

Multiantenna Wireless Communications Research by Prof. Brian L. Evans' Group at UT Austin

| ESPL | 1. Resolution Adaptive ADC | 2. Antenna Selection | 3. Two-Stage Analog Combiner | 4. One-bit Channel Estimation (CE) | 5. Beamformer and Pilot Design for CE | 6. Learning-based ML Detection | 7. User Scheduling |
|--------------------------|-----------------------------------|-----------------------------|-------------------------------------|---|--|---------------------------------------|---------------------------|
| Carrier Frequency | MmWave | MmWave Sub-6GHz | MmWave Sub-6GHz | MmWave | MmWave | MmWave Sub-6GHz | MmWave |
| Bandwidth | Narrow | Wide | Narrow | Narrow | Narrow | Narrow | Narrow |
| ADC Resolution | Low | High Low | Low | One-bit | High | Low One-bit | Low |
| Beamformer Type | Hybrid | Digital | Hybrid | Hybrid | Hybrid | Digital | Hybrid |
| Uplink Downlink | Uplink | Uplink Downlink | Uplink | Downlink | Downlink | Uplink | Uplink |
| User | Multi | Multi | Multi | Multi | Multi | Multi | Multi |

1. Resolution Adaptive ADC

J. Choi, B. L. Evans, and A. Gatherer, "Resolution-Adaptive Hybrid MIMO Architecture for Millimeter Wave Communications", *IEEE Trans. Signal Process.*, 2017
 J. Choi, B. L. Evans, and A. Gatherer, "ADC Bit Optimization for Spectrum- and Energy-Efficient Millimeter Wave Communications", *Proc. IEEE Globecom*, 2017
 J. Choi, B. L. Evans, and A. Gatherer, "ADC Bit Allocation under a Power Constraint for MmWave Massive MIMO Communication Receivers", *Proc. IEEE ICASSP*, 2017

2. Antenna Selection

J. Choi and B. L. Evans, "Analysis of Ergodic Rate for Transmit Antenna Selection in Low-Resolution ADC Systems", *IEEE Trans. Veh. Technol.*, 2018
 J. Choi, B. L. Evans, and A. Gatherer "Antenna Selection for Large-Scale MIMO Systems with Low-Resolution ADCs", *Proc. IEEE ICASSP*, 2018
 J. Choi, J. Sung, N. Prasad, X-F Qi, B. L. Evans, and A. Gatherer, "Base Station Antenna Selection for Low-Resolution ADC Systems", *IEEE Trans. Commun.* (submitted).

3. Two-Stage Analog Combiner

J. Choi, G. Lee, and B. L. Evans, "Two-Stage Analog Combining in Hybrid Beamforming Systems with Low-Resolution ADCs", *IEEE Trans. Signal Process.*, 2019
 J. Choi, G. Lee, and B. L. Evans, "A Hybrid Combining Receiver with Two-Stage Analog Combiner and Low-Resolution ADCs", *Proc. IEEE ICC*, 2019

4. One-bit Channel Estimation

J. Sung, J. Choi, and B. L. Evans, "Narrowband Channel Estimation for Hybrid Beamforming Millimeter Wave Communication Systems with One-bit Quantization," *Proc. IEEE ICASSP*, 2018

5. Hybrid Beamformer and Pilot Design for Channel Estimation

J. Sung and B. L. Evans, "Hybrid Beamformer Codebook Design and Ordering for Compressive mmWave Channel Estimation," (in preparation)
 J. Sung and B. L. Evans, "Versatile Compressive mmWave Hybrid Beamformer Codebook Design Framework," (in preparation)

6. Learning-based ML Detection

J. Choi, Y. Cho, B. L. Evans, and A. Gatherer, "Robust Learning-Based ML Detection for Massive MIMO Systems with One-Bit Quantized Signals", *Proc. IEEE Globecom*, 2019

7. User Scheduling

J. Choi, G. Lee, and B. L. Evans, "User Scheduling for Millimeter Wave Hybrid Beamforming Systems with Low-Resolution ADCs", *IEEE Trans. Wireless Commun.*, 2019
 J. Choi and B. L. Evans, "User Scheduling for Millimeter Wave MIMO Communications with Low-Resolution ADCs", *Proc. IEEE ICC*, 2017