New course developed with GTA Ferdinando Romano
Builds on experience with graduate SDR course and NSF REU site
14 students enrolled in first offering
Course Structure
  - Lectures and hands-on tutorials concentrated in weeks 1-4
    - Tutorials on 3 Software Defined Radio (SDR) software packages (GNU Radio, REDHAWK, liquid-dsp)
    - Inverted classroom approach with out-of-class reading, recorded lectures
  - Lab section including more extensive tutorials and design-oriented exercises including design of basic controllers for adaptive radios
  - Semester projects starting in week 4 (see summary slides below)
SDR RC Car TX Team

**Recorded** command signals

Constructed a user-friendly **GUI**

Characterized and **recreated** our own command signals

Implemented an **automated driving** mode

**WiFi camera**

Modified **antenna** and **speed**

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**Equipment**

- USRP n210
- RC toy car
- GNU Radio
- GoPro HD Hero3

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**RF Position Location**

- Find location of unknown transmitter
  - Trilateration
  - Hyperbolic Positioning Systems
Interfacing RTL-SDR with liquid-dsp

- Implemented fast, efficient, and portable FM and AM radio application in C.
- Ported app to a single-board computer (BeagleBone).
- Created novel web-based interface using WebAudio and WebSockets APIs.

Digital Software Defined Radio

- Components
  - USRP N210, GRC, GStreamer
- Capabilities
  - Instant message, file transfer (.wav), audio/video stream
- Future Work
  - Full duplex for IM and streaming voice, debug file transfer, debug video streaming