELS-2021-FW3N.8
8. S. Brandsen, M. Lian, K. D. Stubbs, **N. R.**, and H. D. Pfister, “Adaptive procedures for discriminating between arbitrary tensor-product quantum states,” in *Proc. IEEE Int. Symp. Inform. Theory*, 2020, pp. 1933–1938. [Online]. Available: <http://arxiv.org/abs/1912.05087>
7. **N. R.**, K. P. Seshadreesan, S. Guha, and H. D. Pfister, “Quantum advantage via qubit belief propagation,” in *Proc. IEEE Int. Symp. Inform. Theory*, 2020, pp. 1824–1829. Video: <https://www.youtube.com/watch?v=L38Y1INdnq0>
6. **N. R.**, R. Calderbank, M. Newman, and H. D. Pfister, “Classical coding problem from transversal T gates,” in *Proc. IEEE Int. Symp. Inform. Theory*, 2020, pp. 1891–1896. [Online]. Available: <http://arxiv.org/abs/2001.04887>. Video: <https://www.youtube.com/watch?v=E7v1k6dW0gQ>
5. T. Can, **N. R.**, R. Calderbank, and H. D. Pfister, “Kerdock Codes Determine Unitary 2-Designs,” in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 2908–2912, July 2019.
4. **N. R.**, 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, June 2018.
3. V. Aref, **N. R.**, and L. Schmalen, “Spatially Coupled LDPC Codes Affected by a Single Random Burst of Erasures,” in *Proc. Int. Symp. on Turbo Codes & Iterative Inform. Process.*, pp. 166–170, Sep. 2016. [Online]. Available: <https://arxiv.org/abs/1607.00918>.
2. **N. R.**, L. Schmalen, and V. Aref, “On the Burst Erasure Correctability of Spatially Coupled LDPC Ensembles,” in *Proc. IEEE Intl. Zurich Seminar on Commun.*, pp. 155–159, March 2016.
1. **N. R.** and H. D. Pfister, “Cyclic Polar Codes,” in *Proc. IEEE Int. Symp. Inform. Theory*, pp. 1287–1291, June 2015.

VISITS, TALKS, POSTERS AND WORKSHOPS

42. **Invited Talk** – “Fault Tolerant Quantum Computing with Quantum LDPC Codes,” *Information Theory and Applications (ITA) Workshop*, Bahia Resort, San Diego, CA, February 19, 2024.
41. **Lightning Talk** – “Tailoring QEC Codes for Target Algorithms,” *Advances in Quantum Coding Theory Workshop*, Simons Institute for the Theory of Computing, University of California Berkeley, CA, February 16, 2024.
40. **Invited Talk** – “Algebraic Codes for Quantum Fault-Tolerance,” *Joint Mathematics Meetings*, Moscone North/South Center, San Francisco, CA, January 4, 2024.
39. **Invited Talk** – “Towards Quantum LDPC code-based Networked Quantum Computing,” *International Symposium on Topics in Coding (ISTC)*, Oceanopolis, Brest, France, September 5, 2023.
38. **Invited Talk** – “Quantum Error Correction based Entanglement Purification,” *Optica Quantum 2.0*, Hyatt Regency Denver at Colorado Convention Center, Denver, CO, June 19, 2023.
37. **Invited Talk** – “Quantum Error Correction is Essential for Scalability,” *Arizona Quantum Initiative (AQI) Inaugural Workshop*, University of Arizona, April 12, 2023. [Online]. Available: <https://aqi.arizona.edu/events/inaugural-workshop>
36. **Talk** – “Entanglement Purification with Quantum LDPC Codes and Iterative Decoding”, *APS March Meeting*, Caesars Forum Convention Center, Las Vegas, Mar. 8, 2023.
35. **Invited Talk** – “Quantum Error Correction for Quantum Computing and Networking”, *Arizona Photonics Days*, UA Tech Park, Tucson, Jan. 27, 2023.
34. **Invited Talk** – “Entanglement Purification with Quantum LDPC Codes and Iterative Decoding”, *Arizona Quantum Initiative (AQI) Seminar*, University of Arizona, Dec. 2, 2022.
33. **Poster** – “Entanglement Purification with Quantum LDPC Codes and Iterative Decoding”, *NSF-ERC Site Visit to Center for Quantum Networks (CQN)*, University of Arizona, Oct. 25, 2022.
32. **Talk** – “Entanglement Purification with Quantum LDPC Codes and Iterative Decoding”, *Seminar*, University of Chicago, Oct. 20, 2022.
31. **Invited Talk** – “Error Correction for Quantum Applications”, *ECE Departmental Seminar*, University of Arizona, Sep. 8, 2022.
30. **Talk** – “NSF-ERC Center for Quantum Networks: An Overview”, *Joint Meeting with Quantinuum and the United States Air Force Academy*, Denver, CO, Aug. 11, 2022.
29. **Invited Talk** – “Entanglement Purification Protocols from Stabilizer Codes”, *QNT Quantum Network Architecture Workshop*, Quantum Network Technologies, July 15, 2022.
28. **Invited Talk** (jointly with Nithin Raveendran) – “Tutorial on Quantum Error Correction and Recent Developments in Quantum LDPC Codes”, *Information Theory and Applications (ITA) Workshop*, May 23, 2022.
27. **Invited Talk** (jointly with Nithin Raveendran and Filip Rozpędek) – “Finite Rate QLDPC-GKP Coding Scheme that Surpasses the CSS Hamming Bound”, *IBM Quantum Network Colloquium*, Apr. 14, 2022.
26. **Talk** – “Distilling GHZ States using Stabilizer Codes”, *Beyond IID in Information Theory Workshop*, Sep. 27 – Oct. 1, 2021. Video: <https://www.youtube.com/watch?v=B18BKnuntTA>
25. **Talk** – “Distilling GHZ States using Stabilizer Codes”, *Quantum Error Correction Meeting*, Duke University, Sep. 16, 2021.
24. **Invited Talk** – “Mitigating Coherent Noise in Quantum Computing using the Classical MacWilliams Identities”, *CCSP Seminar*, University of Maryland, Apr. 8, 2021. Video: <https://www.youtube.com/watch?v=PFR6Ux1GMbg>
23. **Invited Talk** – “Error Correction for Quantum Computing and Communications”, *Modeling, Computation, Nonlinearity, Randomness and Waves Seminar*, University of Arizona, Apr. 1, 2021. Video: <https://arizona.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=d759cd00-b0c0-4068-bc90-ad08012c18d6>
22. **Invited Talk** – “What is Quantum Computing and How does Quantum Error Correction Work?”, *Math/Stat Virtual Tea*, Mount Holyoke College, Sep. 17, 2020. Video: <https://www.youtube.com/watch?v=XmsgxawVceQ>

21. **Invited Talk** – “Quantum Error Correction: Overview and Connections to Classical Coding Theory”, *Seminar*, Indian Institute of Technology Hyderabad and International Institute of Information Technology Hyderabad, Jun. 17-18, 2020. Videos: <https://www.youtube.com/watch?v=dAVUA2iyyK0> , https://www.youtube.com/watch?v=1LysQ_h8pgg
20. **Ph.D. Defense Talk** – “Classical Coding Approaches to Quantum Applications”, *Department of Electrical and Computer Engineering*, Duke University, Mar. 18, 2020. Video: <https://www.youtube.com/watch?v=cvAcaujp7Wo>
19. Talk – “Classical Coding Approaches to Quantum Applications”, *Institute for Quantum Information (IQI) Seminar*, California Institute of Technology (Host: Prof. John Preskill), Feb. 11, 2020, and *Quantum Information Seminar*, Google Quantum AI, Venice, CA (Host: Dr. Jarrod McClean), Feb. 12, 2020.
18. **Invited Talk and Poster** – Graduation Day Talk and Poster at the *Information Theory and Applications Workshop (ITA)*, San Diego, USA, Feb. 2-7, 2020.
17. **Contributed Talk** – “On Optimality of CSS Codes for Transversal T ”, *23rd Annual Conference on Quantum Information Processing (QIP)*, Shenzhen, China, Jan. 7, 2020. Video: <https://www.koushare.com/video/videoPreview/2001.0289>
16. Talk – “On Optimality of CSS Codes for Transversal T ”, *Institut Quantique Seminar*, Université de Sherbrooke (Host: Prof. David Poulin), Oct. 28, 2019, and *Institute for Quantum Computing (IQC) Seminar*, University of Waterloo (Host: Prof. David Gosset), Nov. 5, 2019.
15. Visit – Prof. Jean-Pierre Tillich, *INRIA Research Center*, Paris, July 22-25, 2019.
14. Talk – “Integer Symmetric Diagonal (ISD) Gates and Codes that Support Physical T Gates”, *Quantum Information Seminar*, Technical University of Delft (Host: Prof. Barbara Terhal), July 16, 2019, and University of Sheffield (Host: Prof. Earl Campbell), Aug. 5, 2019.
13. Poster – “Unifying the Clifford Hierarchy via Symmetric Matrices over Rings”, *14th Conference on the Theory of Quantum Computation, Communication and Cryptography*, University of Maryland, Jun. 3-7, 2019, and *5th International Conference on Quantum Error Correction*, Senate House, London, July 29 – Aug. 2, 2019.
12. Poster – “Kerdock Codes Determine Unitary 2-Designs”, *22nd Annual Conference on Quantum Information Processing*, University of Colorado Boulder, Jan. 14-18, 2019, and *14th Conference on the Theory of Quantum Computation, Communication and Cryptography*, University of Maryland, Jun. 3-7, 2019.
11. Poster – “Symplectic Matrices for Logical Clifford Synthesis and Diagonal Unitaries in the Clifford Hierarchy”, *22nd Annual Conference on Quantum Information Processing*, University of Colorado Boulder, Jan. 14-18, 2019.
10. Poster – “Synthesis of Logical Clifford Operators via Symplectic Geometry”, *13th Conference on the Theory of Quantum Computation, Communication and Cryptography*, University of Technology Sydney, Jul. 14-20, 2018.
9. Poster – “Synthesis of Logical Operators for Quantum Computers using Stabilizer Codes”, *North American School of Information Theory*, Texas A&M University, May 20-23, 2018.
8. Talk – “Synthesis of Logical Operators for Quantum Computers using Stabilizer Codes”, *Seminar, Department of Electrical Engineering*, Indian Institute of Technology Madras (Host: Prof. Pradeep Sarvepalli), Apr. 26, 2018.
7. Poster – “Logical Operators for CSS Codes: A Binary Perspective”, *Duke IBM Day*, Duke University, Oct. 31, 2017.
6. Workshop – *Beyond I.I.D. in Information Theory*, National University of Singapore, Jul. 24-28, 2017.
5. Poster – “Deterministic Compressed Sensing and Recovery of Large Supports”, *North American School of Information Theory*, Georgia Institute of Technology, Jun. 6-9, 2017.
4. Workshop – *Communications, Inference, and Computing in Molecular and Biological Systems*, University of Southern California, Dec. 3-4, 2015.
3. Talk – “The Burst Erasure Correctability of Spatially Coupled LDPC Ensembles”, *Information Sciences and Systems Seminar*, Texas A&M University, Nov. 4, 2015.
2. Talk – “Cyclic Polar Codes”, *Information Sciences and Systems Symposium*, Texas A&M University, Oct. 19, 2015.
1. Poster – “Cyclic Polar Codes: How to Achieve Higher Rates than Binary Polar Codes at Finite Blocklengths?”, *Eighth Annual Winedale Workshop*, Round Top, Texas, Oct. 9, 2015.

REFERENCES

1. **Prof. Bane Vasić**, Department of ECE, University of Arizona, ecl.silicon-studio.com/
2. **Prof. Liang Jiang**, Pritzker School of Molecular Engineering, University of Chicago, pme.uchicago.edu/group/jiang-group
3. **Prof. Saikat Guha**, College of Optical Sciences, University of Arizona, sites.google.com/site/saikatguha/
4. **Prof. Henry D. Pfister**, Department of ECE, Duke University, pfister.ee.duke.edu
5. **Prof. Robert Calderbank**, Department of ECE, Duke University, ece.duke.edu/faculty/robert-calderbank