Curriculum Vitae

Taejoon Kim, Ph.D.

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BRIEF BIO

I am currently an Associate Professor of the School of Electrical, Computer and Energy Engineering at Arizona State University (ASU). My research interests include wireless communications, statistical signal processing, machine learning, and security, with a focus on the following topics: NextG networked systems, resilient communication, distributed sensing and fusion, differential privacy, zero trust security, federated/distributed learning, multiple-input multiple-output (MIMO) communication, millimeter wave and THz systems, radar, coding theory, information theory, and agricultural-AI. I am currently supervising 4 Ph.D. students and 1 postdoctoral researcher in these research areas. Prior to joining ASU, he was a Senior Researcher at Nokia Bell Laboratories, CA, a Postdoctoral Researcher at KTH, Stockholm, Sweden, an Assistant Professor at the City University of Hong Kong, and an Associate Professor at the University of Kansas. I received the Ph.D. degree in Electrical and Computer Engineering from Purdue University.

PROFESSIONAL EXPERIENCE

Arizona State University (ASU), Tempe, AZ

Associate Professor of Electrical, Computer and Energy Engineering (ECEE) — *Aug 2024 – present*

- *Research:* My research spans NextG communications, statistical signal processing, machine learning, and security with a focus on the following topics: Next-G networked systems, resilient communication systems, distributed sensing and fusion, differential privacy, zero trust security, federated/distributed learning, multiple-input multiple-output (MIMO) communication, millimeter wave and THz systems, radar, coding theory, information theory, and agricultural-AI.
  I have graduated 6 Ph.D. students and 7 MS students who have successfully completed their degrees. I previously advised 1 postdoc and am advising 4 Ph.D. students and 1 postdoc. I have 50 journal papers and 56 conference papers published/under review for publication. I have 30 issued (granted) US patents.
  As a PI, I have secured approximately $8.0 million in funding from diverse sources, such as NSF, NASA, AFRL, ONR, and industry. As a Co-PI, I have contributed to and brought another $1.8 million in funding. I am honored to be the lead PI of the NSF Convergence Accelerator Track G Phase 2 Project, entitled "Combating Vulnerability and Unawareness in 5G Network Security". I received *Stephen O. Rice Prize* (The Best Paper Award of the *IEEE Transactions on Communications* , 2016), and *Kansas Board of Regents (KBOR) Faculty of the Year Award* (2024).
- *Teaching:* At the graduate level, I developed a new course *Inference and Learning Optimization* (2021-*present*) that was not covered thus far jointly by any other offering in the ECE and CS majors. I also teach *Probabilities and Random Process*, *Information Theory*, *Error Control Coding*, and *Wireless Communications*. At the undergraduate level, I developed a new course *Engineering of Learning Algorithms* (2023-*present*) and taught *Signals and Systems* (*2018-2022*) and *Control Systems* (*2020-present*).
- *Service:* I serve as an Associate Editor for *IEEE Transactions on Wireless Communications (TWC)* and *IEEE Open Journal of the Communication Society*, and previously was an Associate Editor for *IEEE Transactions on Communications (TCOM)* (*2017-2023*). I have co-organized several workshops at major IEEE conferences. I am on several program committees, including TPCs of IEEE INFOCOM (*2023-present*), ICC (*2015-present*), and Globecom (*2012-present*).

University of Kansas (KU), Lawrence, KS

Associate Professor of Electrical Engineering and Computer Science (EECS) — *Aug 2023 – Aug 2024*
Chair's Council Faculty — *Jun 2022 – Aug 2024*
Assistant Professor of EECS — *Aug 2017 – Aug 2023*

- I supervised 3 Ph.D. and 10 M.S. students. I received the *Miller Professional Award for Research* (2023).
- I taught 8 courses from 2017 to 2024. I received the *Harry Talley Excellence in Teaching Award* (2022).

City University of Hong Kong, Hong Kong
Assistant Professor of Electrical Engineering *Mar 2013 – Jul 2017*

- I supervised 4 Ph.D. students. I received the *GRF Early Career Scheme (2014)* and *The President's Awards (2017)*.
- I taught 2 courses each year. I trained teams of CS undergraduate students to attend the International Collegiate Programming Contests (ICPC, *2013-2016*). I developed a new undergraduate level course *Mobile Product Design* that teaches the program languages (Java, Swift, and Python) for mobile App development.

Royal Institute of Technology (KTH), Stockholm, Sweden
Postdoctoral Researcher, Communication Theory Lab *Oct 2012 – Feb 2013*

- The Communication Theory Lab is devoted to research, education, and innovation in wireless communications, information theory, and signal processing. I mentored and supervised one Ph.D. student.

Nokia Bell Labs, Berkeley, CA, USA
Senior Researcher *Aug 2011 – Sep 2012*

- The Lab was devoted to research and innovation in 5G networks, IoT, and 3GPP/IEEE 802. Standardization. I made 7 standard contributions to WiMAX, LTE, and IEEE 802.11 standards and issued 8 US patents, in which 3 of them were registered as standard medium access control (MAC) and physical (PHY) layer techniques in WiMAX and IEEE 802.11ah.
- I received *IEEE PIMRC Best Paper Award* based on the work done in Nokia, *Nokia Research Center Kudos Award*, and *Nokia Research Center Honorable Mention in Top Invention*.

ETRI, Daejeon, Korea
Research Member, Basic Research LAB *Mar 2004 – Aug 2006*

EDUCATION

Purdue University, West Lafayette, IN	*Electrical and Computer Engineering (ECE)*	Ph.D.	2011
KAIST, Korea	*Electrical and Computer Engineering (ECE)*	M.S.	2004
Sogang University (*highest honors*), Korea	*Electrical Engineering (EE)*	B.S.	2002

AWARDS AND HONORS

Kansas Board of Regents (KBOR) Faculty of the Year Award (2024): This award recognizes the outstanding contributions of faculty at state universities to research, teaching, student success, and Kansas communities.

Miller Professional Award for Research (2023): Awarded annually in KU School of Engineering: The highest recognition of a faculty member in the School of Engineering who made an exceptional contribution to the area of research.

US-Israel Binational Agricultural Research and Development (BARD) Workshop (2023): Invited to be a participant and deliver a research talk at the NSF-sponsored US-Israel BARD workshop.

Harry Talley Excellence in Teaching Award (2022): Awarded annually by Eta Kappa Nu, University of Kansas: The highest honor that EECS senior undergraduate students vote on an EECS faculty member who has greatly contributed to their engineering success and been an outstanding educator.

Miller Scholar Awards (both in 2022 and 2021): Awarded annually in KU's School of Engineering: For the nominee's significant contributions to the research, teaching, and service mission.

The President's Award (2017): Awarded annually in City University of Hong Kong: For exemplary contributions to research, professional education, and sustained performance with international recognition.

Stephen O. Rice Prize in The Field of Communications Theory (2016): Awarded annually by IEEE Communications Society: The Best Paper Award of the *IEEE Transactions on Communications*.

Nokia Bell Labs Kudos Award (2012): Awarded based on contribution to the wireless broadband standards.

Best Paper Award (2012): IEEE International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC).

Honorable Mention in Top Invention (2011): Nokia Bell Labs.

PUBLICATIONS

1. Journals and Journal-Equivalent Conferences

Submitted

1.1. S. Habib, R. A. Chou, and T. Kim, "Stabilization of Perturbed Loss Function: Differential Privacy without Gradient Noise," submitted to *IEEE Transactions on Information Forensics and Security*, 2025.

1.2. D. Q. Ngueyn, M. Hashemi, E. Perrins, S. A. Vorobyov, D. J. Love, and T. Kim, "Privacy-Preserving Quantized Federated Learning with Diverse Precision," submitted to *IEEE Transactions on Signal Processing*, 2025.

1.3. T. Zhang, T. Kim, S. Vorobyov, and D. J. Love, "A Novel Multibeam Time-Division ISAC Approach for Accurate Sensing Parameter Estimation,", submitted to *IEEE Transactions on Wireless Communications*, 2025.

1.4. V. Rana, R. Chou, and T. Kim, "Improving the Robustness of Autoencoder-Based Channel Codes Against Jamming," submitted to *IEEE Communication Letters*, 2025

1.5. T. Zhang, T. Kim, S. Vorobyov, and D. J. Love, "Pilot Contamination-Aware Graph Attention Network for Power Control in CFmMIMO," submitted to *IEEE Wireless Communication Letters*, 2025.

1.6. S. Mathad, T. Kim, and D. J. Love, "Protecting Legacy Wireless Systems Against Interference Using Massive MIMO and Region Constraints," submitted to *IEEE Transactions on Wireless Communications*, 2025.

1.7. M. S. Oh, A. B. Das, T. Kim, D. J. Love, and C. G. Brinton, "Energy-Aware Client Selection and Resource Allocation for Federated Learning-Based Positioning: a Deep Reinforcement Learning Approach," submitted to *IEEE Journal on Selected Areas in Communications*, 2024.

Published

1.8. V. Rana, R. Chou, and T. Kim, "Helper-Assisted Coding for Gaussian Wiretap Channels: Deep Learning Meets PhySec," *IEEE Transactions on Communications*, 2025.

1.9. S. Habib, R. Chou, and T. Kim, "Reduced Complexity Interval Passing for Sparse Signal Recovery," *IEEE Transactions on Information Theory*, 2025.

1.10. J. Kim, T. Kim, A. Das, S. Hosseinalipour, D. Love, and C. Brinton, "Coding for Gaussian Two-Way Channels: Linear and Learning-Based Approaches," *IEEE Transactions on Information Theory*, vol. 71, no. 7, pp. 4976-5012, July 2025.

1.11. O. Kandelusi and T. Kim, "Buffer-Aided Distributed Compressed Transmission and Fusion Under Energy and Reliability Constraints," *IEEE Transactions on Green Communications and Networking*, vol. 9, no. 3, pp. 789-801, September 2025.

1.12. M. Gaydos, T. Kim, D. J. Love, "Constant Modulus Precoded MIMO Radar Based on Zadoff-Chu Sequences," *IEEE Transactions on Radar Systems* , vol. 2, pp. 677-689, August 2024.

1.13. D. Q. Nguyen and T. Kim, "Joint Hybrid Delay-Phase Precoding Under True-Time Delay Constraints in Wideband Sub-THz Massive MIMO Systems," *IEEE Transactions on Communications*, vol. 72, no. 10, pp. 6633-6646, October 2024.

1.14. M. S. Oh, A. B. Das, T. Kim, D. J. Love, and C. G. Brinton, "Minimum Description Feature Selection for Complexity Reduction in Machine Learning-based Wireless Positioning," *IEEE Journal on Selected Areas in Communications*, vol. 42, no. 9, pp. 2585-2600, September 2024.

1.15. M. S. Oh, A. B. Das, S. Hosseinalipour, T. Kim, D. J. Love, and C. G. Brinton, "A Decentralized Pilot Assignment Methodology for Scalable O-RAN Cell-Free Massive MIMO," *IEEE Journal on Selected Areas in Communications*, vol. 42, no. 2, Nov 2023.

1.16. W. Zhang and T. Kim, "Successful Recovery Performance Guarantees of SOMP Under the ℓ_2-Norm of Noise," *IEEE Transactions on Vehicular Technologies*, vol. 73, no. 2, pp. 2156 – 2170, Aug 2023.

1.17. M. S. Oh, S. Hosseinalipour, T. Kim, D. J. Love, J. V. Krogmeier, and C. G. Brinton, "Dynamic and Robust Sensor Selection Strategies for Wireless Positioning with TOA/RSS Measurement," *IEEE Transactions on Vehicular Technology*, vol. 72, no. 11, pp. 14656 - 14672, May 2023.

1.18. J. Kim, T. Kim, D. J. Love, and C. G. Brinton, "Robust Non-Linear Feedback Coding via Power-Constrained Deep Learning", *International Conference on Machine Learning (ICML)*, July 2023.

1.19. Q. Duan, H. Ghauch, and T. Kim, "Dual Optimization for Kolmogorov Model Learning Using Enhanced Gradient Descent", *IEEE Transactions on Signal Processing*, vol. 70, pp. 963-977, February 2022.

1.20. W. Zhang, M. Dong, and T. Kim, "MMV-Based Sequential AoA and AoD Estimation for Millimeter Wave MIMO Channels," *IEEE Transactions on Communications*, vol. 70, no. 6, pp. 4063 - 4077, June 2022.

1.21. J. Kim, S. Hosseinalipour, A. C. Marcum, T. Kim, D. J. Love, and C. G. Brinton, "Learning-based Adaptive IRS Control with Limited Feedback Codebooks," *IEEE Transactions on Wireless Communications*, vol. 21, no. 11, pp. 9566 - 9581, November 2022.

1.22. M. Dong, M. Cho, K. Lee, and S. Yoon, T. Kim,"Cost-Optimal Deployment of Millimeter-Wave Base Stations Under Outage Requirement", *IEEE Transactions on Wireless Communications*, vol. 21, no. 12, pp. 10544 - 10559, December 2022.

1.23. Q. Duan, T. Kim, and H. Ghauch, "KM Learning for Millimeter-Wave Beam Alignment and Tracking: Predictability and Interpretability", *IEEE Access*, August 2021.

1.24. J. Kim, T. Kim, M. Hashemi, C. G. Brinton, and D. J. Love, "Minimum Overhead Beamforming and Resource Allocation in D2D Edge Networks", *IEEE/ACM Transactions on Networking*, vol. 30, no. 4, pp. 1454 - 1468, December 2021.

1.25. Y. Yang, G. Li, T. Kim, G. Wang, "An Unsupervised Domain Adaptation Model based on Dual-module Adversarial Training", *Neurocomputing*, vol. 475, pages 102-111, December 2021.

1.26. G. Xiong, T. Kim, D. J. Love, and E. Perrins, "Optimality Conditions of Performance-Guaranteed Power Minimization in MIMO Networks: A Distributed Algorithm and Its Feasibility," *IEEE Transactions on Signal Processing*, vol. 69, pp. 119-135, November 2020.

1.27. W. Zhang, T. Kim, and S. H. Leung, "A Sequential Subspace Method for Millimeter Wave MIMO Channel Estimation,"*IEEE Transactions on Vehicular Technology*, vol. 69, no. 5, pp. 5355-5368, April 2020.

1.28. M. Dong, T. Kim, J. Wu, and E. Wong, "Millimeter-Wave Base Station Deployment Using the Scenario Sampling Approach," *IEEE Transactions on Vehicular Technology*, vol. 69, no. 11, pp. 14013-14018, November 2020.

1.29. Q. Duan, T. Kim, D. Lin, and E. Perrins, "Coherence Statistics of Structured Random Ensembles and Support Detection Bounds for OMP," *IEEE Signal Processing Letters*, vol. 26, no. 11, pp. 1638 - 1642, September 2019.

1.30. W. Zhang, T. Kim, G. Xiong, and S. H. Leung, "Leveraging Subspace Information for Low-Rank Matrix Reconstruction", *Signal Processing*, vol. 163, pp. 123-131, May 2019.

1.31. M. Dong, T. Kim, J. Wu, and E. Wong, "Cost-Efficient Millimeter Wave Base Station Deployment in Manhattan-Type Geometry," *IEEE Access*, vol. 7, pp. 149959-149970, October 2019.

1.32. W. Zhang, T. Kim, D. J. Love, and E. Perrins, "Leveraging the Restricted Isometry Property: Improved Low-Rank Subspace Decomposition for Hybrid Millimeter-Wave Systems," *IEEE Transactions on Communications*, vol. 66, no. 11, pp. 5814-5827, November 2018.

1.33. M. Dong and T. Kim, "Interference Analysis for Millimeter Wave Networks with Geometry-Dependent First-Order Reflections," vol. 67, no. 12, pp. 12404-12409, *IEEE Transactions on Vehicular Technology*, December 2018.

1.34. H. Ghauch, T. Kim, M. Bengtsson, and M. Skoglund, "Sum-rate Maximization in Sub-28 GHz Millimeter-Wave MIMO Interfering Networks," *IEEE Journal of Selected Areas in Communications*, vol. 35, no. 7, pp. 1649-1662, July 2017.

1.35. H. Ghauch, T. Kim, M. Bengtsson, and M. Skoglund, "Subspace Estimation and Decomposition for Large Millimeter-Wave MIMO Systems," *IEEE Journal of Selected Topics in Signal Processing*, vol. 10, no. 3, pp. 528-542, April 2016.

1.36. A. A.I. Ibrahim, T. Kim, and D. J. Love, "On the Achievable Rate of Generalized Spatial Modulation Using Multiplexing Under a Gaussian Mixture Model," *IEEE Transactions on Communications*, vol. 64, no. 4, pp. 1588-1599, April 2016.

1.37. T. Kim, D. J. Love, M. Skoglund, and Z. Jin, "An Approach to Sensor Network Throughput Enhancement by PHY-Aided MAC," *IEEE Transactions on Wireless Communications*, vol. 14, no. 02, pp. 670-684, February 2015.

1.38. H. Ghauch, T. Kim, M. Bengtsson, and M. Skoglund, "Distributed Low-Overhead Schemes for Multi-stream MIMO Interference Channels," *IEEE Transactions on Signal Processing*, vol. 63, no. 07. 1737-1749, April 2015.

1.39. T. Kim, I. Kim, Y. Sun, and Z. Jin, "Physical Layer and Medium Access Control Design in Energy Efficient Sensor Networks: An Overview," *IEEE Transactions on Industrial Informatics*, vol. 11, no. 01, pp. 02-15, February 2015.

1.40. T. Kim and M. Dong, "An Iterative Hungarian Method to Joint Relay Selection and Resource Allocation for D2D Communications," *IEEE Wireless Communications Letters*, vol. 03, no. 06, pp. 625-628, December 2014.

1.41. A. J. Duly, T. Kim, D. J. Love, and J. V. Krogmeier, "Closed-loop Beam Alignment for Massive MIMO Channel Estimation," *IEEE Communications Letters*, vol. 18, no. 08, pp. 1439-1442, August 2014.

1.42. Y. Choi, J. Chun, T. Kim, and J. Bae, "The Schur algorithm applied to the one-dimensional continuous inverse scattering problem," *IEEE Transactions on Signal Processing*, vol. 61, no. 13, pp. 3311-3320, July 2013.

1.43. S. Hur, T. Kim, D. J. Love, J. V. Krogmeier, T. A. Thomas, and A. Ghosh, "Millimeter Wave Beamforming for Wireless Backhaul and Access in Small-Cell Networks," *IEEE Transactions on Communications*, vol. 61, no. 10, pp. 4391-4403, October 2013. (***Best Paper Award*** *of the IEEE Transactions on Communications*, 2016 Stephen O. Rice Prize).

1.44. K. Kim, T. Kim, I. Kim, and D. J. Love, "Differential Feedback in Codebook-Based Multiuser MIMO Systems in Slowly Varying Channels," *IEEE Transactions on Communications*, vol. 60, no. 02, pp. 578-588, February 2012.

1.45. Y. J. Kim, X. Li, T. Kim, and D. J. Love, "A Combination Lock-like Differential Codebook for Temporally Correlated Channels," *Electronics Letters, IET*, volume 48, issue 01, pp. 45-47(2), January 2012.

1.46. T. Kim, D. J. Love, and B. Clerckx, "MIMO Systems with Limited Rate Differential Feedback in Slow Varying Channels," *IEEE Transactions on Communications*, vol. 59, no. 03, pp. 1175-1189, March 2011.

1.47. T. Kim, D. J. Love, and B. Clerckx, "Does Frequent Low Resolution Feedback Outperform Infrequent High Resolution Feedback for Multiple Antenna Beamforming Systems?," *IEEE Transactions on Signal Processing*, vol. 59, no. 04, pp. 1654-1669, April 2011.

1.48. T. Kim, B. Clerckx, D. J. Love, and S. Kim, "Limited Feedback Beamforming Systems for Dual-Polarized MIMO Channels," *IEEE Transactions on Wireless Communications*, vol.9, no.11, pp. 3425-3439, November 2010.

2. Conferences

2.1. X. Ma, S. Zehtabi, T. Kim, and C. G. Brinton, "Error Analysis for Over-the-Air Federated Learning under Misaligned and Time-Varying Channels," *IEEE Global Communications Conference*, 2025.

2.2. G. Aissou, S. Habib, R. A. Chou, and T. Kim, "Feedback-Assisted Decentralized Q-Learning for Dynamic Spectrum Access," *59th Asilomar Conference on Signals, Systems, and Computers*, 2025.

2.3. W. M. Chan, R. A. Chou, and T. Kim, "Multi-Layer Secret Sharing for Cross-Layer Attack Defense in 5G Networks: a COTS UE Demonstration," *MILCOM 2025 - 2025 IEEE Military Communications Conference (MILCOM)*, LA, CA, USA, 2025.

2.4. W. M. Chan, R. A. Chou, and T. Kim, "Two-Dimensional XOR-Based Secret Sharing for Layered Multipath Communication," *MILCOM 2025 - 2025 IEEE Military Communications Conference (MILCOM)*, LA, CA, USA, 2025.

2.5. D. Q. Ngyuen and T. Kim, "On the Privacy-Distortion Trade-off for Differentially-Private Stochastic Quantization," *59th Asilomar Conference on Signals, Systems, and Computers*, 2025.

2.6. S. Habib, R. A. Chou, and T. Kim, "Sequential Interval Passing for Compressed Sensing," *IEEE International Symposium on Information Theory (ISIT),* June 2025.

2.7. Y. Jang, M. Zhang, A. Kirchner, B. A. Jones, V. Marojevic, T. Kim, and D. J. Love, "Optimization of Error Pattern Embedding Steganography within Error-Correcting Code Frameworks," *MILCOM 2024 - 2024 IEEE Military Communications Conference (MILCOM)*, Washington, DC, USA, 2024, pp. 1094-1099.

2.8. H. Mohammadi, M. Zhang, A. Jha, V. Marojevic, R. Chou and T. Kim, "Fortifying 5G Networks: Defending Against Jamming Attacks with Multipath Communications," *MILCOM 2024 - 2024 IEEE Military Communications Conference (MILCOM)*, Washington, DC, USA, 2024, pp. 680-681.

2.9. A. Jha, S. Kashani, M. Hossein, A. Kirchner, M. Zhang, R. A. Chou, S. W. Kim, H. M. Kwon, V. Marojevic, and T. Kim, "Enhancing NextG Wireless Security: A Lightweight Secret Sharing Scheme with Robust Integrity Check for Military Communications," *MILCOM 2024 - 2024 IEEE Military Communications Conference (MILCOM)*, Washington, DC, USA, 2024, pp. 1-6.

2.10. S. Mathad, T. Kim, and D. J. Love, "Protecting Legacy Wireless Systems Against Interference using Massive MIMO," *IEEE the 58th Asilomar Conference on Signals, Systems, and Computers,* October 2024.

2.11. D. Q. Nguyen and T. Kim, "No Analog Combiner TTD-based Hybrid Precoding for Multi-User Sub-THz Communications," *IEEE International Conference on Communications (ICC),* June 2024.

2.12. V. Rana, R. A. Chou, and T. Kim, "Short Blocklength Secret Coding via Helper-Assisted Learning over the Wiretap Channel," *IEEE International Conference on Communications (ICC),* June 2024.

2.13. M. S. Oh, A. B. Das, T. Kim, D. J. Love, and C. G. Brinton, "Complexity Reduction in Machine Learning-Based Wireless Positioning: Minimum Description Features," *IEEE International Conference on Communications (ICC),* June 2024.

2.14. D. Q. Nguyen and T. Kim, "On the Stability of Approximate Message Passing with Independent Measurement Ensembles," *IEEE International Symposium on Information Theory (ISIT),* June 2023.

2.15. O. Kandelusy, C. Brinton, and T. Kim, "Distributed Quantized Transmission and Fusion for Federated Machine Learning," *IEEE Vehicular Technology Conference (VTC)*, October 2023.

2.16. D. Q. Nguyen and T. Kim, "Time-Varying Noise Variance Perturbation and Power Control for Privacy-Preserving Wireless Federated Learning," *the 57th Asilomar Conference on Signals, Systems, and Computers,* October 2023.

2.17. W. M. Chan, T. Kim et al., "Adaptive Frequency Hopping for 5G New Radio mMTC Security," *IEEE International Conference on Industrial Technology (ICIT),* Orlando, FL, April 2023.

2.18. D. Q. Nguyen and T. Kim, "Joint Delay and Phase Precoding Under True-Time Delay Constraint for THz Massive MIMO," *IEEE International Conference on Communications (ICC),* Seoul, Korea, May 2022.

2.19. J. Kim, S. Hosseinalipour, A. C. Marcum, T. Kim, D. Love, and C. G. Brinton, "Deep Reinforcement Learning-Based Adaptive IRS Control with Limited Feedback Codebooks," *IEEE International Conference on Communications (ICC),* Seoul, Korea, May 2022.

2.20. R. Simion, T. Kim, and Erik S. Perrins, "Machine Learning With Gaussian Process Regression For Time-Varying Channel Estimation," *IEEE International Conference on Communications (ICC),* Seoul, Korea, May 2022.

2.21. Y. Yang, T. Kim, and G. Wang,"Multiple Classifiers Based Adversarial Training for Unsupervised Domain Adaptation," *Conference on Robots and Vision (CRV)*, 2022.

2.22. J. Kim, S. Hosseinalipour, T Kim, D. J. Love, and C. G. Brinton, "Linear Coding for Gaussian Two-Way Channels," 58th *Allerton Conference on Communication, Control, and Computing,* Sep 2022.

2.23. U. Sajid, M. Chow, J. Zhang, T. Kim, and G. Wang, "Parallel Scale-wise Attention Network for Effective Scene Text Recognition," *International Joint Conference on Neural Networks (IJCNN)*, 2021.

2.24. U. Sajid, X. Chen, H. Sajid, T. Kim, and G. Wang, "Audio-Visual Transformer Based Crowd Counting", *International Conference on Computer Vision (ICCV) Workshop*, 2021.

2.25. A. Bhattacharya, E. Rutter, C. G. Brinton, T. Kim, and D. R. Diaz, "Predicting in-Season Soil Mineral Nitrogen in Corn Production Using Deep Learning Models," *2021 ASA, CSSA, SSSA International Annual Meeting,* Salt Lake City, UT, Nov 2021.

2.26. M. S. Oh, S. Hosseinalipour, T. Kim, C. G. Brinton, and D. J. Love, "Channel Estimation via Successive Denoising in MIMO OFDM Systems: A Reinforcement Learning Approach," *IEEE International Conference on Communications (ICC)*, Montreal, Canada, 2021.

2.27. J. Kim, S. Hosseinalipour, T. Kim, D. J. Love, and C. G. Brinton, "Multi-IRS-assisted Multi-Cell Uplink MIMO Communications under Imperfect CSI: A Deep Reinforcement Learning Approach," *IEEE International Conference on Communications (ICC)*, Montreal, Canada, 2021.

2.28. B. Badnava, T. Kim, K. Cheung, Z. Ali, and M. Hashemi, "Spectrum-Aware Mobile Edge Computing for UAVs Using Reinforcement Learning," *IEEE/ACM Symposium on Edge Computing (SEC),* 2021.

2.29. J. Kim, T. Kim, M. Hashemi, C. G. Brinton, D. J. Love, "Joint Optimization of Signal Design and Resource Allocation in Wireless D2D Edge Computing," *IEEE International Conference on Computer Communications (INFOCOM)*, Beijing, China, April 2020.

2.30. J. Wu, M. Wang, Y. Chan, E. Wong, and T. Kim, "Performance Evaluation of 5G mmWave Networks with Physical-Layer and Capacity-Limited Blocking", *IEEE 21st International Conference on High Performance Switching and Routing (HPSR)*, Newark, NJ, USA, May 2020.

2.31. Q. Duan, T. Kim, H. Ghauch, and E. Wong, "Enhanced Beam Alignment for Millimeter Wave MIMO Systems: A Kolmogorov Model", *IEEE Global Communications Conference (Globecom)*, Taipei, Taiwan, December 2020.

2.32. L. Yao, M. Hashemi, T. Kim, and E. Perrins, "Delay-Efficient and Reliable Data Relaying in Ultra Dense Networks using Rateless Codes", *IEEE Global Communications Conference (Globecom)*, Taipei, Taiwan, December 2020.

2.33. H. Ghauch, T. Kim, C. Fischione, and M. Skoglund, "Compressive Sensing with Applications to Millimeter-wave Architectures", *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Brighton, UK, May 2019.

2.34. G. Xiong, T. Kim, and E. Perrins "Decorrelation Deep Learning for Fingerprint-based Indoor Localization", *International Telemetry Conference*, Las Vegas, NV, USA, Oct 2019.

2.35. W. M. Chan, H. Ghauch, T. Kim, and G. Fodor, "Kolmogorov Model for Large Millimeter-Wave Antenna Arrays: Learning-based Beam-Alignment", *The 53rd Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, Nov 2019.

2.36. R. Simeon, T. Kim, and E. Perrins, "Channel Estimation Using Gaussian Process Regression", *International Telemetry Conference*, Las Vegas, Na, Oct 2019.

2.37. H. Ghauch, T. Kim, M. Skoglund, and C. Fischione, "Low-Overhead Coordination in Sub-28 Millimeter-Wave Networks", *IEEE International Conference on Communications (ICC)*, Kansas City, KS, USA, May 2018.

2.38. G. Xiong, T. Kim, and D. J. Love, "Distributed Filter Design and Power Allocation for Small-Cell MIMO Networks", *IEEE Vehicular Technology Conference Fall*, Toronto, Canada, Sep 2017.

2.39. W. M. Chan, T. Kim, H. Ghauch, M. Bengtsson, "Subspace Estimation and Hybrid Precoding for Wideband Millimeter-Wave MIMO System", *IEEE 50th Asilomar Conf.*, Pacific Grove, CA, November 2016 (*Invited Paper*).

2.40. W. Zhang, T. Kim, and D. J. Love, "Sparse Subspace Decomposition for Millimeter Wave MIMO Channel Estimation", *IEEE Global Communications Conference (Globecom)*, Washington D.C., USA, December 2016.

2.41. M. Dong and T. Kim, "Reliability of an Urban Millimeter Wave Communication Link with First-Order Reflections", *IEEE Global Communications Conference (Globecom)*, Washington D.C., USA, December 2016.

2.42. T. Kim and D. J. Love, "Virtual AoA and AoD Estimation for Sparse Millimeter Wave MIMO Channels", *IEEE International Workshop on Signal Processing Advanced in Wireless Communications (SPAWC)*, Stockholm, Sweden, June 2015 (*Invited Paper*).

2.43. H. Ghauch, M. Bengtsson, T. Kim, and M. Skoglund, "Subspace Estimation and Decomposition for Hybrid Analog-Digital Millimetre-Wave MIMO systems", *IEEE International Workshop on Signal Processing Advanced in Wireless Communications (SPAWC)*, Stockholm, Sweden, June 2015.

2.44. Q. Duan, T. Kim, H. Huang, K. Liu, G. Wang, "AoD and AoA Tracking with Directional Sounding Beam Design for Millimeter Wave MIMO Systems", *IEEE PIMRC 2015 Workshop*, Hong Kong, September 2015.

2.45. M. Dong, W. M. Chan, T. Kim, K. Liu, H. Huang, G. Wang, "Simulation Study on Millimeter Wave 3D Beamforming Systems in Urban Outdoor Multi-Cell Scenarios Using 3D Ray Tracing", *IEEE PIMRC 2015 Workshop*, Hong Kong, September 2015.

2.46. J. He, T. Kim, H. Ghauch, K. Liu, and G. Wang, "Millimeter Wave MIMO Channel Tracking Systems", *IEEE Global Communications 2014 Workshop*, Austin, TX, December 2014.

2.47. T. Kim, S. Choudhury, K. Doppler, and M. Skoglund, "Simultaneous Polling Mechanism with Uplink Power Control for Low Power Sensor Nodes", *IEEE Vehicular Technology Conference Spring*, Dresden, Germany, June 2013.

2.48. H. Ghauch, T. Kim, M. Bengtsson, and M. Skoglund, "Interference Alignment via Controlled Perturbations", *IEEE Global Communications Conference (Globecom)*, Atlanta, GA, December 2013.

2.49. D. J. Love, S. Hur, J. Krogmeier, T. Thomas, A. Ghosh, and T. Kim, "On Beam Alignment for Outdoor Millimeter Wave Beamforming Systems", *Information Theory and Applications Workshop*, San Diego, CA, 2012.

2.50. T. Kim, S. Choudhury, Z. Jin, K. Doppler, and C. Ghosh, "Simultaneous Polling Mechanism for Low Power Sensor Networks Using ZC Sequences", *IEEE International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC)*, Sydney, Australia, September 2012 (***Best Paper Award*** *of 2012 IEEE PIMRC*).

2.51. T. Kim, D. J. Love, and B. Clerckx, "Instantaneous Degrees of Freedom of Downlink Interference Channels with Multiuser Diversity", *IEEE 45th Asilomar Conf.*, Pacific Grove, CA, November 2011 (*Invited Paper*).

2.52. T. Kim, D. J. Love, and B. Clerckx, "Spatial Degrees of Freedom of Multicell MIMO Multiple Access Channel", *IEEE Global Communications Conference (Globecom)*, Houston, Tx, December 2011.

2.53. S. Hur, T. Kim, D. J. Love, J. Krogmeier, T. Thomas, and A. Ghosh, "Multilevel Millimeter Wave Beamforming for Wireless Backhaul", *IEEE Global Communications Conference (Globecom)*, Houston, Tx, December 2011.

2.54. T. Kim, D. J. Love, and B. Clerckx, "Leveraging Temporal Correlation for Limited Feedback Multiple Antennas Systems," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Dallas, TX, April 2010.

2.55. T. Kim, D. J. Love, and B. Clerckx, "A Feedback Update Control Scheme for Limited Feedback Multiple Antennas Systems", *IEEE Global Communications Conference (Globecom)*, Miami, FL, December 2010.

2.56. T. Kim, B. Clerckx, D. J. Love, and S. Kim, "Limited Feedback Beamforming Codebook Design for Dual-Polarized MIMO Channels," *IEEE Global Communications Conference (Globecom)*, New Orleans, LA, December 2008.

2.57. T. Kim, D. J. Love, B. Clerckx, and S. Kim, "Differential Rotation Feedback MIMO System for Temporally Correlated Channels," *IEEE Global Communications Conference (Globecom)*, New Orleans, LA, December 2008.

2.58. T. Kim, and I. Eo, "Blind Channel Estimation and Equalization in OFDM System with Circular Precoding," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Toulouse, France, May 2006.

2.59. H. Kim, H. Park, T. Kim, I. Eo, "Performance Analysis of a DSTTD System with Decision-Feedback Detection," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Toulouse, France, May 2006.

2.60. T. Kim, I. Eo, J. Nho, and K. Jang, "Timing Synchronizer for IEEE 802.16e: its Architecture and Methods," *Korean Semiconductor Conference (KSC)*, Cheju, Korea, 2006.

2.61. T. Kim, I. Eo, and J. Chun, "Reconstruction of Coupling Profiles for Scattering Media by the Schur Algorithm Combined with an Extrapolation Method," *IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Philadelphia, March 2005.

3. Editorial

3.1. T. Kim, I. Kim, Z. Jin, and L. Tang, "Guest Editorial: Special Section on Energy Efficient Technology in Sensor Networks," *IEEE Transactions on Industrial Informatics*, vol. 11, no. 06, pp. 1617-1620, December 2015.

4. Broadband Standard Contributions

Accepted as Standard techniques

4.1. Transmit precoding codebook (8 transmit antennas)for MIMO operation in IEEE 802.16m (WiMAX), Page $750-752$, IEEE 802.16m Release 10, 2010.

Patent: T. Kim, J. Zhang, B. Clerckx, "Methods and apparatus to generate multiple antennas transmit precoding codebook, U.S. Patent No. 8204151 (granted), 2012.

Contributed and Presented

4.2. B. Clerckx, T. Kim, et al., Rotation based differential feedback framework and precoding codebook, IEEE 802.16m and 3GPP LTE-ADV, C80216m-08_850r1, 2008, C80216m-08_947r4, 2008, R1 $-$ 102205, 2010.

4.3. Z. Jin, T. Kim, C. Ghosh, and K. Doppler, Fairness of DCF in 802.11ah, IEEE 802.11ah, IEEE 11-10-1511ahr0, 2011.

4.4. Z. Jin, T. Kim, C. Ghosh, and K. Doppler, Probe and pull medium access control scheme, IEEE 802.11ah, IEEE 11-11-1512ahr4, 2011.

4.5. T. Kim, Z. Jin, C. Ghosh, S. Choudhury, and K. Doppler, Sequence design for parallel acknowledgements, IEEE 802.11ah, IEEE 11-11-1564ahr0, 2011.

4.6. T. Kim, Z. Jin, C. Ghosh, S. Choudhury, and K. Doppler, Sequence detection for parallel acknowledgements, IEEE 802.11ah, IEEE 11-12-0103ahr0, 2012.

4.7. T. Kim, Z. Jin, C. Ghosh, S. Choudhury, and K. Doppler, Performance Comparison of PP-MAC and DCF, IEEE 802.11ah, IEEE 11-12-0326ahr1, 2012.

5. US Patents (30 Issued US Patents)

5.1. (*Granted*) M. Dong, W. Chan, and T. Kim, "Facilitating interference management in multi-cell and multi-user millimeter wave cellular networks," U.S. Patent No 10,200,894, 2019.

5.2. (*Granted*) J. He, T. Kim, K. Liu, and R. Wen, "Beam tracking method, apparatus, and system," U.S. Patent No 10,320,457, 2019.

5.3. (*Granted*) T. Kim, S. Choudhury, Z. Jin, KF Doppler, C. Ghosh, H. Li, "Medium access control method enhancement," U.S. Patent No 9,565,690, 2017.

5.4. (*Granted*) K. Doppler, C. Ghosh, T. Kim, Z. Jin, "PS Poll enhancement to enable efficient power save," filed with the U.S. Patent Office (No. 13/403057), 2016.

5.5. (*Granted*) B. Clerckx, D. Hwang, C. K. Au Yeung, D. J. Love, T. Kim, "Method and apparatus for interference alignment in a wireless communication system," U.S. Patent No 9,391,730, 2016.

5.6. (*Granted*) K. Kim, D. Hwang, Bruno C., T. Kim, D. J. Love, "Method and apparatus for opportunistic user scheduling of two-cell multiple user MIMO," U.S. Patent No 9,504,047, 2016.

5.7. (*Granted*) J. Choi, B. Clerckx, K.I. Kim, D.J. Love, T. Kim, "Multiple-input multiple-output (MIMO) communication system using a codebook and method of designing the codebook," U.S. Patent No 9,319,251, 2016.

5.8. (*Granted*) T. Kim, S. Choudhury, K. Doppler, C. Ghosh, Z. Jin, E. Tuomaala, "Method and apparatus for signaling sequence root," US Patent No 9,344,916, 2015.

5.9. (*Granted*) T. Kim, S. Choudhury, K. Doppler, C. Ghosh, Z. Jin, E. Tuomaala, "Method and apparatus for signaling sequence root," US Patent No 8,964,561, 2015.

5.10. (*Granted*) B. Clerckx, J. Choi, T. Kim, O. Aluko, D. J. Love, "Method and apparatus for sharing channel state information (CSI) in a multiple-user multiple-input multiple-output (MU-MIMO) environment," U.S. Patent No 8,976,850, 2015.

5.11. (*Granted*) S. Choudhury, C. Ghosh, T. Kim, K. Doppler, E. Tuomaala, "Method, apparatus, and computer program product for resolving hidden node in synchronized DCF based channel access," U.S. Patent No 9,019,874, 2015.

5.12. (*Granted*) C. Ghosh, S. Choudhury, K. Doppler, T. Kim, Z. Jin, H. Li, "Medium Access Control Method," U.S. Patent No 9,226,305, 2015.

5.13. (*Granted*) T. Kim, T. Schmidl, "System and method for channel interpolation," U.S. Patent No 8,644,428, 2014.

5.14. (*Granted*) T. Kim, T. Schmidl, T. Pande, A. Batra, J. Roh, "System and method for channel classification," U.S. Patent No 8,649,446, 2014.

5.15. (*Granted*) T. Kim, T. Schmidl, "Phase Locking Loop," U.S. Patent No 8,711,983, 2014.

5.16. (*Granted*) J. Choi, B. Clerckx, K. I. Kim, D. J. Love, and T. Kim, "Method of Generating Adaptive Codebook and Multiple Input Multiple Output Communication System Using the Adaptive Codebook," U.S. Patent No 8,724,728, 2014.

5.17. (*Granted*) T. Kim, T. Schmidl, "Channel Estimation Based on Long Training Symbol with Doubled Cyclic Prefix," U.S. Patent No 8,767,848, 2014.

5.18. (*Granted*) C. Ghosh, S. Choudhury, K. Doppler, T. Kim, "Method, Apparatus, and computer program for Efficient TIM Compression and Decoding," U.S. Patent No 8,824,440, 2014.

5.19. (*Granted*) B. Clerckx, K. I. Kim, J. Choi, D. J. Love, T. Kim, "Multiple Input Multiple Output Communication System and Communication Method of Configuring Codebook ," U.S. Patent No. 8,477,663, 2013.

5.20. (*Granted*) B. Clerckx, T. Kim, D. J. Love, J. Kim, "Multiple antenna communication system including adaptive updating and changing of codebook," U.S. Patent No. 8,498,358, 2013.

5.21. (*Granted*) B. Clerckx, K. I. Kim, J. Choi, D. J. Love, and T. Kim, "Codebook for Multiple Input Multiple Output Communication and Communication Device Using the Codebook," U.S. Patent No. 8,532,042, 2013.

5.22. (*Granted*) B. Clerckx, K. I. Kim, J. Choi, D. J. Love, T. Kim, C. K. Au-Yeung, and O. Aluko, "Clustered Multi-Cell Multi-User Multiple Input Multiple Output Communication System Using Cell-Edge User Selection Scheme," U.S. Patent No. 8,599,751, 2013.

5.23. (*Granted*) B. Clerckx, T. Kim, D. J. Love, J. Kim, "System for feeding back index of codeword matrix," U.S. Patent No. 8,160,125, 2012.

5.24. (*Granted*) T. Kim, J. Zhang, B. Clerckx, "Methods and apparatus to generate multiple antennas transmit precoding codebook," U.S. Patent No. 8,204,151, 2012.

5.25. (*Granted*) I. Lim, J. Hwang, S. Kang, T. Kim et al., "System and Method for Human Body Communication Using Limited Passband," U.S. Patent No 8,340,158, 2012.

5.26. (*Granted*) T. Kim, I. Eo, H. Jung "Blind Channel Estimation in an Orthogonal Frequency Division Multiplexing System," U.S. Patent No. 7929620, 2011.

5.27. (*Granted*) T. Kim, I. Eo, H. Kim, H. Park, "Apparatus and Method for Transmitting Data in Multi-input Multi-output System," U.S. Patent No. 7,738,843, 2010.

5.28. (*Granted*) B. Clerckx, T. Kim, D. J. Love, J. Kim, "User Terminal and Base Station Using Adapted Codebook According to Polarization," U.S. Patent No. 7,764,746, 2010.

5.29. (*Granted*) T. Kim, I. Eo, H. Kim, H. Park, "Multi-input Multi-output System and Method for Demodulating a Transmitting Vector in a Receiver of the System," U.S. Patent No. 7,787,555, 2009.

5.30. (*Granted*) T. Kim, I. Eo, "Apparatus for Selectively Performing Fast Hadamard Transform (FHT), Fast Fourier Transform (FFT), and Complimentary Code Keying (CCK) Modulation and Demodulation Using the Same," U.S. Patent No. 7,391,632, 2008.

5.31. (*Filed*) C. G. Brinton, D. J. Love, M. S. Oh, A. B. Das, T. Kim, "Systems and Methods for Stealth Communications," (No. 63/723,965), 2024.

5.32. (*Filed*) C. G. Brinton, D. J. Love, M. S. Oh, A. B. Das, T. Kim, "Complexity Reduction Methods for Machine Learning-Based Wireless Positioning," (No. 63/723,965), 2024.

5.33. (*Filed*) H. Kwon, R. Chou, R. Lahman, T. Kim, "Double-layer encryption for 5G and beyond wireless communication systems" (No. 63/521,812), 2023.

5.34. (*Filed*) W. Chan, T. Kim, H. Kwon, R. Chou, "Frequency hopping for 5G and beyond wireless communication systems" (No. 63/521,815), 2023.

5.35. (*Filed*) H. Kwon, R. Chou, T. Kim, R. Sultana, S. Dodda, "Resilience against unknown denial-of-service attacks via multipath communications", (No. 63/521,810), 2023.

5.36. (*Filed*) T. Thomas, S. Hur, T. Kim, D. J. Love, and J. Krogmeier, "Beam Alignment Method Utilizing Omni-directional Sounding And Use Thereof," (No. 13/409441), 2013.

5.37. (*Filed*) Z. Jin, K. Doppler, T. Kim, C. Ghosh, "TIM enhancement to enable efficient power savings for 802.11ah," filed with the U.S. Patent Office (No. 13/403116), 2012.

5.38. (*Filed*) C. Ghosh, K. Doppler, Z. Jin, T. Kim, "A Method for Efficient Power Savings for STAs with PS Poll Message Enhancements," filed with the U.S. Patent Office (No. 13/408523), 2012.

5.39. (*Filed*) T. Kim, S. Choudhury, K. Doppler, C. Ghosh, Z. Jin, T. Esa, "Time Slot and Sub-band Allocation for Sequential/Parallel ACK," filed with the U.S. Patent Office (No. 13/468235), 2012.

5.40. (*Filed*) T. Kim, K. Doppler, S. Choudhury, Z. Jin, "Null subframe indication for LTE and WiFi coexistence," filed with the U.S. Patent Office (No. US2012/57796), 2012.

5.41. (*Filed*) C.Ghosh, S. Choudhury, K. Doppler, T. Kim, Z. Jin, "PP-MAC Mechansim for Resource Allocation of STAs," filed with the U.S. Patent Office (No. 61/556520), 2011.

5.42. (*Filed*) K. Doppler, Z. Jin, C. Ghosh, S. Choudhury, T. Kim, H. Li, "Probe enhancement to PP-MAC to restrict amount of responses," filed with the U.S. Patent Office (No. 13/307134), 2011.

RESEARCH GRANTS

1. External ($8.0 million as a PI and $1.8 million as a Co-PI)

1.1. Lead **PI**, *NSF Convergence Accelerator, Phase 2*, "NSF Convergence Accelerator Track G: Combating Vulnerability and Unawareness in 5G Network Security" (with R. Chou (UTA), V. Marojevic (MSU), D. Love (Purdue), S. R. Hussain (PSU), S. Kim (ISU), H. Kwon (WSU), C. Vander Valk (Raytheon)), Sep 2023 – Aug 2026. (*$5 million*)

1.2. Lead **PI**, *NSF CISE Medium*, "GOALI: CNS Core: Medium: Communication-Computation Co-Design for Rural Connectivity and Intelligence under Nonuniformity: Modeling, Analysis, and Implementation" (with M. Hashemi (KU), C. Brinton (Purdue), D. Love (Purdue), J. Krogmeier (Purdue)), Oct 2022 – Sep 2026. (*$1 million*)

1.3. Lead **PI**, *NSF CISE Small*, "NSF-AoF: CNS Core: Small: Towards Scalable and Al-based Solutions for Beyond-5G Radio Access Networks" (with D. Love (Purdue), S. Vorovyov (Aalto)), Jan 2023 – Dec 2026. (*$280,000*)

1.4. **PI**, *Office of Naval Research (ONR)* "Network-Aware Distributed Machine Learning and Sensor Fusion for Spectrum System Intelligence" (with C. Brinton (Lead PI, Purdue), D. Love (Purdue)), Jan 2022 – May 2026. (*$597,776*)

1.5. **Co-PI**, *NSF CISE Medium*, "Collaborative Research: CNS Core: Medium: Combating Latency and Disconnectivity in MmWave networks: From Theory to Implementation" (with N. Shroff (Lead PI, OSU), M. Hashemi (KU PI, KU), E. Ekici (OSU)), Oct 2020 – Sep 2026. (*$428,000*)

1.6. (*Completed*) Lead **PI**, *NSF Convergence Accelerator, Phase 1*, "NSF Convergence Accelerator Track G: Combating Vulnerability and Unawareness in 5G Network Security: Signaling and Full-Stack Approach" (with R. Chou (UTA), D. Love (Purdue), S. Fahmy (Purdue)), July 2022 – June 2024. (*$750,000*)

1.7. (*Completed*) **Co-PI**, *NASA*, "Spectrum Management Framework for Unmanned Aerial Systems and Traffic Management in BVLOS: From Assessment to Modeling and Analysis" (with M. Hashemi (PI, KU), E. Perrins (KU), M. Ewing (KU)), Oct 2020 – Sep 2025. (*$399,903*)

1.8. (*Completed*) **Co-PI**, *National Spectrum Consortium (NSC)*, "Space Time Coding for Multi-h CPM" (with E. Perrins (PI, KU)), Nov 2017 – Oct 2024. (*$964,770*)

1.9. (*Completed*) **PI**, *NSF SII, Phase 1*, "Spectrum Innovation Initiative (SII) Planning: Spectrum-Agile Cognitive Communications for Terrestrial and Space Applications" (with UNM [Lead], CMU, ISU, Purdue, and WSU), Aug 2020 – July 2021 (*$47,125*).

1.10. (*Completed*) **PI**, *NASA EPSCoR*, "An Active Learning Framework for Increasing Generalizability of Machine Learning Models", July 2020 – June 2021. (*$99,994*)

1.11. (*Completed*) **PI**, *Naval Surface Warfare Center, Crane Division*, "Distributed Machine Learning and Sensor Fusion For Spectrum Sensing System Optimization" (with C. Brinton (Lead PI, Purdue), D. Love (Purdue), M. Hashemi (KU)), , July 2020 – Aug 2020. (*$19,355*)

1.12. (*Completed*) **PI**, *AFRL*, "Wideband Fast Spatial Spectrum Sensing Using Digital Beamforming," May 2020 – May 2021. (*$82,800*)

1.13. (*Completed*) **PI**, *Samsung Electronics CO., LTD.*, "Automatic Cell Planning" (with E. Perrins (KU)), August 2019 – July 2020. (*$150,133*)

2. Internal

2.1. PI, ASU, *Start-up Grant*, $900,000, (Sep 2024 – present).

2.2. (*Completed*) PI, University of Kansas, *Start-up Grant*, $200,000, (Sep 2017 – Aug 2020).

2.3. (*Completed*) PI, University of Kansas, *New Faculty General Research Fund*, $19.939 (Nov 2019 – Nov 2021).

TEACHING

Taught at ASU

EEE 554 Probability and Random Processes	Spring, Fall 2025

Taught at KU

EECS 360 Signal and System Analysis	Fall 2018, 2019, 2020
EECS 444 Control Systems	Spring 2021, 2022
EECS 664 Introduction to Digital Communications	Spring 2018
EECS 690 Engineering of Learning Algorithms	Spring 2024
EECS 769 Information Theory	Fall 2017, 2020, 2021
EECS 800 Inference and Learning Optimization	Summer 2019; Fall 2023
EECS 865 Wireless Communication Systems	Spring 2019, 2020, 2022
EECS 869 Error Control Coding	Fall 2019, 2022

Taught at CityU

EE3008 Principles of Communications:	Fall 2016
EE6617 Detection and Estimations:	Spring 2014, Summer 2015, Spring 2016, Spring 2017
EE4092 Engineering Training II Part-A,B:	Summer 2016, Fall 2016, Summer 2017
EE4990 Summer Camp (Mobile Product Design):	Summer 2014, Summer 2015, Summer 2016
EE2000 Logic Circuit Design, Lab & Tutorial:	Fall 2013, Fall 2014, Fall 2015
EE2301 Basic Electronic Circuit, Lab:	Spring 2015, Spring 2016

Class Material Development

Lecture notes, course layout, homeworks, projects, tests for EEE554 Probability and Random Process (2025)

Lecture notes, course layout, homeworks, projects, tests for EECS444 Control Systems (2021, 2022)

Lecture notes, course layout, homeworks, projects, tests for EECS869 Error Control Coding (2019, 2022)

Lecture notes, course layout, homeworks, projects, tests for EECS800 Special Topics: Inference and Learning Optimization (2019, 2023)

Lecture notes, course layout, homeworks, projects, tests for EECS865 Wireless Communication Systems (2019, 2022)

Lecture notes, course layout, homeworks, projects, tests for EECS360 Signal and System Analysis (2018)

Lecture notes, course layout, homeworks, projects, tests for EECS664 Intro. to Digital Communications (2018)

Lecture notes, course layout, homeworks, projects, tests for EECS769 Information Theory (2017)

Lecture notes, course layout, assignments, tests for EE6617 Detection and Estimations (2014-2016)

Lecture notes, course layout, laboratory projects for EE4990 Mobile Product Design (2014)

Course layout, laboratory projects for EE4092 Engineering Training II (2015)

Lecture notes, course layout, assignments, tests for EE3008 Principles of Communications (2016-)

ADVISING

Postdoctoral Researcher Currently Being Supervised:

Omid Moghimi Kandelusy	Jan 2022 – May 2023
Salman Habib	Feb 2024 – present

Ph.D. Students Currently Being Supervised:

Syed Ali Haider Shirazi	Ph.D. candidate	EE	Aug 2025 – present
Fengyuan Ye	Ph.D. candidate	EE	Aug 2024 – present
Ghilas Aissou	Ph.D. candidate	EE	Aug 2023 – present
Wai Ming Chan	Ph.D. candidate	EE	Aug 2023 – present

M.S. Students Currently Being Supervised:

Shu-Chen Want	M.S. candidate	EE	Aug 2025 – present

Ph.D. Students Graduated:

Dang Qua Nguyen (now at Apple)	Ph.D. (*honor*)	EE	Aug 2020 – July 2025
Usman Sajid (now at Samsung)	Ph.D. (*honor*)	CS	Jan 2017 – Dec 2021
Qiyou Duan (now at State Grid)	Ph.D.	EE	Sep 2014 – Aug 2021
Miaomioa Dong (now at Huawei)	Ph.D.	EE	Sep 2016 – Sep 2020
Wei Zhang (Assistant Professor at Harbin Inst. of Tech. at Shenzhen)	Ph.D.	EE	Sep 2015 – Sep 2019
Hadi Ghauch (Assistant Professor at Telecom Paris, France)	Ph.D.	EE	Sep 2012 – Sep 2017

M.S. Students Graduated:

Sohan Chandra	M.S.	CS	Aug 2022 – Dec 2023
Anushka Bhattacharya	M.S.	EE	Sep 2020 – May 2022
Sergine Seck	M.S.	EE (with Dr. Hashemi)	Sep 2020 – May 2022
Yiju Yang	M.S.	CS	Aug 2019 – May 2021
Christian James Daniel	M.S.	EE (with Dr. Perrins)	Aug 2019 – Dec 2021
Guojun Xiong	M.S. (*honor*)	EE	Jan 2018 – Sep 2020
Dung Ngyuen Viet	M.S.	EE	Jan 2019 – Jan 2021

Grad Committees: Ph.D.:

Yongkyu Jang	Ph.D.	ECE (Purdue)	Aug 2022 – Present
Sameer Shashikant Mathad	Ph.D.	ECE (Purdue)	Aug 2021 – Present
Arman Ghasemi	Ph.D.	EE	Aug 2019 – present
Masound Ghazikor	Ph.D.	CS	Aug 2022 – present
Babak Badnava	Ph.D.	CS	Aug 2021 – present
Sravan Reddy Chintareddy	Ph.D.	EE	Aug 2020 – Present
Amin Shojaei	Ph.D.	EE	May 2019 – May 2025 (*Completed*)
Kaidong Li	Ph.D.	EE	Aug 2018 – Aug 2023 (*Completed*)
Luyao Shang	Ph.D.	EECS	Aug 2015 – Dec 2019 (*Completed*)
Yuanwei Wu	Ph.D.	EECS	Aug 2015 – Dec 12 2019 (*Completed*)
Ali Mohamed Alshawish	Ph.D.	EECS	Dec 2018 – Feb 2021 (*Completed*)
Xi Mo	Ph.D.	EE	Jan 2017 – May 2022 (*Completed*)
Truc Anh Ngoc Nguyen	Ph.D.	CS	Jan 2012 – Aug 2021 (*Completed*)
Wenchi Ma	Ph.D.	EE	Aug 2016 – July 2021 (*Completed*)

Grad Committees: M.S.:

Sumant Madan Pathak	M.S.	EE	Sep 2017 – July 2018 (*Completed*)
Priyanka Saha	M.S.	CS	Aug 2017 – May 2019 (*Completed*)
Jason C Baxter	M.S.	EE	Sep 2018 – Sep 2020 (*Completed*)
Chanaka Janitha Samarathunga	M.S.	EE	Aug 2019 – June 2021 (*Completed*)
Chuan Sun	M.S.	EE	Aug 2019 – April 2021 (*Completed*)
Brian Quiroz	M.S.	CS	Aug 2020 – May 2022 (*Completed*)
Kamala Gajuel	M.S.	CS	Aug 2019 – May 2021 (*Completed*)

AWARDS AND HONORS BY MENTORED STUDENTS

– Guojun Xiong, *the KU Richard & Wilma Moore MS Thesis Award*, 2021 on his outstanding thesis and research outcomes, May 2021.

SEMINARS

"Combating Vulnerability and Unawareness in 5G Network Security," NSF Convergence Accelerator PI Meeting, Alexandria, VA, Aug 2025.

"Learning for Robust Channel Coding and Zero Trust Security," Electrical Engineering (EE), University of Buffalo, Oct 2024.

"NSF Convergence Accelerator Track G Site Visit," Lawrence Tech Conference, July 2024.

"Zero Trust X (ZTX): Combating Vulnerability and Unawareness in 5G Network Security," Lawrence Tech Conference, April 2024.

"Zero Trust X (ZTX): Combating Vulnerability and Unawareness in 5G Network Security," Douglas County CORE Pitch Competition, April 2024.

"Zero Trust X (ZTX): Operating Securely Through 5G Infrastructure," the 14th New England Workshop on Software Defined Radio (NEWSDR 2024), May 2024.

"Learning and Optimization for Robust Coding and Fusion," Electrical and Computer Engineering (ECE) Department, Stevens Institute of Technology, March 2024.

"Learning and Optimization for Robust Coding and Fusion," Computer Science and Engineering (CSE) Department, University of Southern Florida, March 2024.

"Learning and Optimization for Robust Coding and Fusion," Electrical Engineering and Computer Science (EECS) Department, University of Tennessee, March 2024.

"Learning and Optimization for Robust Coding and Fusion," Computer Science and Engineering (CSE) Department, University of Texas at Arlington, Feb 2024.

"Learning and Optimization for Robust Coding and Fusion," The School of Electrical, Computer and Energy Engineering (ECEE), Arizona State University, Feb 2024.

"Joint Learning and Optimization for Robust Coding and Fusion," Computer, Information, Science, and Engineering (CISE) Department, University of Florida, Feb 2024.

"Predicting In-Season Soil Nitrogen in Corn Production Using Generative Deep Learning," US-Israel BARD Workshop, 07/18/2023.

"Adaptive Wideband Beamforming and Distributed Compression and Fusion," Raython BBN 6G Workshop, 03/07/2023.

"Combating Vulnerabilities and Unawareness in 5G Security," Advisory Board Meeting, Department of Electrical Engineering & Computer Science, University of Kansas, Lawrence, KS, 12/07/2022.

"Network-Aware Distributed Machine Learning and Sensor Fusion for Spectrum System Intelligence," ONR, 08/15/2022.

"Agile Channel Access and Wideband Beamforming: Learning and Optimization Approach," ETRI, 02/22/2022.

"5G Communications and Data Innovation," Jeju National University, Korea, 02/18/2021.

"Combatting Latency and Disconnectivity in Millimeter-Wave Communications: Fast Beam Alignment," Seoul National University, 08/30/2021.

"An Active Learning Framework for Increasing Generalizability of Machine Learning Models," NASA, 03/4/2021.

"Agile Spatial Spectrum Sensing: Learning-Based Approach," AFRL, Sensor Division, OH, 12/04/2020.

"Low-Overhead Spatial Spectrum Sensing and Classification: Learning-Based Approach," Naval Surface Warfare Center, Crane Division, IN, 06/17/2020.

"Intelligent 5G Cell-Planning and Machine Logistics," Connected and Autonomous Vehicles (CAV) Planning Meeting, University of Kansas, Lawrence, KS, 04/16/2020.

"Intelligence 5G Cell-Planning: KU & Samsung Collaboration," NSA Lablet Advisory Board Meeting, Department of Electrical Engineering & Computer Science, University of Kansas, Lawrence, KS, 12/05/2019.

"Distributed Clock Synchronization for Wireless Sensor Networks," Department of Electrical Engineering & Computer Science, Wichita State University, Wichita, KS, 11/18/2019.

"Intelligence 5G Cell-Planning: KU & Samsung Collaboration," Advisory Board Meeting, Department of Electrical Engineering & Computer Science, University of Kansas, Lawrence, KS, 11/15/2019.

"MmWave Base Station Deployment: Link Level Perspective," Communication Research Center, Samsung Electronics, Suwon, South Korea, 05/18/2018.

"Exploiting The Isometry Property for Improved MmWave Channel Estimation," Communication Research Center, Samsung Electronics, Suwon, South Korea, 05/18/2018.

"Exploiting The Restricted Isometry Property and Artificial Intelligence for Improved Communication Systems," Marine Research Center, Daejeon, South Korea, 05/17/2018.

"Exploiting The Restricted Isometry Property and Artificial Intelligence for Improved Communication Systems," National Security Research Center, Daejeon, South Korea, 05/17/2018.

"Adaptive Channel Estimation for Large MIMO," Department of Electrical Engineering & Computer Science, Wichita State University, Wichita, KS, 02/20/2018.

"Adaptive MIMO Channel Estimation," HKN Founder's Day Event, Department of Electrical Engineering & Computer Science, University of Kansas, Lawrence, KS, 11/09/2017.

"5G Wireless," Department of Electrical Engineering & Computer Science, University of Kansas, Lawrence, KS, 12/09/2016.

"Massive MIMO Channel Sounding," Department of Mobile System Engineering, Dankook University, Korea, 05/20/2016.

"Millimeter Wave Beam Tracking," R&D Center of Huawei Technologies, Chengdu, China, 11/18/2014 (Invited Talk).

"Outdoor Millimeter Wave Systems for 5G Urban Cellular: Design and Analysis," Innovation and Technologies Commission of Hong Kong, West Wing, Central Government Offices, 09/14/2015.

"Advanced Wireless Communications for Mobile Broadbands," Department of Electronic Engineering, The Chinese University of Hong Kong, 08/28/2015.

"Adaptive MIMO Enhancement," Communication Theory Group, KTH, Stockholm, Sweden, 11/15/2012.

"Adaptive MIMO Enhancement for Next Generation Wireless Communications," Department of Electrical and Computer Engineering, Southern Illinois University, Carbondale, Illinois, USA, 09/20/2012.

"Advanced MIMO Enhancement," Center for Chaos and Complex Networks, City University of Hong Kong, Kowloon, 05/03/2012.

"Limited Feedback MIMO Enhancement," Nokia Research Center, Berkeley, California, USA, 02/05/2011.

EXTERNAL ACTIVITIES

NSF Panel

NSF, NewSpectrum, 2024
NSF, Statistics, 2023
NSF, CISE, 2025, 2023, 2022
NSF, SWIFT, 2022

Professional Society Memberships

Senior Member of IEEE
Member of IEEE Communication Theory Committee
Member of IEEE Wireless Communication Committee
Member of IEEE Communications Society
Member of IEEE Signal Processing Society
Member of IEEE Industrial Electronics Society

Editorial Positions

Associate Editor, *IEEE Transactions on Wireless Communications*	2024 – present
Associate Editor, *IEEE Open Journal of Communications Society*	2024 – present
Associate Editor, *IEEE Transactions on Communications*	2016 – 2023
Guest Editor, *IEEE Transactions on Industrial Informatics*	2014 – 2016

Review Activities

Reviewed papers for *IEEE Transactions on Signal Processing*, *IEEE Transactions on Communications*, *IEEE Transactions on Information Theory*, *IEEE Transactions on Wireless Communications*, *IEEE Transactions on Vehicular Technology*, *IEEE Transactions on Networking*, *IEEE Transactions on Industrial Informatics*, *IEEE Transactions on Aerospace and Electronic Systems*, *IEEE Journal of Selected Topics in Signal Processing*, *IEEE Journal of Selected Areas in Communications*, *IEEE Communications Letters*, *IEEE Wireless Communications Letters*, *EURASIP Journals on Wireless Communications and Networking*, *Digital Signal Processing*

Conference Technical Program Committees (TPC)/Symposium Chair

1. Symposium Chair, IEEE Globecom Conference, Signal Processing for Communications Symposium, Macau, China, 2025 – 2026.

2. Publicity Chair, IEEE Information Theory Workshop (ITW), Tempe, Arizona, 2025 – 2026.

3. Publicity Chair, IEEE Communication Theory Workshop (CTW), Florida, 2018.

4. Technical Program Committee Chair, IEEE Asilomar Conference on Signals, Systems, and Computers, Special Session on "Hybrid Analog/Digital Precoding and related implementation issues for mmWave and massive MIMO systems", Asilomar, California, USA, November, 2016.

5. Technical Program Committee Chair, IEEE International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC), Workshop on Wireless Communications in Millimeter Wave Bands, Hong Kong, September, 2015.

Conference Technical Program Committees (TPC) Member

1. Technical Program Committee Member for IEEE International Conference on Communications (ICC), SAC - Integrated Sensing and Communications, 2026.

2. Technical Program Committee Member, IEEE Conference on Computer Communications (INFOCOM), 2023 – Present.

3. Technical Program Committee Member, IEEE Global Communications Conference (Globecom), Communication Theory Symposium, 2013 – Present.

4. Technical Program Committee Member, IEEE Global Communications Conference (Globecom), Wireless Communications Symposium, 2013 – Present.

5. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Communication Theory Symposium, 2018 – Present.

6. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Wireless Communications Symposium, 2018 – Present.

7. Technical Program Committee Member, IEEE Asilomar Conference on Signals, Systems, and Computers, 2021-2022.

8. Technical Program Committee Member, IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), July, 2017.

9. Technical Program Committee Member, IEEE International Conference on Communications in China (ICCC), Signal Processing for Communications Symposium, August, 2013.

10. Technical Program Committee Member, IEEE International Conference on Signal Processing, Communications and Computing (ICSPCC), August, 2013.

11. Awards Committee Member, IEEE Global Communications Conference (Globecom), December, 2013.

12. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Selected Areas in Communications Symposium, June, 2014.

13. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Wireless Communications Symposium, June, 2015.

14. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Workshop BackNets, June, 2015.

15. Technical Program Committee Member, IEEE Military Communications Conference (Milcom), October, 2014-2016.

16. Technical Program Committee Member, IEEE International Conference on Computing, Networking and Communications (ICNC), February, 2016.

Session Chair

1. IEEE International Symposium on Information Theory (ISIT), "TuC-4-I-102: Streaming Codes", June 2023.
2. IEEE Global Communications Conference (Globecom), "WCS-16, Detection and Estimation," December 2014.
3. IEEE International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC), Workshop on Wireless Communications in Millimeter Wave Bands, Hong Kong, September 2015.
4. IEEE International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC), "MWN 28, Wireless Sensor Network I", Hong Kong, September, 2015.
5. IEEE Global Communications Conference (Globecom), "WC-5, Channel Coding, ARQ, and Power Allocation," December 2013.
6. IEEE Global Communications Conference (Globecom), "WC-6, Millimeter Wave and Device-to-Device Communications," December 2013.

INTERNAL ACTIVITIES

1. Departmental
   - 1.1. Member, EECS Broadening Participation in Computing (BPC) Plan Committee, University of Kansas, 2022–2024
   - 1.2. Member, ECE Curriculum Committee, University of Kansas, 2021–2024
   - 1.3. Member, EECS Standing Committee, Student Awards, University of Kansas, 2018–2024
   - 1.4. Member, EECS ABET Committee, University of Kansas, 2019–2020
   - 1.5. Member, EECS Faculty Search Committee, Machine Learning, University of Kansas, 2019–2020
   - 1.6. Member, EECS Faculty Search Committee, Communications, University of Kansas, 2017–2018
2. Engineering College
   - 2.1. Member, Engineering Library Committee, University of Kansas, 2020 – 2024