

Signal Processing for Wireless Basestations

Prof. Brian L. Evans

Mr. Srikanth Gummadi

Mr. Murat Torlak

In collaboration with Prof. Guanghai Xu

Dept. of Electrical & Computer Eng.

The University of Texas at Austin

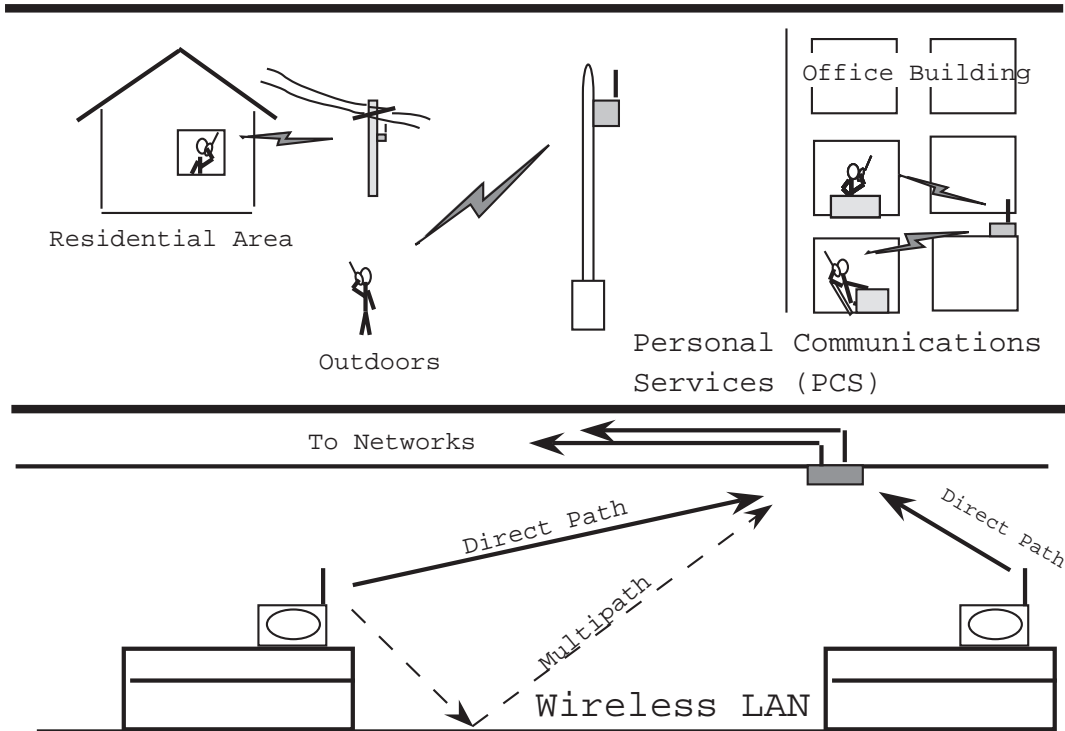
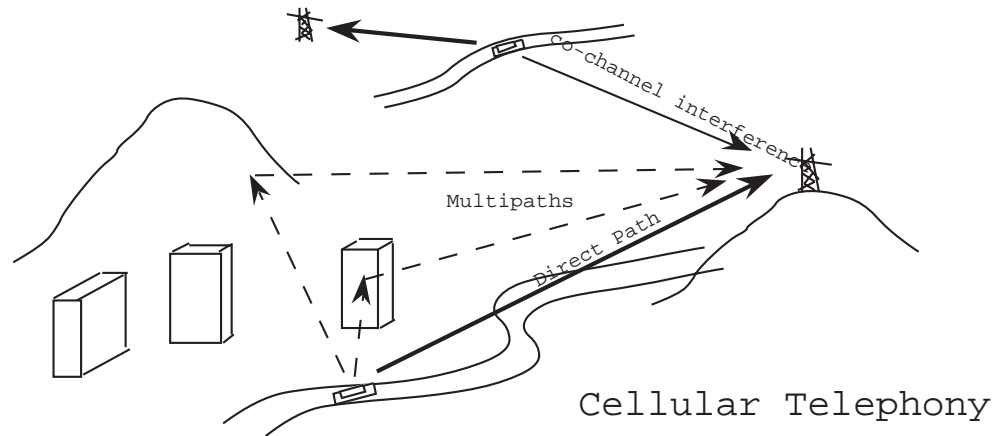
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Outline

- Introduction (Evans)
 - ☞ Motivation
 - ☞ Wireless communications
 - ☞ Smart antennas
- Mobile User Location (Gummadi)
 - ☞ Angle of arrival
 - ☞ Time of arrival
 - ☞ Joint angle-delay estimation
- Code Division Multiple Access (Torlak)
 - ☞ Wideband asynchronous CDMA
 - ☞ Multi-user channel estimation
- Conclusion

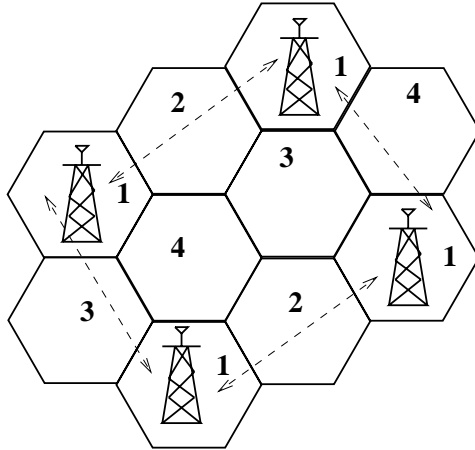
Motivation



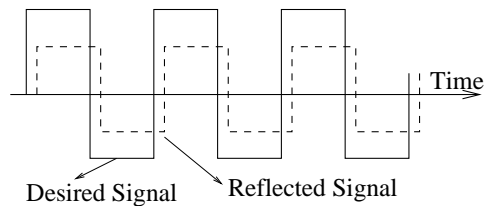
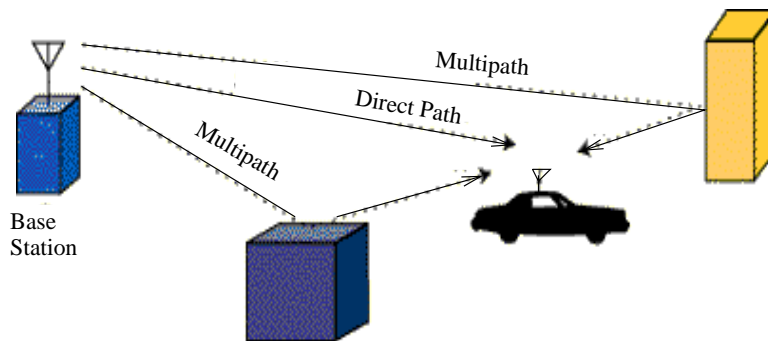
- Increasing demand for wireless services
- Different problems than wireline communications

Motivation

- Scarce radio spectrum and co-channel interference



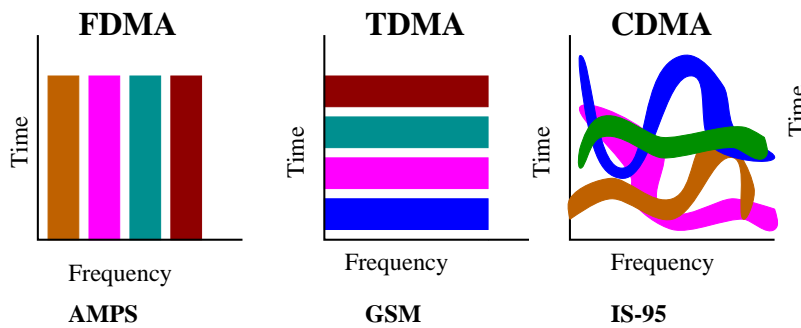
- Multipath



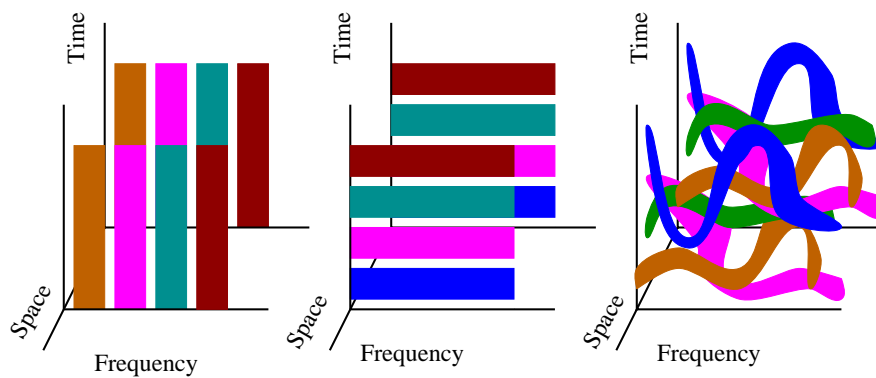
- Coverage and range

Wireless Communications

- Time-frequency approaches



NEW DIMENSION--SPACE



SPACE DIVISION MULTIPLE ACCESS (SDMA)

➡ Increased SNR— increased capacity

Smart Antenna Systems

- Employ multiple antenna elements
 - ☞ Exploit spatial dimension in signal processing
 - ☞ Improve capacity, quality, coverage, cost

