Abstract: Wireless multiple-input - multiple-output (MIMO) systems, defined as systems that have multiple antenna elements at both link ends, can greatly enhance the robustness and spectral efficiency of wireless communications. While most of the literature has concentrated on signal processing and space-time coding for MIMO, the fundamental performance limits are determined by the propagation channel and the way it is "excited" and "sampled" by the transmit and receive antenna arrays, respectively. In this talk, we first give an overview of array design, in particular, the question of how close we can space antennas. Subsequently, we describe typical propagation channels and how they impact system capacity; we also consider ways to describe the interaction between antennas and channels. Throughout the talk, we will show how the antenna and channel properties impact system capacity, diversity, and other system performance parameters.

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