Course Project

- Dig deep into a focus area on your own
  - lectures would provide a “broad” coverage
- Aim for something concrete and tangible, even if minor
  - Simulation, analysis, software/hardware design, tools, application...
  - Literature surveys not acceptable
- Project topics
  - Some topics will be provided as exemplars
  - But ultimately coming up with a topic is your responsibility
  - Come and discuss project ideas with me
  - While project may be motivated by your research or work, it must be a distinct topic and effort whose output you must be willing to publicly disseminate
    - you may not reuse work already being done or planned for a thesis or another project
    - you may not collaborate with other researchers in your group
  - Topics will have to be approved by me and I reserve the right to veto any project proposal
- What should be your goal?
  - Something useful or cool, erring on the side of risky ideas where the results may turn to be negative
  - Similar style/quality as a conference paper and talk
  - The key is to keep the project simple, and focused
  - Aim for high quality!

Project Timeline

- Project topic, abstract, and team finalized by Wednesday of Week 3 @ 5PM
- Creation of project web page with detailed proposal, timeline, and prior literature by Wednesday of Week 4 @ 5PM
- Intermediate progress updates of project web page thereafter on a weekly basis (every Monday)
- Project presentations starting the weekend after the 10th week of lectures through the finals week
- Reports due by Wed of exam week @ 5PM

Project Score Decomposition

Quality of Work & Effort:	*40%*
Oral presentation and demo:	*20%*
Final project report:	*20%*
Interaction & updates during the Quarter:	*20%*

More Project Guidelines

- The project should reflect a serious effort to go beyond the course material
  - Obtain additional sources from the net, journals, or books.
- All prior work, published or not, public domain or proprietary, should be fully credited
  - "my officemate, Joe Schmo, says ...", "This section of code is modified from XXX gotten from YYY" etc.
- Do not build software or hardware from scratch
  - Your project will not be evaluated on the basis of how much effort you put into it, but rather on how effective your work is.
  - Go to the net or commercial software and find something to build on.
- Learn to use the relevant tools and languages
  - At least to the level of proficiency required to make your point
  - Get the compiler, simulator, design environment, and install it
- If you are already engaged in relevant work, leverage it.
- You may work in groups of up to 3
  - I will expect the ambitious-ness of the project to be proportional to the group size
  - I think optimal group size is 2
- You need to deal with inter-personal issues in the group yourself
  - Learning how to work in a team is important professionally
- Project report must describe what each team member did
  - Part of the score will depend on team effort and part on individual effort

Source: Prof. Lee @ Berkeley, Prof. Kastner @ UCSD

Sample Projects From Winter 2014

- Using iBeacons to Improve Dead-Reckoning Navigation
- Tunable Clock Sources for Embedded Systems
- Augmented Reality with smartphone: real-time projection
- A Hardware/Software Framework for Enabling Battery Charging-Aware Systems Research
- Design of Smart Refrigerator Container
- FriendBeacon: Discovering nearby friends and their locations
- Implementation, Monitoring and Configuration of CC2540 based Beaconing Devices
- Side Channel Video Snooping via A Multi-class SVM Classifier utilizing the RBF Kernel
- SignSpeech: a Communication Device for Sign Language Users
- Building Endoscopy
- Sharing and Processing Sensor Data for IOT

Sample Projects From Fall 2012

- Machine Learning API for Embedded Platforms
- Real-time Face Detection and Information Display
- High Fidelity of Star Tracking Device for Cameras
- RF-based Occupancy Detection
- A machine learning library on snapdragon platform
- User-voting HVAC control system
- EEG Sonification and Pseudo-Telepathic Communication
- Network device discovery
- Low-Cost Ultrasound Water Flow Sensor
- RF-based Occupancy Detection
- Cloud-based mbed Testbed
- Emulation of UnderDesigned Sparc LEON V8
- Human Body as Antenna for Activity Sensing
- Watermelon Maturity Detector
- Human Body as Antenna for Activity Sensing
- Smart Lock based on Bluetooth LE technology
- Swept Frequency Capacitive Sensing Lamp
- Bluetooth LE Privacy Sensitive Social Context Inferencing
- Ultrasound Water Flow Sensor

Sample Projects From Fall 2011

- Inference of Conversation State using ECG
- Distributed Filesystem for Wireless Mesh Sensor Network on Chronos Watches
- Browser plug-in for web applications to interact with local sensors
- SmartFurniture
- Using Skeletal Data from Kinect to identify subjects
- Energy Efficient Temperature Control
- Web-based Lua IDE for mBed
- Robotic Jellyfish/Submarine Test Platform
- Use room lighting to transmit wireless data
- Powercast characterization and implementation of wireless sensor power
- Power Characterization of BLE
- DC-DC Boost Converter with Embedded Digital Feedback
- MBED Simulator
- Characterizing variability in power consumption in mobile phones
- Powercast Energy Harvesting
- Optical Modem for Underwater communication
- EyeRobot
- Thermal Energy Harvesting from Hot Water Pipes
- Smart Grid Privacy
- BrowserSensorProcessing
- Minimized FOTA using Feedback linking
- Unsupervised gesture recognition with accelerometers assisted by computer vision
- Kinect Door Monitor Project
- Minimized FOTA using feedback linking
- Room lighting based broadcast
- Smart Toothbrush
- Serial data transmission over Bluetooth audio profile
- Remote Firmware Upgrade
- Appliance recognition using wideband NILM

Sample Projects From Fall 2010

- Variability-Aware DVFS
- A Multi-Channel Wireless Neural Recording System
- Map-assisted GPS Trace Compression on Resource-constrained Mobile Platforms
- Energy Harvester for Sensing
- Variability in Networking
- GNU Radio (and UANT) on Gumstix
- LPC1768 Based Mote and Python Based programmer
- Indoor Map-assisted Inertial Localization
- A Google Cell Phone Based Wearable Real-time ECG Classification Platform with Machine Learning Algorithm in Heart Disease Diagnose
- Hiking Trail Guide
- Using R-R Intervals to Detect Breathing Rate
- Thought Control on the Android based on Emotiv Epoc
- Tiny OS mig for WebSockets
- Compressive Sampling for Electrical Power Measurement
- Synthesizing Interface Automata for hardware devices for robust device drivers.
- Miniature airflow sensor design
- Activating Screen for Synergy
- WebSocket on mbed
- Joseph Pilates Exercise Machine Rehabilitation Quantification
- Software approaches to coping with Variability in Memory Banks
- Occupants Behavior Interpreting System Based on Personal Heights
- Using the Audio Bridge to interface Sensors in devices not supporting the Bluetooth Serial Interface.

Sample Projects From Fall 2009

- Personal Activity Monitor Sensor Placement Tool
- AnyClassifier: an Application for Fast Prototyping of Self-Improving Activity Classifiers
- miniNALM: Miniaturized NALM Implementation on Outlet Level Power Monitor
- Personal Posture Monitoring System
- Compressed Sensing Framework on TinyOS
- Hypermiling Application for the Android Phone
- Fine-Grained Privacy Policy Language for Body-Area Sensor Networks
- Thermoelectric Energy Harvesting
- EKG SmartPad
- Explorations with the OCZ Neural Impulse Actuator
- Zeroconf Embedded Sensor Discovery
- Personal Posture Monitoring System
- ARSA: An Augmented Reality Interface for Spotlight
- Physically Unclonable Smart Card
- iPhone + Blip (b6loWPAN) Based Application for Home Energy Monitoring
- Solar-powered Automatic Water Meter Reader
- Implementation of Random Modulation Pre-Integration for Compressed Sensing on PSoC3 Architecture

Sample Projects From Fall 2008

- Interfacing TikiTag RFID reader to Linux-based embedded platform
- Embedded machine learning algorithms
- Configuration tool for mPlatform (Microsoft's embedded sensing platform)
- Underwater acoustic communication using GNU Radio / USRP
- Robot localization using Northstar
- GPIB to USB adapter for screen capture from test instruments
- Energy characterization of home networking technologies
- Embedded OS support for adaptive sampling
- Study of multihop latency in 802.15.4 networks
- GNU Radio & USRP based channel monitor for 802.15.4 networks
- System for proximity sensing for the visually impaired
- Distributed medium reservation for wireless sensor networks
- IMU localization to assist in GPS gaps
- Patient identification system to minimize medical errors
- Distributed online calibration
- BeepBeep ranging on Gumstix/Audiostix
- Scheduling-based bus protocol for mPlatform
- FPGA implementation of XCXO clock drift compensation scheme
- Non-invasive power monitoring
- Evaluation of robustness of FTSP time synchronization