

HW-CSP Breakout: Hardware & Communication and Signal Processing Interface

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Topics of Discussion:

- What are the main issues at the HW-CSP interface that drive system design at the physical layer? (e.g., energy consumption, HW-CSP co-design signal processing across RF/analog/digital domains and more broadly to mechanical, acoustic or photonic domains, etc.)
- What are the HW-CSP pros/cons of alternative beamforming approaches (e.g, photonic, lens-based, mechanical)?
- What are the most promising directions to pursue in advanced systems beyond 5G and how do they impact on HW-CSP challenges? (higher frequencies, spatial multiplexing MIMO, point-to-point MIMO, high-order modulation, full-duplex etc.)
- What frequencies and bandwidths to target at millimeter-wave?
- What are the most promising emerging physical/device technologies, circuit or algorithmic concepts?
- Should we intelligently partition the signal processing across RF, analog and digital domains? Or should we strive for an all-digital approach?
- What HW-CSP-NET co-design approaches are necessary to address interference and co-existence issues (with other communication systems, or with radar)?
- What role can machine learning play not only at the HW-CSP level, but also at the network level?
- How important is physical layer and hardware level security? What are some of the key HW-CSP considerations related to this?
- Training/Education: How should we train researchers with sufficient breadth for effective collaboration at the HW-CSP interface? How must university curricula adapt?