



INTRODUCTION TO MIMO

- ▶ MIMO (multiple input, multiple output) is an antenna technology for wireless communications
- ▶ Multiple antennas are used at both the source (transmitter) and the destination (receiver)
- ▶ MIMO makes good use of a wireless propagation phenomenon called multipath to boost the performance.
- ▶ Multipath occurs when wireless signals bounce off objects such as buildings, trees, cars.



MIMO CHANNEL CAPACITY & DIVERSITY GAIN

- ▶ With TX and RX CSI, capacity of MIMO channel uses water filling in space or space/time - leads to $\min(M_t, M_r)$ capacity gain.
- ▶ Without transmitter CSI, use outage as capacity metric.
- ▶ Capacity of massive MIMO at high SNR is $\min(M_t, M_r)$ capacity gain.