WILLIE K. HARRISON: CV

Email: willie.harrison@byu.edu
Phone: (801) 422-4355

Professional Preparation

Utah State University	Electrical Engineering	BS, 2007
Utah State University	Electrical Engineering	MS, 2007
Georgia Institute of Technology	Electrical & Computer Engr	PhD, 2012

Appointments

Brigham Young University	Associate Professor in ECE	2021–Present
Brigham Young University	Assistant Professor in ECE	2017–2021
University of Colorado Colorado Springs	Assistant Professor in ECE	2012–2017
Georgia Institute of Technology	Graduate Research Assistant in ECE	2007–2012
Utah State University	Graduate Research Assistant in ECE	2005–2007

Expertise

- Research: Physical-layer security, wiretap coding, error-control coding, information theory, graph theory, machine learning, software defined radios, signal & image processing, telecommunications, probability and statistics, and sports performance analytics.
- Teaching: Subjects taught to date include information theory, coding theory, machine learning, physical-layer security, stochastic processes, digital communications, digital signal processing, probability and statistics, satellite communications, signals and systems, junior project for electrical and computer engineers, freshman seminar for engineers.

Journal Papers

[1] M. Shoushtari and W. Harrison, "Optimizing finite-blocklength nested linear secrecy codes: Using the worst code to find the best code," *Entropy*, vol. 25, no. 10: 1456, pp. 1–15, Oct. 2023.

[2] D. Harman, K. Knapp, T. Sweat, P. Lundrigan, M. Rice, and W. Harrison, "Physical layer security: Channel sounding results for the multi-antenna wiretap channel," *Entropy*, vol. 25, no. 10: 1397, pp. 1–13, Sept. 2023.

[3] C. A. Gutiérrez, W. Harrison, M. Rice, B. Jensen, K. Norman, B. Redd, A. Twitchell, and M. Cardenas-Juarez , "Envelope distribution and Doppler spectrum of V2V channels at 5.9 GHz in mountainous roads," *Vehicular Communications*, vol. 39, pp. 1–17, Feb. 2023.

[4] C. Josephson, S. Giddens, E. Perrins, W. Harrison and M. Rice, "Estimators for space-time block-coded ARTM CPM in aeronautical mobile telemetry," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 58, no. 4, pp. 3353–3369, Aug. 2022.

[5] A. Silva, M. Gomes, J. P. Vilela, and W. K. Harrison, "SDR proof-of-concept of full-duplex jamming for enhanced physical layer security," *Sensors*, vol. 21, no. 3: 856, pp. 1–15, Jan. 2021.

[6] W. K. Harrison, "Exact equivocation expressions for wiretap coding over erasure channel models," *IEEE Communication Letters*, vol. 24, no. 12, pp. 2687–2691, Dec. 2020.

[7] M. Rice, B. Clark, D. Flanary, B. Jensen, N. Nelson, K. Norman, E. Perrins, and W. K. Harrison, "Physical-layer security for vehicle-to-everything networks: Increasing security while maintaining reliable communications," *IEEE Vehicular Technology Magazine*, vol. 15, no. 3, pp. 68–76, Sept. 2020.

[8] A. J. Smiley, W. K. Harrison, G. L. Plett, "Postprocessing the outputs of an interacting multiple-model Kalman filter using a Markovian trellis to estimate parameter values of aged Li-ion cells," *Journal of Energy Storage*, vol. 27, no. 2, pp. 1–14, Feb. 2020.

[9] W. K. Harrison, E. Beard, S. Dye, E. Holmes, K. Nelson, M. A. C. Gomes, and J. P. Vilela, "Implications of coding layers on physical-layer security: A secrecy benefit approach," *Entropy*, vol. 21, no. 8, pp. 1–15, Aug. 2019.

[10] W. K. Harrison, T. Fernandes, M. A. C. Gomes, and J. P. Vilela, "Generating a binary symmetric channel for wiretap codes," *IEEE Transactions on Information Forensics and Security*, vol. 14, no. 8, pp. 2128–2138, Aug. 2019.

[11] W. K. Harrison, D. Sarmento, J. P. Vilela, and M. A. C. Gomes, "Analysis of short blocklength codes for secrecy," *EURASIP Journal on Wireless Communications and Networking*, vol. 2018, no. 255, pp. 1–15, Oct 2018. [Online]. Available: https://doi.org/10.1186/s13638-018-1276-1

[12] J. L. Salmon and W. K. Harrison, "A data analytics approach to evaluation of competition in the 2012 Summer Olympics," *Journal of Data Science*, vol. 15, no. 3, pp. 373–390, July 2017.

[13] J. P. Vilela, M. Gomes, W. K. Harrison, D. Sarmento, and F. Dias, "Interleaved concatenated coding for secrecy in the finite blocklength regime," *IEEE Signal Processing Letters*, vol. 23, no. 3, pp. 356–360, Mar. 2016.

[14] W. K. Harrison, "The role of graph theory in system of systems engineering," *IEEE Access*, vol. 4, pp. 1716–1742, 2016.

[15] W. K. Harrison, J. Almeida, M. R. Bloch, S. W. McLaughlin, and J. Barros, "Coding for secrecy: An overview of error-control coding techniques for physical-layer security," *IEEE Signal Processing Magazine*, vol. 30, no. 5, pp. 41–50, Sept. 2013.

[16] W. K. Harrison, J. Almeida, S. W. McLaughlin, and J. Barros, "Coding for cryptographic security enhancement using stopping sets," *IEEE Transactions on Information Forensics and Security*, vol. 6, no. 3, pp. 575–584, Sept. 2011.

[17] D. J. Baker, B. K. Thurgood, W. K. Harrison, M. G. Mlynczak, and J. M. Russell, "Equatorial enhancement of the nighttime OH mesospheric infrared airglow," *Physica Scripta*, vol. 75, no. 5, pp. 615–619, 2007. [Online]. Available: http://stacks.iop.org/1402-4896/75/i=5/a=004

Conference Papers

[1] M. M. Billah and W. K. Harrison, "Artificially noise-injected low-density parity-check codes for the Gaussian wiretap channel," in *Proc. Int. Telemetering Conf. (ITC)*, Las Vegas, NV, Oct. 2023, pp. 1–10.

[2] D. Hunn and W. K. Harrison, "Adaptive linear secrecy codes with feedback," in *Proc. Int. Telemetering Conf. (ITC)*, Las Vegas, NV, Oct. 2023, pp. 1–10.

[3] M. Rice, H. Croft, J. Gillis, Z. Hilton, R. Kirkwood, P. Walker, P. Lundrigan, and W. Harrison, "A comparison of two software defined radios for aeronautical telemetry," in *Proc. Int. Telemetering Conf. (ITC)*, Las Vegas, NV, Oct. 2023, pp. 1–10.

[4] M. Shoushtari, F. Arabian, and W. K. Harrison, "On the crucial role of information theory in the Metaverse," in *Proc. Intermountain Engineering, Technology, and Computing Conference (i-ETC)*, Provo, UT, May 2023, pp. 77–82.

[5] M. Rice, R. Kirkwood, L. Landon, P. Walker, and W. Harrison, "On polarization diversity in 5G and beyond Internet-of-Things networks," in *Proc. Intermountain Engineering, Technology, and Computing Conference (i-ETC)*, Provo, UT, May 2023, pp. 126–131.

[6] M. Shoushtari, F. Arabian, and W. K. Harrison, "Post-quantum cryptography based on codes: A game changer for secrecy in aeronautical mobile telemetry," in *Proc. Int. Telemetering Conf. (ITC)*, Glendale, AZ, Oct. 2022, pp. 1–13.

[7] B. Havens, J. Lamb, R. Kirkwood, G. Oliveira, P. Walker, W. K. Harrison, and M. Rice, "An experiment with polarization diversity combining for aeronautical mobile telemetry," in *Proc. Int. Telemetering Conf. (ITC)*, Glendale, AZ, Oct. 2022, pp. 1–16.

[8] D. Hunn and W. K. Harrison, "Subspace decomposition of extreme-rate secrecy codes," in *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Oulu, FI, June-July 2022, pp. 1235–1240.

[9] C. A. Gutiérrez, W. Harrison, M. Rice, B. Redd, and A. Twitchell, "Doppler shift and envelope distribution of V2V channels at 5.9 GHz in suburban environments," in *Proc. Intermountain Engineering, Technology, and Computing Conference (i-ETC)*, Orem, UT, May 2022, pp. 1–6.

[10] M. Shoushtari and W. Harrison, "Secrecy coding in the integrated network enhanced telemetery (iNET)," in *Proc. Int. Telemetering Conf. (ITC)*, Las Vegas, NV, Oct. 2021, pp. 1–9.

[11] W. Harrison, M. Rice, S. Giddens, and C. Josephson, "Pilot sequence design for space-time coded ARTM CPM," in *Proc. Int. Telemetering Conf. (ITC)*, Las Vegas, NV, Oct. 2021, pp. 1–8.

[12] M. Rice, C. Josephson, W. Harrison, S. Giddens, and E. Perrins, "On space-time coded ARTM CPM to solve the two-antenna problem," in *Proc. Int. Telemetering Conf. (ITC)*, Las Vegas, NV, Oct. 2021, pp. 1–11.

[13] M. Shoushtari and W. K. Harrison, "New dual relationships for error-correcting wiretap codes," in *Proc. IEEE Information Theory Workshop (ITW)*, 2021, pp. 1–6.

[14] T. M. S. Pinto, J. P. Vilela, M. A. C. Gomes, and W. K. Harrison, "Keyed polar coding for physical-layer security without channel state information," in *Proc. IEEE Int. Conf. Communications (ICC)*, 2021, pp. 1–6.

[15] S. Giddens, M. A. C. Gomes, J. P. Vilela, J. L. Santos, and W. K. Harrison, "Enumeration of the degree distribution space for finite block length LDPC codes," in *Proc. IEEE Int. Conf. Communications (ICC)*, 2021, pp. 1–6.

[16] W. K. Harrison and M. Shoushtari, "On caching with finite blocklength coding for secrecy over the binary erasure wiretap channel," in *Proc. Wireless Telecommunications Symposium (WTS)*, 2021, pp. 1–6.

[17] A. Silva, M. A. C. Gomes, J. P. Vilela, and W. K. Harrison, "SDR testbed of full-duplex jamming for secrecy," in *Proc. IEEE/IET International Symposium on Communication Systems, Networks and Digital Signal Processing (CSNDSP)*, Porto, Portugal, July 2020, pp. 1–3.

[18] M. Johnson and W. K. Harrison, "Comparison of latency with selective repeat and rateless coding in delayed feedback systems," in *Proc. IEEE Workshop on Computing, Networking and Communications (CNC)*, Kailua-Kona, HI, Feb. 2020, pp. 1–5.

[19] H. Searle, M. A. C. Gomes, J. P. Vilela, and W. K. Harrison, "Irregular quadrature amplitude modulation for adaptive physical-layer security," in *Proc. IEEE Global Telecommunications Conf. (GLOBECOM)*, Waikoloa, HI, Dec. 2019, pp. 1–6.

[20] M. Rice, W. K. Harrison, B. Jensen, K. Norman, B. Wood, and C. A. Gutirrez, "V2V propagation in mountainous terrain: Part I—Experimental configuration and measurement results," in *Proc. IEEE Latin-American Conference on Communications (LATINCOM)*, Nov. 2019, pp. 1–6.

[21] C. A. Gutiérrez, W. K. Harrison, and M. Rice, "V2V propagation in mountainous terrain: Part II—Modeling results," in *Proc. IEEE Latin-American Conference on Communications (LATINCOM)*, Nov. 2019, pp. 1–6.

[22] K. Norman, B. Jensen, M. Rice, and W. K. Harrison, "Doppler power spectra from vehicle-to-everything propagation experiments," in *Proc. Int. Telemetering Conf. (ITC)*, Las Vegas, NV, Oct. 2019, pp. 1–7.

[23] W. K. Harrison and M. R. Bloch, "Attributes of generator matrices for best finite blocklength wiretap

codes," in *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Paris, FR, July 2019, pp. 1–5.

[24] D. Flanary, B. Jensen, B. Clark, K. Norman, N. Nelson, M. Rice, and W. K. Harrison, "Manufacturing an erasure wiretap channel from channel sounding measurements," in *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Paris, FR, July 2019, pp. 1–5.

[25] B. Jensen, B. Clark, D. Flanary, K. Norman, M. Rice, and W. K. Harrison, "Physical-layer security: Does it work in a real environment?" in *Proc. IEEE Int. Conf. Communications (ICC)*, Shanghai, CN, May 2019, pp. 1–7.

[26] M. Carreira, T. M. Sa Pinto, M. Gomes, J. P. Vilela, and W. K. Harrison, "Adaptive physical-layer security through punctured coding for secrecy," in *Proc. IEEE Int. Conf. Communications (ICC)*, Shanghai, CN, May 2019, pp. 1–6.

[27] Z. Dryer, A. Nickerl, M. A. C. Gomes, J. P. Vilela, and W. K. Harrison, "Full-duplex jamming for enhanced hidden-key secrecy," in *Proc. IEEE Int. Conf. Communications (ICC)*, Shanghai, CN, May 2019, pp. 1–7.

[28] T. M. Sa Pinto, M. Gomes, J. P. Vilela, and W. K. Harrison, "Polar coding for physical-layer security without knowledge of the eavesdropper's channel," in *Proc. IEEE 89th Vehicular Technology Conference (VTC2019-Spring)*, Kuala Lumpur, MY, Apr. 2019, pp. 1–5.

[29] W. K. Harrison and J. L. Salmon, "Leveraging pitcher-batter matchups for optimal game strategy," in *Proc. MIT Sloan Sports Analytics Conference*, Boston, MA, Mar. 2019, pp. 1–22. [Online]. Available: http://www.sloansportsconference.com/wp-content/uploads/2017/02/1684.pdf

[30] W. K. Harrison, K. Nelson, and S. Dye, "Physical-layer security for aeronautical telemetry," in *Proc. Int. Telemetering Conf. (ITC)*, Glendale, AZ, Nov. 2018, pp. 1–12.

[31] W. K. Harrison and M. R. Bloch, "On dual relationships of secrecy codes," in *Proc. 56th Allerton Conference on Communication, Control, and Computing*, Urbana-Champaign, IL, Oct. 2018, pp. 1–7.

[32] P. Boyce and W. K. Harrison, "Cryptanalysis of Lempel-Ziv compressed and encrypted text: The statistics of compression," in *Proc. IEEE Int. Symp. Wireless Communication Systems (ISWCS)*, Lisbon, PO, Aug. 2018, pp. 1–6.

[33] F. Arabian, W. Harrison, C. Josephson, E. Perrins, and M. D. Rice, "On peak-to-average power ratio optimization for coded APSK," in *Proc. IEEE Int. Symp. Wireless Communication Systems (ISWCS)*, Lisbon, PO, Aug. 2018, pp. 1–6.

[34] G. Larmore and W. K. Harrison, "Active topology inference in store, code, and forward networks," in *Proc. IEEE Int. Symp. Wireless Communication Systems (ISWCS)*, Lisbon, PO, Aug. 2018, pp. 1–6.

[35] M. H. Johnson and W. K. Harrison, "A rateless approach to physical-layer security," in *Proc. IEEE Int. Conf. Communications (ICC)*, Kansas City, MO, May 2018, pp. 1–6.

[36] G. T. Rendon, W. K. Harrison, M. A. C. Gomes, and J. P. Vilela, "Nested QPSK encoding for information theoretic security," in *Proc. IEEE Int. Conf. Communications (ICC)*, Kansas City, MO, May 2018, pp. 1–6.

[37] J. Pfister, M. A. C. Gomes, J. P. Vilela, and W. K. Harrison, "Quantifying equivocation for finite blocklength wiretap codes," in *Proc. IEEE Int. Conf. Communications (ICC)*, Paris, France, May 2017, pp. 1–6.

[38] W. K. Harrison and J. L. Salmon, "Bullpen strategies for Major League Baseball," in *Proc. MIT Sloan Sports Analytics Conference*, Boston, MA, Mar. 2017, pp. 1–16, 4th place paper award of approximately 200 submissions. [Online]. Available: http://www.sloansportsconference.com/wp-content/uploads/2017/02/1684.pdf

[39] J. L. Salmon and W. K. Harrison, "Tracking pitcher performance with instantaneous component ERA and moving averages," in *Proc. MIT Sloan Sports Analytics Conference*, Boston, MA, Mar. 2016, pp. 1–8. [Online]. Available: http://www.sloansportsconference.com/wp-content/uploads/2016/02/1564-Tracking-Pitcher-Performance-with-Instantaneous-Component-ERA-and-Moving-Averages.pdf

[40] D. Sarmento, J. P. Vilela, W. K. Harrison, and M. Gomes, "Interleaved coding for secrecy with a hidden key," in *Proc. IEEE Global Telecommunications Conf. (GLOBECOM) Workshops*, San Diego, CA, Dec. 2015, pp. 1–6.

[41] S. Schmidt and W. K. Harrison, "Real-time rate-adaptable coding for fading channels," in *Proc. IEEE Signal Processing & SP Education Workshop (SP/SPE)*, Salt Lake City, UT, Aug. 2015, pp. 151–156.

[42] W. K. Harrison and P. Boyce, "Parity modifications and stopping sets in high-rate codes for physical-layer security," in *Proc. IEEE Conf. Communications and Network Security (CNS)*, San Francisco, CA, Oct. 2014, pp. 115–120.

[43] N. L. Gross and W. K. Harrison, "An analysis of an HMM-based attack on the substitution cipher with error-prone ciphertext," in *Proc. IEEE Int. Conf. Communications (ICC)*, Sydney, AU, June 2014, pp. 749–754.

[44] W. K. Harrison, "Coset codes in a multi-hop network," in *Proc. IEEE Global Telecommunications Conf. (GLOBECOM) Workshops*, Atlanta, GA, Dec. 2013, pp. 1270–1274.

[45] W. K. Harrison and S. W. McLaughlin, "Equivocations for the simple substitution cipher with erasure-prone ciphertext," in *Proc. IEEE Information Theory Workshop (ITW)*, Lausanne, CH, Sept. 2012, pp. 622–626.

[46] W. Harrison, J. Almeida, S. McLaughlin, and J. Barros, "Physical-layer security over correlated erasure channels," in *Proc. IEEE Int. Conf. Communications (ICC)*, Ottawa, ON, June 2012, pp. 888–892.

[47] W. K. Harrison, J. Almeida, D. Klinc, S. W. McLaughlin, and J. Barros, "Stopping sets for physical-layer security," in *Proc. IEEE Information Theory Workshop (ITW)*, Dublin, IE, Aug. 2010, pp. 1–5.

[48] W. K. Harrison and S. W. McLaughlin, "EXIT charts applied to tandem coding and cryptography in a wiretap scenario," in *Proc. IEEE Information Theory Workshop (ITW)*, Taormina, Sicily, Oct. 2009, pp. 173–177.

[49] ——, "Tandem coding and cryptography on wiretap channels: EXIT chart analysis," in *Proc. IEEE Int. Symp. Information Theory (ISIT)*, Seoul, Korea, June-July 2009, pp. 1939–1943.

[50] ——, "Physical-layer security: Combining error control coding and cryptography," in *Proc. IEEE Int. Conf. Communications (ICC)*, Dresden, Germany, June 2009, pp. 1–5.

Theses

[1] W. K. Harrison, "Physical-layer security: Practical aspects of coding and cryptography," Ph.D. dissertation, Georgia Institute of Technology, Atlanta, GA, June 2012. [Online]. Available: https://smartech.gatech.edu/handle/1853/44818

[2] W. K. Harrison, "Mesospheric infrared airglow measurements of molecular twilight transitions by means of satellite-based radiometry," Master's thesis, Utah State University, Logan, UT, May 2007.

Funded Projects (External funding in bold)

1) K. Franke, PI, Senior Personnel: W. K. Harrison, R. W. Beard, et al., "BRITE Pivot: Towards Intelligent Health Monitoring, Inspection, and Reconnaissance of Critical Infrastructure using Autonomous Robots," Funding Entity: **National Science Foundation**, Project dates: 1/1/22–12/31/24,

Total funded amount: **$595,822**.

2) W. K. Harrison, PI, "CIF: Small: Best Wiretap Codes for Real-world Physical-layer Security," Funding Entity: **National Science Foundation**, Project dates: 10/1/19–9/30/22, Total funded amount: **$449,928**. REU Supplement of **$24,000** granted on 4/17/20.
3) W. K. Harrison, PI, "HIDRA Application," Funding Entity: Graduate Studies at BYU, Project dates: Fall 2018–Summer 2021, Total funded amount: $90,000.
4) W. K. Harrison, PI, "Secrecy Codes in Real-Life Environments," Funding Entity: Ira A. Fulton College of Engineering and Technology at BYU, Project dates: 1/1/18–12/31/19, Total funded amount: $12,500.
5) W. K. Harrison, PI, "Continuous Phase Demodulation Firmware Implementations," Funding Entity: **RT Logic: A Kratos Company**, Project dates: 7/1/16–6/30/17, Total funded amount: **$31,345**.
6) W. K. Harrison, PI, "URS: Algebraic Secrecy Coding Structures," Funding Entity: University of Colorado Colorado Springs, Project dates: 7/1/16–6/30/17, Total funded amount: $2,000.
7) W. K. Harrison, PI, "IRES: Practical Physical-Layer Security in Coimbra, Portugal," Funding Entity: **National Science Foundation**, Project dates: 9/1/15–6/30/20, Total funded amount: **$249,798**.
8) W. K. Harrison, PI, "CRCW: Secrecy Codes in Real-Life Environments," Funding Entity: University of Colorado Colorado Springs, Project dates: 7/1/15–6/30/16, Total funded amount: $7,500.
9) W. K. Harrison, PI, "URA/URS: Rateless Physical-Layer Security Coding," Funding Entity: University of Colorado Colorado Springs, Project dates: 6/1/15–5/31/16, Total funded amount: $7,000.
10) W. K. Harrison, PI, "URS: Convolutional Codes for Secrecy," Funding Entity: University of Colorado Colorado Springs, Project dates: 7/1/14–6/30/15, Total funded amount: $2,500.
11) A. Ketsdever, PI, Co-PIs: W. K. Harrison, R. Lewis, S. Johnson, L. Lauderbaugh, R. Cascaval, "Model-Based Simulation for System of Systems Engineering," Funding Entity: **AMRDEC/Missile Defense Agency**, Project Dates: 8/1/14–12/31/14, Total funded amount: **$94,409**.
12) W. K. Harrison, PI, "CRCW: Noisy-Ciphertext Attack Model for Cryptographic Protocols," Funding Entity: University of Colorado Colorado Springs, Project dates: 7/1/13-6/30/14, Total funded amount: $7,428.

Patent Applications

1) M. A. C. Gomes, W. K. Harrison, J. P. Vilela, and T. M. Sa Pinto, "Polar coding for physical-layer security without knowledge of the eavesdropper's channel," provisional patent filed July 2019, US patent filed Dec. 2019.
2) M. A. C. Gomes, W. K. Harrison, and J. P. Vilela, "A three-stage coding approach to physical-layer security," provisional patent filed Dec. 2018, US patent filed Dec. 2019.
3) S. W. McLaughlin, W. K. Harrison, J. McConnell, and C. Argon, "Applications for physical-layer security," Jun. 19 2014, US Patent App. 13/962,777. [Online]. Available: http://www.google.com/patents/US20140171856
4) S. W. McLaughlin, W. K. Harrison, J. McConnell, and C. Argon, "System for providing physical layer security," Jun. 5 2014, US Patent App. 13/908,230. [Online]. Available: http://www.google.com/patents/US20140153723

Academic Research Experience (As Student)

- PhD: Dr. Steven W. McLaughlin's lab at Georgia Institute of Technology, Aug. 2007–Aug. 2012.
- PhD Study Abroad: Dr. João Barros's lab at University of Porto in Porto, Portugal, Jan. 2009–Apr. 2009.
- MS: Dr. Doran J. Baker's lab in conjunction with the Rocky Mountain NASA Space Grant Consortium at Utah State University, Apr. 2005–Aug. 2007.

Industry Experience

- Caliola Engineering, LLC, Consultant, Colorado Springs CO, May 2023–Jan. 2024.
- Whisper Communications, LLC, Principal Scientist, Atlanta GA, July 2010–Aug. 2012.
- MIT Lincoln Laboratory, Communications Engineering Intern, Lexington MA, Aug. 2009–Dec. 2009.
- Micron Technology, Inc., Electrical Engineering Intern, Boise ID, May 2005–Aug. 2005 and May 2006–Aug. 2006.
- Space Dynamics Laboratory, Student Engineer, North Logan UT, Aug. 2003–May 2005.

Research Team

Current:

- David Hunn (PhD)
- Md. Munibun Billah (PhD)
- Daniel Harman (PhD)
- Tyler Sweat (MS)
- Joshua Gillis (BS)
- Trevor Hancock (BS)
- Preston Walker (BS)
- Riley Kirkwood (BS)
- Zachary Hilton (BS)
- Eleanor Gish (BS)
- Tyler Gourley (BS)
- John Rowberry (BS)

Graduated (including undergraduates with published works):

- Andrew Swain (PhD Dissertation: Methods for Finding Best Coset Codes for Physical-Layer Security), 2024.
- Morteza Shoushtari (PhD Dissertation: Securing Wireless Communication via Information-Theoretic Approaches: Innovative Schemes and Code Design Techniques), 2023.
- Laura Landon (BS), 2023.
- Elise Beard (BS), 2023.
- Benjamin Havens (BS), 2023.
- Joseph Lamb (BS), 2023.
- Jesse Richmond (MS Thesis: The Applicability of Joint Source-Channel Coding Systems to Aeronautical Mobile Telemetry Data), 2022.
- Md. Shoriful Islam (MS Coursework Option), 2021.
- Brett Wood (BS), 2021.
- Matthew Johnson (PhD Dissertation: Applications of Rateless Codes), 2020.
- Spencer Giddens (MS Thesis: Applications of Mathematical Optimization Methods to Digital Communications and Signal Processing), 2020.
- Benjamin Jensen (BS), 2020.
- Dakota Flanary (BS), 2020.
- Kalin Norman (BS), 2020.
- Bradford Clark (BS), 2019.
- Zachary Dryer (BS), 2019.
- Scott Dye (BS), 2019.
- Kaela Nelson (BS), 2019.
- Adam Nickerl (BS), 2019.

- Hunter Searle (BS), 2019.
- Jack Pfister (MS Thesis: Finite Blocklength Secrecy Coding), 2018.
- Jayadev Nair (MS Thesis: A Study of Secrecy Codes and Their Real-World Performance), 2017.
- Gregory Larmore (MS Thesis: Topology Inference in Store, Code, and Forward Networks), 2016.
- Nathan Gross (MS Thesis: Beyond Cryptography: A Multi-layer Approach to Communication Privacy), 2016.
- Dustin Lovell (MS Project: Secure Wireless Transmission by Scrambling using USRP Software Radios), 2016.
- Sam Schmidt (BS), 2016.
- Erin Holmes (BS), 2016.
- Parker Boyce (BS), 2016.
- Roxanne L. Beem (MS Thesis: Low-Density Parity-Check Codes for Security in Low-Power Networks), 2013.

Service

- Track Chair for the Vehicular Technology Conference (VTC2023-Spring): Wireless Networks: Protocols, Security and Services Track, Fall 2022-Spring 2023.
- Guest Editor for Entropy Journal special issue titled *Learning from Games and Contests*, Fall 2022-Fall 2024.
- Entropy Journal Topic Advisory Panel Member, 2022–Present.
- Member of the Technical Program Committee for GLOBECOM 2014, 2015 & 2016—Workshop on Trusted Communications with Physical Layer Security, ICC 2015, 2018–Present—Wireless Communications Symposium, ICC 2023–Present—Machine Learning for Communications and Networking, WiComSec-Phy 2015—Workshop on Wireless Communication Security at the Physical Layer, ICC 2016—Workshop on Wireless Physical Layer Security, CCWC 2017, 2018—IEEE Annual Computing and Communication Workshop and Conference, WCS 2017—Workshop on Communication Security, WCNC 2018, 2019, 2021—IEEE Wireless Communications and Networking Conference.
- Served on 6 NSF proposal review panels: 2015, 2017, 2018 (2), 2020, 2021; served as a "Remote Reviewer" for CHIST-ERA ERA-NET, a European consortium of 20 research funding organizations, 2016.
- Scholarly reviewer for IEEE Transactions on Information Forensics and Security, IEEE Journal of Selected Areas in Information Theory, IEEE Transactions on Communications, IEEE Open Journal of the Communications Society, IEEE Transactions on Aerospace and Electronic Systems, IEEE Access, IEEE Signal Processing Magazine, IEEE Communications Magazine, IEEE Network Magazine, IEEE Signal Processing Letters, IEEE Communication Letters, Wireless Communications and Mobile Computing, IEEE sponsored conferences, EURASIP, Cryptography, Sensors, Entropy, Physical Communication, and Information Visualization journals.
- Session Chair for IEEE Intermountain Engineering, Technology, and Computing Conference 2020, and for IEEE International Symposium on Information Theory (ISIT) 2022.
- Meet and Greet Moderator for NSF Town Hall Zoom Meeting, 2021.
- Ethics Broader Impacts Group Leader, BYU IMMERSE, 2020–Present.
- ABET Organizer, BYU ECEn Department, 2019–Present.
- Member of BYU ECEn Department Undergraduate Committee, 2017–Present.
- BYU ECEn Department Undergraduate Committee Chair, 2021–Present.
- Faculty advisor to UCCS IEEE student club, 2012–2017.
- STEM outreach activities with high school students—"What has STEM got to do with you?"
- STEM cub scouts—"Mad Scientist Night"
- Served on UCCS proposal committee, 2014.

- Member of UCCS instructor search committee, 2014.
- Member of UCCS graduate fellowship selection committee, 2016.
- Member of UCCS Internationalization Advisory Committee, 2015–2017.
- Member of UCCS ECE Graduate Committee, 2012-2017, UCCS ECE Grievance Committee, 2014–2017.
- Full-time volunteer missionary service 2000–2002.

Miscellaneous

- Cliff Aggen Award for Best Graduate Student Paper at the International Telemetering Conference (ITC), 2023. Paper title: Artificially Noise-Injected Low-Density Parity-Check Codes for the Gaussian Wiretap Channel. Authors: Md Munibun Billah, Willie K. Harrison.
- Awarded Most Influential Faculty Member Award for the Electrical & Computer Engineering Department for the 2022-2023 academic year by the 2022-2023 graduating class.
- Best Paper Award at the International Telemetering Conference (ITC), 2022. Paper title: Post-Quantum Cryptography Based on Codes: A Game Changer for Secrecy in Aeronautical Mobile Telemetry. Authors: Morteza Shoushtari, Farah Arabian, Willie K. Harrison.
- Awarded Engineering Faculty Development Fellowship, BYU Ira A. Fulton College of Engineering, 2021.
- Nominated for Inspiring Learning Award, Brigham Young University, 2021.
- IEEE Senior Member as of 2020.
- Director of NSF-funded International Research for Students (IRES) program in conjunction with the University of Coimbra, Portugal; 2015–2018.
- MIT Sloan Sports Analytics Conference 4th Place Paper Award, 2017. Work was referenced by the Washington Post at https://www.washingtonpost.com/news/fancy-stats/wp/2017/04/03/a-bold-plan-to-build-a-statistically-perfect-bullpen/
- Teacher of the Year award 2015–2016, College of Applied Science, UCCS.
- Member of Phi Kappa Phi Honor Society.
- Member of IEEE Information Theory Society.
- Speak, read, and write Mandarin Chinese.
- Outstanding Teaching Assistant Award, Georgia Institute of Technology, 2007-2008 school year.