



## MIT2000-10: Software Technologies for Wireless Communication

Stephen Garland, John Guttag, and David Karger



# Project Overview



### Project goals

- Better communication, not just better networks
- Faster innovation, deployment of applications
- Easier adaptation using cross-layer optimization
  - To current operating conditions
  - To application requirements
- Graceful degradation

### Research areas

- New signal processing algorithms
- Network protocols that exploit flexibility
- End-to-end analysis of soft physical layers



## Progress Through December 2000

- Adaptable physical layer for wireless communication
  - Provides information about current conditions
    - Power consumption, latency, error rate, ...
  - Receives application requests
    - Lower power, lower error rate, increase bit rate, ...
  - Selects strategy
    - Use new channel(s), modulation, ...
- Physical layer algorithms
  - Direct waveform synthesis for transmission
  - Efficient filter for channel separation
    - Processing proportional to output sample rate
  - Efficient multithreshold detector



## Research Plan for the Next Six Months

RadioActive networks

- Negotiated transmission format

- Vertical handoffs between administrative domains

Wireless communications for patient monitoring

- Improved deployment of operating room equipment

  - Low power sensors coupled to high power processors

  - Reduced clutter (cables, bulky equipment)

- Better separation, modularity

  - Transducers — acquire analog signals

  - Software — analyzes signals, integrates info

  - Processors — run the software

  - User interface — present information