

# MAC Protocols In Sensor Networks



# Multiple Access Control (MAC) Protocols

- MAC allows multiple users to share a common channel.
- **Conflict-free protocols** ensure successful transmission. Channel can be allocated to users statically or dynamically.
- Only static conflict-free protocols are used in cellular mobile communications
  - Frequency Division Multiple Access (FDMA): provides a fraction of the frequency range to each user for all the time
  - Time Division Multiple Access (TDMA) : The entire frequency band is allocated to a single user for a fraction of time
  - Code Division Multiple Access (CDMA) : provides every user a portion of bandwidth for a fraction of time
- **Contention based protocols** must prescribe ways to resolve conflicts
  - Static Conflict Resolution: Carrier Sense Multiple Access (CSMA)
  - Dynamic Conflict Resolution: the Ethernet, which keeps track of various system parameters, ordering the users accordingly



# Frequency Division Multiple Access (FDMA)

- Channels are assigned to the user for the duration of a call. No other user can access the channel during that time. When call terminates, the same channel can be re-assigned to another user
- FDMA is used in nearly all first generation mobile communication systems, like AMPS (30 KHz channels)
- Number of channels required to support a user population depends on the average number of calls generated, average duration of a call and the required quality of service (e.g. percentage of blocked calls)

