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General Research Interests

Communication systems with feedback, multicell/multiuser/massive/distributed MIMO systems, mmWave systems, reconfigurable intelligent surface (RIS)-aided communication systems, satellite communication systems, V2X communication systems, joint radar-communication systems.

Education

<i>Degree</i>	<i>Date</i>	<i>School</i>
B.S.E.E.	Feb. 2005	Seoul National University
M.S.E.E.	Feb. 2007	Seoul National University
Ph.D.	May 2015	Purdue University

Dissertation: Advanced Wireless Communications Using Large Numbers of Transmit Antennas and Receive Nodes

Professional Work Experience

Sep. 2021 - Present	Associate Professor School of Electrical Engineering Korea Advanced Institute of Science and Technology (KAIST)
Aug. 2019 - Aug. 2021	Assistant Professor School of Electrical Engineering Korea Advanced Institute of Science and Technology (KAIST)
Jul. 2016 - Aug. 2019	Assistant Professor Department of Electrical Engineering Pohang University of Science and Technology (POSTECH)
Apr. 2015 - Jun. 2016	Postdoctoral Researcher Department of Electrical and Computer Engineering The University of Texas at Austin Advisor: Prof. Robert W. Heath Jr.
Jan. 2011 - May 2011	Member of Technical Staff Samsung Electronics
Feb. 2007 - Dec. 2010	Member of Technical Staff Samsung Advanced Institute of Technology

Professional Society Memberships

- Institute of Electrical and Electronics Engineering (IEEE) - Communications Society, Signal Processing Society, Vehicular Technology Society
 - Senior Member 2020 - Present
 - Member 2015 - 2020
 - Student Member 2011 - 2015
- The Korean Institute of Communications and Information Sciences (KICS)
 - Life Member 2018 - Present
 - Member 2017 - 2018
- The Institute of Electronics and Information Engineers (IEIE)
 - Life Member 2018 - Present

Honors, Awards, and Scholarships

1. IEEE Communications Society Communication Theory Technical Committee Early Achievement Award, 2021.
2. **IEEE Vehicular Technology Society Neal Shepherd Memorial Best Propagation Paper Award, 2021.**
3. **(Named) Ewon Assistant Professor of KAIST, 2021.**
4. KAIST Technology Innovation Excellence Award, 2020.
5. **IEEE Communications Society Stephen O. Rice Prize, 2019.**
6. KICS Haedong Young Engineer Award, 2019.
7. POSTECH EE Best Teacher Award, 2019.
8. **NRF Korea and Elsevier Young Researcher Award, 2018.**
9. KICS Joint Conference on Communications and Information (JCCI) Best Paper Award, 2018.
10. IEEE ComSoc AP Region Outstanding Young Researcher Award, 2017.
11. IEEE Transactions on Communications Exemplary Reviewer, 2016, 2017, 2018.
12. IEEE Wireless Communications Letters Exemplary Reviewer, 2013, 2015.
13. **IEEE Signal Processing Society Best Paper Award, 2015.**
14. College of Engineering Outstanding Graduate Student Research Award, Purdue University, 2014.
15. Purdue University ECE Graduate Student Association (GSA) Outstanding Graduate Student Award, 2013.
16. **IEEE Global Communications Conference (GLOBECOM) Best Paper Award, 2013.**
17. Korean Government Scholarship Program for Study Overseas, 2011-2013.
18. Michael and Katherine Birck Fellowship, Purdue University, 2011-2012.
19. Samsung Innovation Award, Samsung Electronics, 2010.
20. Samsung Group Internal Audit Award, Samsung Electronics, 2009.
21. Global Samsung Tech. Conference Best Paper Award, Samsung Electronics, 2008.

Publications

- *Journal Articles* [Accepted/Published]

1. D. Jung, J. Ryu, and **J. Choi**, “When Satellites Work as Eavesdroppers,” accepted to *IEEE Transactions on Information Forensics and Security*, Jun. 2022.
2. I. Kim, M. Bennis, and **J. Choi**, “Cell-Free MmWave Massive MIMO Systems with Low-Capacity Fronthaul Links and Low-Resolution ADC/DACs,” accepted to *IEEE Transactions on Vehicular Technology*, Jun. 2022.
3. S. Hong, J. Park, S. Kim, and **J. Choi**, “Hybrid Beamforming for Intelligent Reflecting Surface Aided Millimeter Wave MIMO Systems,” accepted to *IEEE Transactions on Wireless Communications*, Mar. 2022.
4. S. Kim, H. Lee, J. Cha, S. Kim, J. Park, and **J. Choi**, “Practical Channel Estimation and Phase Shift Design for Intelligent Reflecting Surface Empowered MIMO Systems,” accepted to *IEEE Transactions on Wireless Communications*, Jan. 2022.
5. J. Cha, **J. Choi**, and D. J. Love, “Practical Distributed Reception for Wireless Body Area Networks Using Supervised Learning,” accepted to *IEEE Transactions on Wireless Communications*, Dec. 2021.
6. D. Jung, J. Ryu, W. Byun, and **J. Choi**, “Performance Analysis of Satellite Communication System Under the Shadowed-Rician Fading: A Stochastic Geometry Approach,” *IEEE Transactions on Communications*, vol. 70, no. 4, pp. 2707-2721, Apr. 2022.
7. S. Moon, H. Lee, **J. Choi**, and Y. Lee, “Low-Complexity Beamforming Optimization for IRS-Aided MU-MIMO Wireless Systems,” *IEEE Transactions on Vehicular Technology*, vol. 71, no. 5, pp. 5587-5592, May 2022.
8. T. Noh and **J. Choi**, “Cell-Free MIMO Systems Powered by Intelligent Reflecting Surfaces,” *IEEE Communications Letters*, vol. 26, no. 5, pp. 1076 - 1080, Feb. 2022.
9. J. Park, K. Kang, and **J. Choi**, “Low-Complexity Algorithm for Outage Optimal Resource Allocation in Energy Harvesting-Based UAV Identification Networks,” *IEEE Communications Letters*, vol. 25, no. 11, pp. 3639-3643, Nov. 2021.
10. H. Lee, H. Choi, H. Kim, S. Kim, C. Jang, Y. Choi, and **J. Choi**, “Downlink Channel Reconstruction for Spatial Multiplexing via CSI-RS with SRS in Massive MIMO Systems,” *IEEE Transactions on Wireless Communications*, vol. 20, no. 9, pp. 6154-6166, Sep. 2021.
11. J. Kang, **J. Choi**, and W. Choi, “Multi-user Energy Beamforming for Different Energy Requests,” *IEEE Wireless Communications Letters*, vol. 10, no. 8, pp. 1687-1691, Aug. 2021.
12. H. Choi and **J. Choi**, “Alternating Beamforming with Intelligent Reflecting Surface Element Allocation,” *IEEE Wireless Communications Letters*, vol. 10, no. 6, pp. 1232-1236, Jun. 2021.
13. I. Kim and **J. Choi**, “Spatial Wideband Channel Estimation for MmWave Massive MIMO Systems with Hybrid Architectures and Low-Resolution ADCs,” *IEEE Transactions on Wireless Communications*, vol. 20, no. 6, pp. 4016-4029, Jun. 2021.
14. S. Hong, S. Kim, **J. Choi**, and W. Choi, “Polar-Cap Codebook Design for MISO Rician Fading Channels with Limited Feedback,” *IEEE Wireless Communications Letters*, vol. 10, no. 4, pp. 730-734, Apr. 2021.
15. H. Kim, S. Kim, H. Lee, C. Jang, Y. Choi, and **J. Choi**, “Massive MIMO Channel Prediction: Kalman Filtering vs. Machine Learning,” *IEEE Transactions on Communications*, vol. 69, no. 1, pp. 518-528, Jan. 2021.

16. S. Kim, **J. Choi**, and J. Song, "Beam Designs for Millimeter-Wave Backhaul with Dual-Polarized Uniform Planar Arrays," *IEEE Transactions on Communications*, vol. 68, no. 7, pp. 4202-4217, Jul. 2020.
17. H. Choi and **J. Choi**, "Downlink Extrapolation for FDD Multiple Antenna Systems Through Neural Network Using Extracted Uplink Path Gains," *IEEE Access*, vol. 8, pp. 67100-67111, Apr. 2020.
18. I. Kim and **J. Choi**, "Channel Estimation via Gradient Pursuit for MmWave Massive MIMO Systems with One-Bit ADCs," *EURASIP Journal on Wireless Communications and Networking*, vol. 2019, no. 1, p. 289, Dec. 2019.
19. H. Kim and **J. Choi**, "Channel Estimation for Spatially/Temporally Correlated Massive MIMO Systems with One-Bit ADCs," *EURASIP Journal on Wireless Communications and Networking*, vol. 2019, no. 1, p. 267, Dec. 2019.
20. I. Kim and **J. Choi**, "FCFGS-CV-Based Channel Estimation for Wideband MmWave Massive MIMO Systems with Low-Resolution ADCs," *IEEE Wireless Communications Letters*, vol. 8, no. 6, pp. 1648-1652, Dec. 2019.
21. S. Moon, I. Kim, D. Kam, D. Jee, **J. Choi**, and Y. Lee, "Massive MIMO Systems with Low-Resolution ADCs: Baseband Energy Consumption vs. Symbol Detection Performance," *IEEE Access*, vol. 7, pp. 6650-6660, Jan. 2019.
22. D. Zhu, **J. Choi**, and R. W. Heath Jr., "High-Resolution Angle Tracking for Mobile Wideband Millimeter-Wave Systems with Antenna Array Calibration," *IEEE Transactions on Wireless Communications*, vol. 17, no. 11, pp. 7173-7189, Nov. 2018.
23. V. Va, **J. Choi**, T. Shimizu, G. Bansal, and R. W. Heath Jr., "Impact of Measurement Noise on Millimeter Wave Beam Alignment Using Beam Subsets," *IEEE Wireless Communications Letters*, vol. 7, no. 5, pp. 784-787, Oct. 2018.
24. H. Kim and **J. Choi**, "Channel AoA Estimation for Massive MIMO Systems Using One-Bit ADCs," *Journal of Communications and Networks*, vol. 20, no. 4, pp. 374-382, Aug. 2018.
25. A. Mayouche, A. Metref, and **J. Choi**, "Downlink Training Overhead Reduction Technique for FDD Massive MIMO Systems," *IEEE Signal Processing Letters*, vol. 25, no. 8, pp. 1201-1205, Jun. 2018.
26. J. Song, **J. Choi**, T. Kim, and D. J. Love, "Advanced Quantizer Designs for FDD-based FD-MIMO Systems Using Uniform Planar Arrays," *IEEE Transactions on Signal Processing*, vol. 66, no. 14, pp. 3891-3905, May 2018.
27. V. Va, **J. Choi**, T. Shimizu, G. Bansal, and R. W. Heath Jr., "Inverse Multipath Fingerprinting for Millimeter Wave V2I Beam Alignment," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 5, pp. 4042-4058, May 2018.
28. P. Kumari, **J. Choi**, N. G. Prelcic, and R. W. Heath Jr., "IEEE 802.11ad-based Radar: An Approach to Joint Vehicular Communication-Radar System," *IEEE Transactions on Vehicular Technology*, vol. 67, no. 4, pp. 3012-3027, Apr. 2018.
29. D. Zhu, **J. Choi**, and R. W. Heath Jr., "Two-Dimensional AoD and AoA Acquisition for Wideband mmWave Systems with Cross-Polarized MIMO," *IEEE Transactions on Wireless Communications*, vol. 16, no. 12, pp. 7890-7905, Dec. 2017.
30. A. Ibrahim, A. C. Marcum, **J. Choi**, D. J. Love, and J. V. Krogmeier, "Multi-Way Distributed Wireless Relay Network with Projected Binary Quantization," *IEEE Transactions on Signal Processing*, vol. 65, no. 24, pp. 6462-6477, Dec. 2017.
31. M. E. Eltayeb, **J. Choi**, T. Y. Al-Naffouri, and R. W. Heath Jr., "Enhancing Secrecy with Multi-Antenna Transmission in Millimeter Wave Vehicular Communication Systems," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 9, pp. 8139-8151, Sep. 2017.

32. D. Zhu, **J. Choi**, and R. W. Heath Jr., "Auxiliary Beam Pair Enabled AoD and AoA Estimation in Closed-Loop Large-Scale mmWave MIMO System," *IEEE Transactions on Wireless Communications*, vol. 16, no. 7, pp. 4770-4785, Jul. 2017.
33. V. Va, **J. Choi**, and R. W. Heath Jr., "The Impact of Beamwidth on Temporal Channel Variation in Vehicular Channels and Its Implications," *IEEE Transactions on Vehicular Technology*, vol. 66, no. 6, pp. 5014-5029, Jun. 2017 (**2021 IEEE Vehicular Technology Society Neal Shepherd Memorial Best Propagation Paper Award**).
34. E. Yeh, **J. Choi**, N. G. Prelcic, C. R. Bhat, and R. W. Heath Jr., "Security in Automotive Radar and Vehicular Networks," *Macrowave Journal*, vol. 60, no. 5, pp. 148-165, May 2017.
35. J. Song, **J. Choi**, and D. J. Love, "Common Codebook Millimeter Wave Beam Design: Designing Beams for Both Sounding and Communication with Uniform Planar Arrays," *IEEE Transactions on Communications*, vol. 65, no. 4, pp. 1859-1872, Apr. 2017.
36. C. Mollén, **J. Choi**, E. Larsson, and R. W. Heath Jr., "Uplink Performance of Wideband Massive MIMO With One-Bit ADCs," *IEEE Transactions on Wireless Communications*, vol. 16, no. 1, pp. 87-100, Jan. 2017.
37. **J. Choi**, V. Va, N. G. Prelcic, R. Daniels, C. R. Bhat, and R. W. Heath Jr., "Millimeter Wave Vehicular Communication to Support Massive Sensing," *IEEE Communications Magazine*, vol. 54, no. 12, pp. 160-167, Dec. 2016.
38. M. Motro, A. Chu, **J. Choi**, P. S. Lavieri, A. R. Pinjari, C. R. Bhat, J. Ghosh, and R. W. Heath Jr., "Vehicular Ad-Hoc Network Simulations of Overtaking Maneuvers on Two-Lane Rural Highways," *Transportation Research Part C: Emerging Technologies*, vol. 72, pp. 60-76, Nov. 2016.
39. **J. Choi**, J. Mo, and R. W. Heath Jr., "Near Maximum-Likelihood Detector and Channel Estimator for Uplink Multiuser Massive MIMO Systems with One-Bit ADCs," *IEEE Transactions on Communications*, vol. 64, no. 5, pp. 2005-2018, May 2016 (**2019 IEEE Communications Society Stephen O. Rice Prize**).
40. Z. Pi, **J. Choi**, and R. W. Heath Jr., "Millimeter-wave Gbps Broadband Evolution towards 5G: Fixed Access and Backhaul," *IEEE Communications Magazine*, vol. 54, no. 4, pp. 138-144, Apr. 2016.
41. J. Song, **J. Choi**, S. G. Larew, D. J. Love, T. A. Thomas, and A. Ghosh, "Adaptive Millimeter Wave Beam-Alignment for Dual-Polarized MIMO Systems," *IEEE Transactions on Wireless Communications*, vol. 14, no. 11, pp. 6283-6296, Nov. 2015.
42. B. Lee, **J. Choi**, J. Seol, D. J. Love, and B. Shim, "Antenna Grouping based Feedback Compression for FDD-based Massive MIMO Systems," *IEEE Transactions on Communications*, vol. 63, no. 9, pp. 3261-3274, Sep. 2015.
43. V. Raghavan, **J. Choi**, and D. J. Love, "Design Guidelines for Limited Feedback in the Spatially Correlated Broadcast Channel," *IEEE Transactions on Communications*, vol. 63, no. 7, pp. 2524-2540, Jul. 2015.
44. **J. Choi**, D. J. Love, D. R. Brown III, and M. Boutin, "Quantized Distributed Reception for MIMO Wireless Systems Using Spatial Multiplexing," *IEEE Transactions on Signal Processing*, vol. 63, no. 13, pp. 3537-3548, Jul. 2015.
45. **J. Choi**, D. J. Love, and T. Kim, "Trellis-Extended Codebooks and Successive Phase Adjustment: A Path from LTE-Advanced to FDD Massive MIMO Systems," *IEEE Transactions on Wireless Communications*, vol. 14, no. 4, pp. 2007-2016, Apr. 2015.
46. **J. Choi**, D. J. Love, and P. Bidigare, "Coded Distributed Diversity: A Novel Distributed Reception Technique for Wireless Communication Systems," *IEEE Transactions on Signal Processing*, vol. 63, no. 5, pp. 1310-1321, Mar. 2015.

47. **J. Choi**, D. J. Love, and P. Bidigare, "Downlink Training Techniques for FDD Massive MIMO Systems: Open-Loop and Closed-Loop Training with Memory," *IEEE Journal of Selected Topics in Signal Processing*, vol. 8, no. 5, pp. 802-814, Oct. 2014 (**2015 IEEE Signal Processing Society Best Paper Award**).
 48. **J. Choi**, and D. J. Love, "Bounds on Eigenvalues of a Spatial Correlation Matrix," *IEEE Communications Letters*, vol. 18, no. 8, pp. 1391-1394, Aug. 2014.
 49. S. Y. Park, **J. Choi**, and D. J. Love, "Multicell Cooperative Scheduling for Two-Tier Cellular Networks," *IEEE Transactions on Communications*, vol. 62, no. 2, pp. 536-551, Feb. 2014.
 50. **J. Choi**, Z. Chance, D. J. Love, and U. Madhow, "Noncoherent Trellis-Coded Quantization: A Practical Limited Feedback Technique for Massive MIMO Systems," *IEEE Transactions on Communications*, vol. 61, no. 12, pp. 5016-5029, Dec. 2013.
 51. **J. Choi**, B. Clerckx, N. Lee, and G. Kim, "A New Design of Polar-Cap Differential Codebook for Temporally/Spatially Correlated MISO Channels," *IEEE Transactions on Wireless Communications*, vol. 11, no. 2, pp. 703-711, Feb. 2012.
 52. D. Hwang, **J. Choi**, B. Clerckx, and G. Kim, "MIMO Precoder Selections in Decode-Forward Relay Networks with Finite Feedback," *IEEE Transactions on Communications*, vol. 59, no. 7, pp. 1785-1790, Jul. 2011.
 53. I. Sohn, **J. Choi**, B. O. Lee, and K. B. Lee, "Unitary Beamforming Multi-user MIMO System with Efficient User Scheduling Algorithm," *IEICE Transactions on Communications*, vol. E93-B, no. 7, Jul. 2010.
- *Journal Articles* [Submitted/In Preparation]
 1. G. Han and **J. Choi**, "Radar Imaging Based on IEEE 802.11ad Waveform in V2I Communications," submitted to *IEEE Transactions on Signal Processing*, Jun. 2021.
 2. S. Kim, H. Lee, H. Kim, Y. Choi, and **J. Choi**, "Complete Power Reallocation for MU-MIMO under Per-Antenna Power Constraint," submitted to *IEEE Transactions on Communications*, Jan. 2022.
 3. G. Lee, H. Lee, J. Oh, J. Chung, and **J. Choi**, "Channel Estimation for Reconfigurable Intelligent Surface with a few Active Elements," submitted to *IEEE Transactions on Vehicular Technology*, May 2022.
 4. I. Kim, M. Bennis, and **J. Choi**, "Bayesian Channel Estimation for Intelligent Reflecting Surface-Aided mmWave Massive MIMO Systems With Semi-Passive Elements," submitted to *IEEE Transactions on Wireless Communications*, Jun. 2022.
 - *Conference Articles*
 1. H. Cho and **J. Choi**, "Energy Efficient UAV Communication via Multiple Intelligent Reflecting Surfaces," in *Proc. of IEEE Wireless Communications and Networking Conference Workshops*, Apr. 2022.
 2. S. Hong and **J. Choi**, "Phase Shift Design for Intelligent Reflecting Surface Aided mmWave MIMO Systems," in *Proc. of IEEE Global Communications Conference Workshops*, Dec. 2021.
 3. B. Ko, H. Kim, and **J. Choi**, "Machine Learning-Based Channel Prediction Exploiting Frequency Correlation in Massive MIMO Wideband Systems," in *Proc. of International Conference on Information and Communication Technology Convergence*, Oct. 2021.
 4. H. Choi and **J. Choi**, "WiThRay: Versatile 3D Simulator for Intelligent Reflecting Surface-aided MmWave Systems," in *Proc. of IEEE international Symposium on Antennas and Propagation*, Oct. 2021.

5. I. Kim and **J. Choi**, “Gridless Channel Estimation for mmWave Hybrid Massive MIMO Systems with Low-Resolution ADCs,” in *Proc. of IEEE Statistical Signal Processing Workshop*, Jul. 2021.
6. H. Lee, H. Choi, H. Kim, S. Kim, and **J. Choi**, “Downlink Channel Reconstruction for Massive MIMO Spatial Multiplexing,” in *Proc. of IEEE International Conference on Communications*, Jun. 2021.
7. G. Han, S. Kim, and J. Choi, “Multi-Vehicle Velocity Estimation Using IEEE 802.11 ad Waveform,” in *Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing*, Jun. 2021.
8. I. Kim and J. Choi, “Performance of Cell-Free MmWave Massive MIMO Systems with Fronthaul Compression and DAC Quantization”, in *Proc. of IEEE Wireless Communications and Networking Conference Workshops*, Mar. 2021.
9. H. Kim, S. Kim, H. Lee, and **J. Choi**, “Massive MIMO Channel Prediction: Machine Learning Versus Kalman Filtering,” in *Proc. of IEEE Global Communications Conference Workshop*, Dec. 2020.
10. G. Han and **J. Choi**, “Radar Imaging Based on IEEE 802.11 ad Waveform,” in *Proc. of IEEE Global Communications Conference*, Dec. 2020.
11. J. Cha, **J. Choi**, and D. J. Love, “Noncoherent OOK Symbol Detection with Supervised-Learning Approach for BCC,” in *Proc. of IEEE International Symposium on Personal, Indoor and Mobile Radio Communications*, Sep. 2020.
12. S. Kim, **J. Choi**, and J. Song, “Beam Design for Millimeter-Wave Backhaul with Dual-Polarized Uniform Planar Arrays,” in *Proc. of IEEE International Conference on Communications*, Jun. 2020.
13. I. Kim and **J. Choi**, “Gradient Pursuit-Based Channel Estimation for MmWave Massive MIMO Systems with One-Bit ADCs,” in *Proc. IEEE International Symposium of Personal, Indoor and Mobile Radio Communications*, Sep. 2019.
14. H. Lee, S. Kim, and **J. Choi**, “Efficient Channel AoD/AoA Estimation Using Widebeams for Millimeter Wave MIMO Systems,” in *Proc. of IEEE International Workshop on Signal Processing Advances in Wireless Communications*, Jul. 2019.
15. I. Kim, N. Lee, and **J. Choi**, “Dominant Channel Estimation via MIPS for Large-Scale Antenna Systems with One-Bit ADCs,” in *Proc. of IEEE Global Communications Conference*, Dec. 2018.
16. H. Kim and **J. Choi**, “Channel Estimation for One-Bit Massive MIMO Systems Exploiting Spatio-Temporal Correlations,” in *Proc. of IEEE Global Communications Conference*, Dec. 2018.
17. A. Ibrahim, **J. Choi**, A. C. Marcum, D. J. Love, and J. V. Krogmeier, “Performance Analysis of Multi-Way Quantized Distributed Relay Networking,” in *Proc. of IEEE Global Communications Conference*, Dec. 2017.
18. V. Raghavan, **J. Choi**, and D. J. Love, “Statistical Beamforming For The Large Antenna Broadcast Channel,” in *Proc. of IEEE International Symposium on Information Theory*, Jun. 2017
19. C. Mollén, **J. Choi**, E. Larsson, and R. W. Heath Jr., “Achievable Uplink Rates for Massive MIMO with Coarse Quantization,” in *Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing*, Mar. 2017.
20. D. Zhu, **J. Choi**, and R. W. Heath Jr., “Auxiliary Beam Pair Enabled AoD and AoA Estimation in mmWave FD-MIMO Systems,” in *Proc. of IEEE Global Communications Conference*, Dec. 2016.

21. J. Song, **J. Choi**, and D. J. Love, "Advanced Quantizer Designs for FD-MIMO Systems using Uniform Planar Arrays," in *Proc. of IEEE Global Communications Conference*, Dec. 2016.
22. M. E. Eltayeb, **J. Choi**, T. Y. Naffouri, and R. W. Heath Jr., "On the Security of Millimeter Wave Vehicular Communication Systems using Random Antenna Subsets," in *Proc. of IEEE Vehicular Technology Conference*, Sep. 2016.
23. C. Mollén, **J. Choi**, E. Larsson, and R. W. Heath Jr., "Performance of Linear Receivers for Wideband Massive MIMO with One-Bit ADCs," in *International ITG Workshop on Smart Antennas (WSA 2016)*, Mar. 2016.
24. C. Mollén, **J. Choi**, E. Larsson, and R. W. Heath Jr., "One-Bit ADCs in Wideband Massive MIMO Systems with OFDM Transmission," in *Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing*, Mar. 2016.
25. D. Zhu, **J. Choi**, and R. W. Heath Jr., "Auxiliary Beam Pair Design in mmWave Cellular Systems with Hybrid Precoding and Limited Feedback," in *Proc. of IEEE International Conference on Acoustics, Speech and Signal Processing*, Mar. 2016.
26. **J. Choi**, K. Lee, D. J. Love, T. Kim, and R. W. Heath Jr., "Advanced Limited Feedback Designs for FD-MIMO Using Uniform Planar Arrays," in *Proc. of IEEE Global Communications Conference*, Dec. 2015.
27. **J. Choi** and R. W. Heath Jr., "Near Maximum-Likelihood Detector with One-Bit ADCs for Multiuser Massive MIMO Systems," in *Proc. of IEEE International Workshop on Computational Advances in Multi-Sensor Adaptive Processing*, Dec. 2015 (invited).
28. **J. Choi**, T. Kim, D. J. Love, and J. Seol, "Exploiting the Preferred Domain of FDD Massive MIMO Systems with Uniform Planar Arrays," in *Proc. of IEEE International Conference on Communications*, Jun. 2015.
29. J. Song, **J. Choi**, and D. J. Love, "Codebook Design for Hybrid Beamforming in Millimeter Wave Systems," in *Proc. of IEEE International Conference on Communications*, Jun. 2015.
30. **J. Choi**, D. J. Love, and D. Richard Brown III, "Channel Estimation Techniques for Quantized Distributed Reception in MIMO Systems," in *Proc. of IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2014 (invited).
31. B. Lee, **J. Choi**, J. Seol, D. J. Love, and B. Shim, "Antenna Grouping based Feedback Reduction Technique for FDD-based Massive MIMO Systems," in *Proc. of IEEE International Conference on Communications*, Jun. 2014.
32. **J. Choi**, V. Raghavan, and D. J. Love, "Limited Feedback Design for the Spatially Correlated Multi-Antenna Broadcast Channel," in *Proc. of IEEE Global Communications Conference*, Dec. 2013 (**Best Paper Award**).
33. D. J. Love, **J. Choi**, and P. Bidigare, "Receive Spatial Coding for Distributed Diversity," in *Proc. of IEEE Asilomar Conference on Signals, Systems, and Computers*, Nov. 2013 (invited).
34. **J. Choi**, D. J. Love, and U. Madhow, "Limited Feedback in Massive MIMO Systems: Exploiting Channel Correlations via Noncoherent Trellis-Coded Quantization," in *Proc. of Conference on Information Sciences and Systems*, Mar. 2013.
35. D. J. Love, **J. Choi**, and P. Bidigare, "A Closed-Loop Training Approach for Massive MIMO Beamforming Systems," in *Proc. of Conference on Information Sciences and Systems*, Mar. 2013.
36. **J. Choi**, Z. Chance, D. J. Love, and U. Madhow, "Noncoherent Trellis Coded Quantization for Massive MIMO Limited Feedback Beamforming," in *UCSD Information Theory and Applications Workshop*, Feb. 2013 (invited).

37. **J. Choi**, B. Clerckx, and D. J. Love, "Differential Codebook for General Rotated Dual-Polarized MISO Channels," in *Proc. of IEEE Global Communications Conference*, Dec. 2012.
38. B. Clerckx, G. Kim, and **J. Choi**, "Explicit vs. Implicit Feedback for SU and MU-MIMO," in *Proc. of IEEE Global Communications Conference*, Dec. 2010.
39. B. Clerckx, G. Kim, **J. Choi**, and S. Kim, "Allocation of Feedback Bits Among Users in Broadcast MIMO Channels," in *Proc. of IEEE Global Communications Conference*, Dec. 2008.
40. B. Clerckx, D. Hwang, G. Kim, **J. Choi**, and S. Kim, "Multi-User MIMO with Limited Feedback Made Practical," in *Global Samsung Tech. Conference 2008*, Nov. 2008 (**Best Paper Award**).
41. P. H. Kuo, **J. Choi**, J. Suh, and S. Kim, "A Feedback Scheme for ZFBF-Based MIMO Broadcast Systems with Infrastructure Relay Stations," in *Proc. of IEEE Wireless Communications and Networking Conference*, Apr. 2008.
42. **J. Choi**, I. S. Sohn, S. J. Kim, and K. B. Lee, "Efficient Uplink User Selection Algorithm in Distributed Antenna Systems," in *Proc. IEEE International Symposium of Personal, Indoor and Mobile Radio Communications*, Sep. 2007.

Patents

- *US Granted Patents*

1. J. Lim, H. Lee, **J. Choi**, S. Kim, and M. Byun, "Apparatus and Method for Estimating Direction in Wireless Communication System."
US Patent, 10,958,330 B2. Filing Date: Dec. 26, 2018.
2. **J. Choi** and H. Kim, "Method and Apparatus for Estimating Channel in Multiple-Input Multiple-Output Communication Systems Exploiting Temporal Correlations."
US Patent, 10,530,610 B2. Filing Date: Jan. 3, 2018.
3. B. Clerckx, **J. Choi**, and K. Kim, "Method and Apparatus for Feedback in Multi-User Multiple-Input Multiple-Output (MU-MIMO) Communication System."
US Patent, 10,469,237 B2. Filing Date: Sep. 29, 2010.
4. **J. Choi**, D. J. Love, T. Kim, and J. Seol, "Codebook for Multiple-Input Multiple-Output System and Communication Method and Apparatus Using Same."
US Patent, 10,305,557 B2. Filing Date: Dec. 22, 2014.
5. T. Kim, D. J. Love, **J. Choi**, J. Seol, and K. Lee, "Apparatus and Method for Feedback of Channel State Information in Wireless Communication System."
US Patent, 10,291,307 B2. Filing Date: Mar. 31, 2016.
6. **J. Choi**, D. J. Love, T. Kim, and K. Lee, "Apparatus and Method for Channel Information Feedback in Wireless Communication System."
US Patent, 10,158,408 B2. Filing Date: Mar. 27, 2014.
7. **J. Choi**, B. Clerckx, and K. Kim, "Multiple-Input Multiple-Output Communication System Using Codebook Corresponding to Each Reporting Mode."
US Patent, 9,876,553 B2. Filing Date: Apr. 29, 2011.
8. B. Clerckx, **J. Choi**, and K. Kim, "Method and Apparatus for Feedback in Multi-User Multiple-Input Multiple-Output (MU-MIMO) Communication System."
US Patent, 9,800,388 B2. Filing Date: Jan. 16, 2015.
9. H. Li, **J. Choi**, and B. Clerckx, "Method and Device for Low-Complexity Feedback in a Multiuser and Multipoint Cooperative Communication System."
US Patent, 9,735,853 B2. Filing Date: May 11, 2011.

10. **J. Choi**, B. Clerckx, and K. Kim, "Codebook for Eight Transmit Antennas and Multiple-Input Multiple-Output Communication System Using the Codebook."
US Patent, 9,628,160 B2. Filing Date: Feb. 11, 2014.
11. **J. Choi**, B. Clerckx, K. Kim, D. J. Love, and T. Kim, "Multiple-Input Multiple-Output (MIMO) Communication System Using a Codebook and Method of Designing the Codebook."
US Patent, 9,319,251 B2. Filing Date: Dec. 28, 2010.
12. S. Ro, M. Agrawal, D. J. Love, **J. Choi**, and J. Lee, "Method and Apparatus for using Channel Output Feedback in Multi User Wireless Systems and Hybrid-ARQ."
US Patent, 9,161,247 B2. Filing Date: Oct. 21, 2013.
13. B. Clerckx, **J. Choi**, T. Kim, O. Aluko, and D. J. Love, "Method and Apparatus for Sharing Channel State Information (CSI) in a Multiple-user Multiple-Input Multiple-Output (MU-MIMO) Environment."
US Patent, 8,976,850 B2. Filing Date: Dec. 30, 2010.
14. **J. Choi**, B. Clerckx, and K. Kim, "Codebook Design Method for Multiple-Input Multiple-Output (MIMO) Communication System and Method for Using the Codebook."
US Patent, 8,958,495 B2. Filing Date: Jul. 14, 2010.
15. S. Ro, **J. Choi**, D. J. Love, and J. Lee, "Differential Codebook for Temporally-Correlated MISO Dual-Polarized Antenna."
US Patent, 8,953,707 B2. Filing Date: Oct. 19, 2012.
16. B. Clerckx, **J. Choi**, and K. Kim, "Method and Apparatus for Feedback in Multi-User Multiple-Input Multiple-Output (MU-MIMO) Communication System."
US Patent, 8,948,104 B2. Filing Date: Sep. 29, 2011.
17. B. Clerckx, **J. Choi**, and S. Kim, "Multiple-Input Multiple-Output Communication System Control Method and Apparatus."
US Patent, 8,867,646 B2. Filing Date: Jul. 16, 2008.
18. **J. Choi**, B. Clerckx, K. Kim, D. J. Love, and T. Kim, "Method of Generating Adaptive Codebook and Multiple-Input Multiple-Output Communication System Using the Adaptive Codebook."
US Patent, 8,724,728 B2. Filing Date: Dec. 1, 2010.
19. B. Clerckx, K. Kim, **J. Choi**, and J. Han, "Unified Feedback Frame for Supporting a Plurality of Feedback Modes and a Multiple-Input Multiple-Output (MIMO) Communication System Using the Unified Feedback Frame."
US Patent, 8,711,963 B2. Filing Date: Feb. 1, 2011.
20. **J. Choi**, B. Clerckx, and K. Kim, "Codebook for Eight Transmit Antennas and Multiple-Input Multiple-Output Communication System Using the Codebook."
US Patent, 8,654,878 B2. Filing Date: Aug. 16, 2011.
21. K. Kim, B. Clerckx, **J. Choi**, I. Lee, S. Park, H. Park, and H. Kong, "Multiple-Input Multiple-Output (MIMO) Communication System Using Regularized Beamforming."
US Patent, 8,638,873 B2. Filing Date: Mar. 4, 2011.
22. B. Clerckx, K. Kim, **J. Choi**, D. J. Love, T. Kim, C. Au-Yeung, and O. Aluko "Clustered Multi-Cell Multi-User Multiple-Input Multiple-Output Communication System Using Cell-Edge User Selection Scheme."
US Patent, 8,599,751 B2. Filing Date: Sep. 13, 2010.
23. Y. Zhou, and **J. Choi**, "Multiple-Input Multiple-Output (MIMO) Communication System for Feedforwarding Interference Vector Indicator."
US Patent, 8,553,787 B2. Filing Date: Jan. 9, 2009.

24. B. Clerckx, K. Kim, **J. Choi**, D. J. Love, and T. Kim, “Codebook for Multiple-Input Multiple-Output Communication and Communication Device Using the Codebook.”
US Patent, 8,532,042 B2. Filing Date: Sep. 2, 2010.
 25. B. Clerckx, S. Park, **J. Choi**, and D. Mazzarese, “Multiple-Input Multiple-Output Communication System Using Explicit Feedback.”
US Patent, 8,494,074 B2. Filing Date: Aug. 9, 2010.
 26. **J. Choi**, B. Clerckx, and K. Kim, “Rotating Reference Codebook that is used in a Multiple-Input Multiple-Output (MIMO) Communication Systems.”
US Patent, 8,488,708 B2. Filing Date: Jun. 21, 2010.
 27. B. Clerckx, K. Kim, **J. Choi**, D. J. Love, and T. Kim, “Multiple-Input Multiple-Output Communication System and Communication Method of Configuring Codebook.”
US Patent, 8,477,663 B2. Filing Date: Jun. 1, 2010.
 28. **J. Choi**, C. Park, K. Park, Y. Ko, and J. Lee, “Data Transmission System for Forwarding Data Using a Plurality of Antennas.”
US Patent, 8,374,542 B2. Filing Date: Jul. 24, 2012.
 29. **J. Choi**, C. Park, K. Park, Y. Ko, and J. Lee, “Data Transmission System for Forwarding Data Using a Plurality of Antennas.”
US Patent, 8,254,830 B2. Filing Date: May 14, 2009.
 30. Y. Zhou, **J. Choi**, and S. Kim, “Multiple-Input Multiple-Output (MIMO) Communication Method and System of Enabling the Method.”
US Patent, 8,228,810 B2. Filing Date: Jun. 24, 2008.
 31. **J. Choi**, and Y. Zhou, “Codebook for Multiple User Multiple-Input Multiple-Output System and Communication Device Using the Codebook.”
US Patent, 8,031,090 B2. Filing Date: Oct. 13, 2008.
 32. J. Suh, S. Kim, P. Kuo, and **J. Choi**, “Method of Space Division Multiple Access Communication Using User Cooperation and System of Enabling the Method.”
US Patent, 8,010,140 B2. Filing Date: May 12, 2008.
- *US Filed Patents*
 1. N. Kang, **J. Choi**, and E. Won, “Wireless Charging Control Method and Wireless Charging Apparatus Employing the Same.”
US Patent, 13/766,397, Feb. 13, 2013.
 2. B. Clerckx, **J. Choi**, and K. Kim, “Multiple-Input Multiple-Output Communication System Using At Least Two Codebooks.”
US Patent, 13/205,881, Aug. 9, 2011.
 3. **J. Choi**, B. Clerckx, K. Kim, J. Cho, and J. Han, “Multiple-Input Multiple-Output Communication System of Supporting Several Reporting Modes.”
US Patent, 13/098,765, May 2, 2011.

External Activities

- Editorial Positions
 - Editor, *IEEE Communications Letters*, February 2018 to Present.
 - Editor, *IEEE Open Journal of the Communications Society*, September 2019 to Present.
 - Associate Editor, *Frontiers in Communications and Networks*, May 2020 to Present.

- Professional Society Committees
 - IEEE Communications Society, Communication Theory Technical Committee, 2016 to Present.
 - IEEE Communications Society, Signal Processing and Computing for Communications Technical Committee, 2016 to Present.
 - IEEE Communications Society, Wireless Communications Technical Committee, 2020 to Present.
 - IEEE Signal Processing Society, Signal Processing for Communications and Networking (SP-COM) Technical Committee *Elected Member*, 2022 to Present.
- Conference TPC Chair and Organization Activities
 - Student Travel Grant Co-Chair, IEEE International Conference on Communications, 2022.
 - Workshop Co-Chair, IEEE Wireless Communications and Networking Conference, 2022.
 - Track Co-Chair (equivalent to TPC co-chair), IEEE Consumer Communications and Networking Conference (CCNC), Vehicular Communications and Applications in Water, Land, and Sky, 2018, 2019.
 - Fundraising Co-Chair, IEEE Communication Theory Workshop, 2018.
- Conference Technical Program Committees
 - IEEE ICC, 2015, 2019 - 2023.
 - IEEE GLOBECOM, 2013, 2014, 2017, 2018, 2021, 2022.
 - IEEE SPAWC, 2017.
 - IEEE VTC, 2017 Fall, 2018 Spring and Fall, 2019 Fall.
 - IEEE WCNC, 2020, 2022.
 - IEEE MILCOM, 2016 - 2018.
 - IEEE 5G World Forum, 2018 - 2021
 - IEEE WCSP, 2018.
 - IEEE ICNC, 2016 - 2020.
 - IEEE CCNC, 2018 - 2019.
 - IEEE ICCVE, 2013 - 2016.
 - IEEE ICC, 2019 - 2022.
- Journal Paper Review
 - IEEE Communications Magazine
 - IEEE Wireless Communications
 - IEEE Vehicular Technology Magazine
 - IEEE Intelligent Transportation Systems Magazine
 - IEEE Transactions on Communications
 - IEEE Transactions on Wireless Communications
 - IEEE Transactions on Signal Processing
 - IEEE Transactions on Vehicular Technology
 - IEEE Transactions on Microwave Theory and Techniques
 - IEEE Transactions on Mobile Computing
 - IEEE Journal on Selected Areas in Communications
 - IEEE Journal of Selected Topics in Signal Processing
 - IEEE Access
 - IEEE Communications Letters
 - IEEE Wireless Communications Letters

- IEEE Signal Processing Letters
- IEEE Networking Letters
- IEEE/ACM Transactions on Networking
- IEEE Transactions on Circuits and Systems I: Regular Papers
- IEEE Transactions on Circuits and Systems II: Express Briefs
- IEEE Transactions on Mobile Computing
- Wiley Encyclopedia of Electrical and Electronics Engineering
- Foundations and Trends in Signal Processing
- IET Communications
- Journal of Communications and Networks
- EURASIP Journal on Wireless Communications and Networking
- EURASIP Journal on Advances in Signal Processing
- ELSEVIER Computer Networks
- MDPI Sensors
- Conference Paper Review
 - IEEE GLOBECOM, IEEE ICC, IEEE ISIT, IEEE ICASSP, IEEE VTC, IEEE PIMRC, IEEE SPAWC, IEEE MILCOM, IEEE ICC, IEEE MICC, IEEE ICCVE, IEEE SAM, IEEE ICNC, IEEE CSCN, IEEE BlackSeaCom, IEEE CCNC, ISTC, CECNet.
- Project Proposal Review
 - Netherlands Organisation for Scientific Research – Applied and Engineering Sciences Domain

Invited Talks

1. King Abdullah University of Science and Technology (KAUST) in Saudi Arabia, “How to Make Practical RIS Techniques (and Evaluate Them)?,” Online Presentation, Jun. 21, 2022.
2. KICS Joint Conference on Communications and Information (JCCI) Post-AI Panel, “Machine-Learning Applications for Wireless Communications,” Online Presentation, Apr. 27, 2022.
3. Korea Development Bank (KDB), “Technical Characteristics and Impacts of Future Mobile Communications,” Seoul, South Korea, Apr. 18, 2022.
4. KICS Future Communication Technologies Workshop, “Wireless Communication Channel Estimation/Prediction Using Machine Learning,” Online Presentation, May 6, 2021.
5. LG Electronics Global 6G Experts Seminar, “Massive MIMO Channel Prediction: Kalman Filtering vs. Machine Learning,” Online Seminar, Mar. 23, 2021.
6. KAOS Foundation, “5G - A Lever of Industry 4.0,” Seoul, South Korea, Apr. 8, 2020.
7. Hanbat University, “Bring 5G to Life,” Daejeon, South Korea, Jan. 14, 2020.
8. KAIST, “Bring 5G to Life,” Daejeon, South Korea, Jan. 22, 2019.
9. Hanyang University, “Millimeter Wave V2X Communications: Current Trends and Recent Results,” Seoul, South Korea, Apr. 27, 2018.
10. DGIST, “Millimeter Wave V2X Communications for Future Connected Vehicles,” Daegu, South Korea, Jul. 25, 2017.
11. Joint IEEE SPS and EURASIP Summer School on Signal Processing For 5G Wireless Access, “FDD Massive MIMO for 5G,” Gothenburg, Sweden, May 30, 2017.
12. Samsung Electronics, “Massive MIMO — Fundamentals and CSI Quantization,” Suwon, Korea, May 18, 2017.

13. Arizona State University, “Millimeter Wave V2X Communications for Future Connected Vehicles,” Tempe, AZ, Apr. 4, 2016.
14. Seoul National University, “Millimeter Wave V2X Communications for Future Connected Vehicles,” Seoul, South Korea, Mar. 18, 2016.
15. POSTECH, “IoT and Vehicular Communication: New Applications of Wireless Communication,” Pohang, South Korea, Nov. 23, 2015.
16. MIT Lincoln Laboratory, “Quantized Distributed Reception Techniques for MIMO Wireless Systems,” Lexington, MA, November 21, 2014.
17. Qualcomm Corporate R&D, “How to Make FDD Massive MIMO Systems Practical?,” San Diego, CA, September 29, 2014.
18. Seoul National University, “How to Make FDD Massive MIMO Systems Practical?,” Seoul, South Korea, May 23, 2014.