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Research Interests

Statistical signal processing, Machine learning optimization, Communication theory, Non-linear optimization, Array signal processing, Feedback communications, Multiple-input multiple-output (MIMO) communications, High-frequency MIMO systems, Data fusion, and Distributed reception.

Education

Ph.D., ECE, Purdue University, West Lafayette, IN, USA	2011
M.S., EE, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea	2004
B.S., EE, Sogang University (highest honors, Jesuit), Seoul, Korea	2002

Experience

The University of Kansas, Lawrence, KS Chair's Council Faculty, EECS.	2022 – present
The University of Kansas, Lawrence, KS Assistant Professor, EECS.	2017 – present
City University of Hong Kong, Hong Kong Assistant Professor, EE.	2013 – 2017
Royal Institute of Technology (KTH), Stockholm, Sweden Postdoctoral Researcher, Communication Theory Lab.	2012 – 2013
Nokia Bell Labs, Berkeley, CA, USA Senior Researcher, Radio Systems Group.	2011 – 2012
ETRI, Daejeon, Korea Research Member, Basic Research LAB.	2004 – 2007

Awards

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

Miller Faculty Awards (both in 2022 and 2021), School of Engineering, The University of Kansas (for nominee's significant contributions to the research, teaching, and service mission.)

The President's Award (2017), 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), IEEE Communications Society (the Best Paper Award of the *IEEE Transactions on Communications*.)

Nokia Bell Labs Kudos Award (2012), Nokia Bell Labs.

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

In the below, my name and the names of my students are underlined.

1. Journals

Submitted

- 1.1. W. Zhang and T. Kim, “Successful Recovery Performance Guarantees of Noisy SOMP,” submitted to *IEEE Transactions on Signal Processing*, 2022.
- 1.2. 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,” submitted to *IEEE Transactions on Vehicular Technology*, 2022.

Published

- 1.3. 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.
- 1.4. 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.
- 1.5. 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*, pp. 1-16, June 2022.
- 1.6. M. Dong, M. Cho, K. Lee, and S. Yoon, T. Kim, “Cost-Optimal Deployment of Millimeter-Wave Base Stations Under Outage Requirement”, pp. 1-16, *IEEE Transactions on Wireless Communications*, June 2022.
- 1.7. Q. Duan, T. Kim, and H. Ghauch, “KM Learning for Millimeter-Wave Beam Alignment and Tracking: Predictability and Interpretability”, *IEEE Access*, August 2021.
- 1.8. 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.
- 1.9. 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.
- 1.10. 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.
- 1.11. 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.
- 1.12. 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.
- 1.13. 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.
- 1.14. W. Zhang, T. Kim, G. Xiong, and S. H. Leung, “Leveraging Subspace Information for Low-Rank Matrix Reconstruction”, vol. 163, pp. 123-131, *Signal Processing*, May 2019.
- 1.15. 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.
- 1.16. 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.
- 1.17. 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.

- 1.18. 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.
- 1.19. 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.
- 1.20. 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.
- 1.21. 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.
- 1.22. 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, pp. 1737-1749, April 2015.
- 1.23. 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.
- 1.24. 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.
- 1.25. 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.
- 1.26. 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.
- 1.27. 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).
- 1.28. 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.
- 1.29. 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.
- 1.30. 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.
- 1.31. 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.
- 1.32. 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. 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.

- 2.2. 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.
- 2.3. 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.
- 2.4. Y. Yang, T. Kim, and G. Wang, “Multiple Classifiers Based Adversarial Training for Unsupervised Domain Adaptation,” *Conference on Robots and Vision (CRV)*, 2022.
- 2.5. 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*, 2022.
- 2.6. 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.
- 2.7. 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.
- 2.8. 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.
- 2.9. 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.
- 2.10. 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.
- 2.11. 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.
- 2.12. 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.
- 2.13. 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.
- 2.14. 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.
- 2.15. 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.
- 2.16. 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.
- 2.17. G. Xiong, T. Kim, and E. Perrins “Decorrelation Deep Learning for Fingerprint-based Indoor Localization”, *International Telemetry Conference*, Las Vegas, NV, USA, Oct 2019.
- 2.18. 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.
- 2.19. R. Simeon, T. Kim, and E. Perrins, “Channel Estimation Using Gaussian Process Regression”, *International Telemetry Conference*, Las Vegas, Na, Oct 2019.
- 2.20. 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.
- 2.21. 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.

- 2.22. 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*).
- 2.23. 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.
- 2.24. 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.
- 2.25. 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*).
- 2.26. 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.
- 2.27. 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.
- 2.28. 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.
- 2.29. 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.
- 2.30. 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.
- 2.31. H. Ghauch, T. Kim, M. Bengtsson, and M. Skoglund, “Interference Alignment via Controlled Perturbations”, *IEEE Global Communications Conference (Globecom)*, Atlanta, GA, December 2013.
- 2.32. 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.
- 2.33. 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**).
- 2.34. 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*).
- 2.35. 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.
- 2.36. 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.
- 2.37. 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.
- 2.38. 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.
- 2.39. 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.
- 2.40. 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.
- 2.41. 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.

- 2.42. 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.
- 2.43. 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.
- 2.44. 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. Patents (29 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 10,200,594, 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*) 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.
- 5.5. (*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.
- 5.6. (*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.

- 5.7. (*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.
- 5.8. (*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.
- 5.9. (*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.
- 5.10. (*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.
- 5.11. (*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.
- 5.12. (*Granted*) T. Kim, T. Schmidl, "System and method for channel interpolation," U.S. Patent No 8,644,428, 2014.
- 5.13. (*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.
- 5.14. (*Granted*) T. Kim, T. Schmidl, "Phase Locking Loop," U.S. Patent No 8,711,983, 2014.
- 5.15. (*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.
- 5.16. (*Granted*) T. Kim, T. Schmidl, "Channel Estimation Based on Long Training Symbol with Doubled Cyclic Prefix," U.S. Patent No 8,767,848, 2014.
- 5.17. (*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.
- 5.18. (*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.
- 5.19. (*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.
- 5.20. (*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.
- 5.21. (*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.
- 5.22. (*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.
- 5.23. (*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.
- 5.24. (*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.
- 5.25. (*Granted*) T. Kim, I. Eo, H. Jung "Blind Channel Estimation in an Orthogonal Frequency Division Multiplexing System," U.S. Patent No. 7929620, 2011.
- 5.26. (*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.
- 5.27. (*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.
- 5.28. (*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.
- 5.29. (*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.

- 5.30. (*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.
- 5.31. (*Filed*) 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), 2012.
- 5.32. (*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.
- 5.33. (*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.
- 5.34. (*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.
- 5.35. (*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.
- 5.36. (*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.
- 5.37. (*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.

Grants

1. External Funding (Awarded Total: \$3,872,093 = PI: \$3,034,183 + Co-PI: \$837,910)

- 1.1. Taejoon Kim (PI), “NSF-AoF: CNS Core: Small: Towards Scalable and AI-based Solutions for Beyond-5G Radio Access Networks”, **NSF CISE**, Award Number 2225577, \$285,000, January 2023 – December 2025.
- 1.2. Taejoon Kim (PI), “GOALI: CNS Core: Medium: Communication-Computation Co-Design for Rural Connectivity and Intelligence under Nonuniformity: Modeling, Analysis, and Implementation”, **NSF CISE**, Award Number 2212565, \$1,000,000, October 2022 – September 2025.
- 1.3. Taejoon Kim (PI), “NSF Convergence Accelerator Track G: Combating Vulnerability and Unawareness in 5G Network Security: Signaling and Full-Stack Approach”, **NSF Convergence Accelerator**, Award Number 2226447, \$750,000, July 2022 – June 2023.
- 1.4. Taejoon Kim (PI), “Network-Aware Distributed Machine Learning and Sensor Fusion for Spectrum System Intelligence”, **ONR**, \$597,776, May 2021 – May 2024.
- 1.5. Taejoon Kim (Co-PI), “Collaborative Research: CNS Core: Medium: Combating Latency and Disconnectivity in MmWave networks: From Theory to Implementation”, **NSF CISE**, Award Number 1955561, \$438,000, Oct 2020 – Sep 2023.
- 1.6. Taejoon Kim (PI), “Spectrum Innovation Initiative (SII) Planning: Spectrum-Agile Cognitive Communications for Terrestrial and Space Applications”, **NSF SII**, Award Number 2037864, \$47,125, Aug 2020 – July 2021.
- 1.7. Taejoon Kim (PI), “An Active Learning Framework for Increasing Generalizability of Machine Learning Models”, **NASA EPSCoR**, \$99,994, July 2020 – June 2021.
- 1.8. Taejoon Kim (Co-PI), “Spectrum Management Framework for Unmanned Aerial Systems and Traffic Management in BVLOS: From Assessment to Modeling and Analysis”, **NASA**, \$399,903, Oct 2020 – Sep 2023.
- 1.9. Taejoon Kim (PI), “Distributed Machine Learning and Sensor Fusion For Spectrum Sensing System Optimization,” **Naval Surface Warfare Center, Crane Division**, \$19,355, July 2020 – Aug 2020.
- 1.10. Taejoon Kim (PI), “Wideband Fast Spatial Spectrum Sensing Using Digital Beamforming,” **AFRL**, \$82,800, May 2020 – May 2021.
- 1.11. Taejoon Kim (PI), “Automatic Cell Planning,” 1001332, **Samsung Electronics CO., LTD.**, \$150,133, August 2019 – July 2020.

2. Internal Grants

- 2.1. Taejoon Kim (PI), University of Kansas, **Start-up Grant**, \$200k (Sep 2017 – Aug 2020).

2.2. Taejoon Kim (PI), University of Kansas, **New Faculty General Research Fund**, \$19.939 (Nov 2019 – Nov 2021).

Teaching and Advising

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 769 Information Theory	Fall 2017, 2020, 2021
EECS 800 Special Topics: Bayesian Inference and Learning	Summer 2019
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 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: Bayesian Inference and Learning (2019)
- 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-)

Postdoctoral Researcher Currently Being Supervised:

Omid Moghimi Kandelusy EECS Jan. 2022 – present

Ph.D. Students Currently Being Supervised:

Wai Ming Chan Ph.D. candidate EECS Jan. 2022 – present
 Dang Qua Nguyen Ph.D. candidate EECS Sep. 2020 – present
 Richard Simeon Ph.D. candidate EECS (with Dr. Perrins) Jan. 2018 – present

M.S. Students Currently Being Supervised:

Saharsh Gupta M.S. candidate EECS Aug 2020 – present

Ph.D. Students Graduated:

Usman Sajid Ph.D. (*honor*) CS Jan. 2017 – Dec. 2021
 Qiyou Duan Ph.D. EE Sep. 2014 – Aug. 2021
 Miaomia Dong Ph.D. EE Sep. 2016 – Sep. 2020
 Wei Zhang Ph.D. EE Sep. 2015 – Sep. 2019
 Hadi Ghauch Ph.D. EE Sep. 2012 – Sep. 2017

M.S. Students Graduated:

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

Grad Committees:

Kaidong Li Ph.D. EECS Aug 2018 – Present
 Ibikunle Oluwanisola Ph.D. EECS Jan 2018 – Present
 Ali Mohamed Alshawish Ph.D. EECS Dec 11 2018 – Present
 Sumant Madan Pathak Ph.D. EECS Sep 2017 – Present
 Xi Mo Ph.D. EECS Jan 2017 – Present (CE Nov 2019)
 Gordon Ariho Ph.D. EECS Sep 2017 – Present (QE Sep 2018)

Chanaka Janitha Samarathunga M.S. EECS Aug 2019 – Present
 Sumant Madan Pathak M.S. EECS Sep 2017 – July 2018
 Priyanka Saha M.S. EECS May 2019
 Jason C Baxter M.S. EECS Sep 2018 – Sep 2020
 Luyao Shang Ph.D. EECS Aug 2015 – Dec 2019
 Yuanwei Wu Ph.D. EECS Aug 2015 – Dec 12 2019

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

- “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 Learnign 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.

Internal Activities

1. Departmental

- 1.1. Member, EECS Faculty Search Committee, Communications, University of Kansas, 2017–2018

- 1.2. Member, EECS Faculty Search Committee, Machine Learning, University of Kansas, 2019–2020
- 1.3. Member, EECS ABET Committee, University of Kansas, 2019–2020
- 1.4. Member, EECS Standing Committee, Student Awards, University of Kansas, 2018–Present
- 1.5. Member, ECE Curriculum Committee, University of Kansas, 2021–Present.

2. Engineering College

- 2.1. Member, Engineering Library Committee, University of Kansas, 2020 – Present

External Activities

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, <i>IEEE Transactions on Communications</i>	2016 – 2022
Guest Editor, <i>IEEE Transactions on Industrial Informatics</i>	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) Member

1. Technical Program Committee Member, IEEE Global Communications Conference (Globecom), Communication Theory Symposium, 2013 – Present.
2. Technical Program Committee Member, IEEE Global Communications Conference (Globecom), Wireless Communications Symposium, 2013 – Present.
3. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Wireless Communications Symposium, 2018 – Present.
4. Technical Program Committee Member, IEEE Asilomar Conference on Signals, Systems, and Computers, 2021-2022.
5. Technical Program Committee Member, IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), July, 2017.
6. Technical Program Committee Member, IEEE International Conference on Communications in China (ICCC), Signal Processing for Communications Symposium, August, 2013.
7. Technical Program Committee Member, IEEE International Conference on Signal Processing, Communications and Computing (ICSPCC), August, 2013.
8. Awards Committee Member, IEEE Global Communications Conference (Globecom), December, 2013.

9. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Selected Areas in Communications Symposium, June, 2014.
10. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Wireless Communications Symposium, June, 2015.
11. Technical Program Committee Member, IEEE International Conference on Communications (ICC), Workshop Back-Nets, June, 2015.
12. Technical Program Committee Member, IEEE Military Communications Conference (Milcom), October, 2014-2016.
13. Technical Program Committee Member, IEEE International Conference on Computing, Networking and Communications (ICNC), February, 2016.

Conference Technical Program Committees (TPC) Chair

1. 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.
2. 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.
3. Publicity Chair, IEEE Communication Theory Workshop (CTW), Florida, 2018.

Session Chair

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