CSE 521S Wireless Sensor Networks
Project Topics

• Topic 1: Environmental Monitoring

• Topic 2: Mapping Occupancy Dynamics

• Topic 3: Building Energy Performance

• Topic 4: Information System for Smart Homes

• Topic 5: PV module identification and characterization
Topic 1 – Environmental Monitoring

Sensors needed for measurement

1. Outdoor Environments
   – Weather station system for solar radiation, temperature, precipitation, humidity, wind velocity, CO\textsubscript{2}, Particulates (PM 10, 2.5, and 0.3), etc.

2. Indoor Environments (location specified)
   – Thermal comfort
     • Temperature, Humidity, Wind Velocity, CO\textsubscript{2}, VOC, and particulates (PM 10, 2.5, and 0.3), etc.
   – Visual comfort
     • Illuminance at targeted spaces
   – Acoustic comfort
     • Noise level
Topic 2 - Occupancy

• Sensors needed for measure occupancy
• Mapping indoor and outdoor occupancy dynamics
• Working with Architectural students to define the nature of room use
Topic 3 – Building Energy Performance

• Measure building energy performance
• Smart metering system
  – Electricity generation from PV at system and module level
  – Electricity meters for lighting, equipment, plug loads, etc.
  – Electricity storage (power wall monitoring etc.)
• Natural gas meters
• Water usage meters
**Topic 4 - Information System for Smart Homes**

- **Database**
  - Global data
  - Local data

- **Interface (Dashboard)**
  - Monitoring
    - Instant conditions
    - Trending data (hourly, daily, and monthly)
  - Control
    - Indoor environment schedule
    - Day-lighting and lighting

- **Data Structure**
  - Object oriented
  - Flexible structure

- **Interaction Device**
  - Computer, PAD, phone and other mobile devices
Topic 5 - Photovoltaic Module Identification and Characterization

• System identification
  – PV type, Battery, Inverters, and Grid
  – Sizing Capacity
• Prediction Model
• Operation logic model
• Optimization (option)
Thank you!