

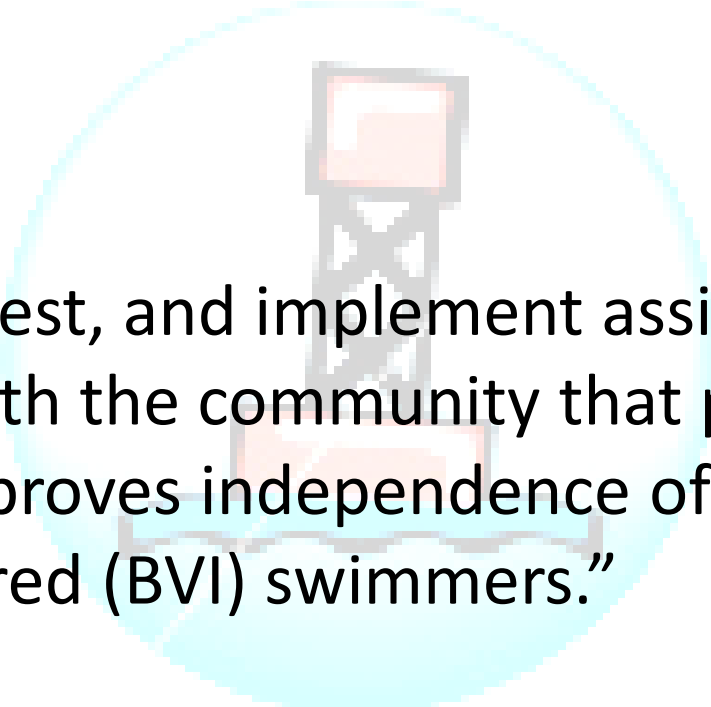
# BUOY

IPRO 310

## Assistive Devices for Blind and Visually Impaired Swimmers

*A vision for blind swimmers*

# Buoy Mission Statement



“To develop, test, and implement assistive technology with the community that promotes safety and improves independence of blind and visually impaired (BVI) swimmers.”

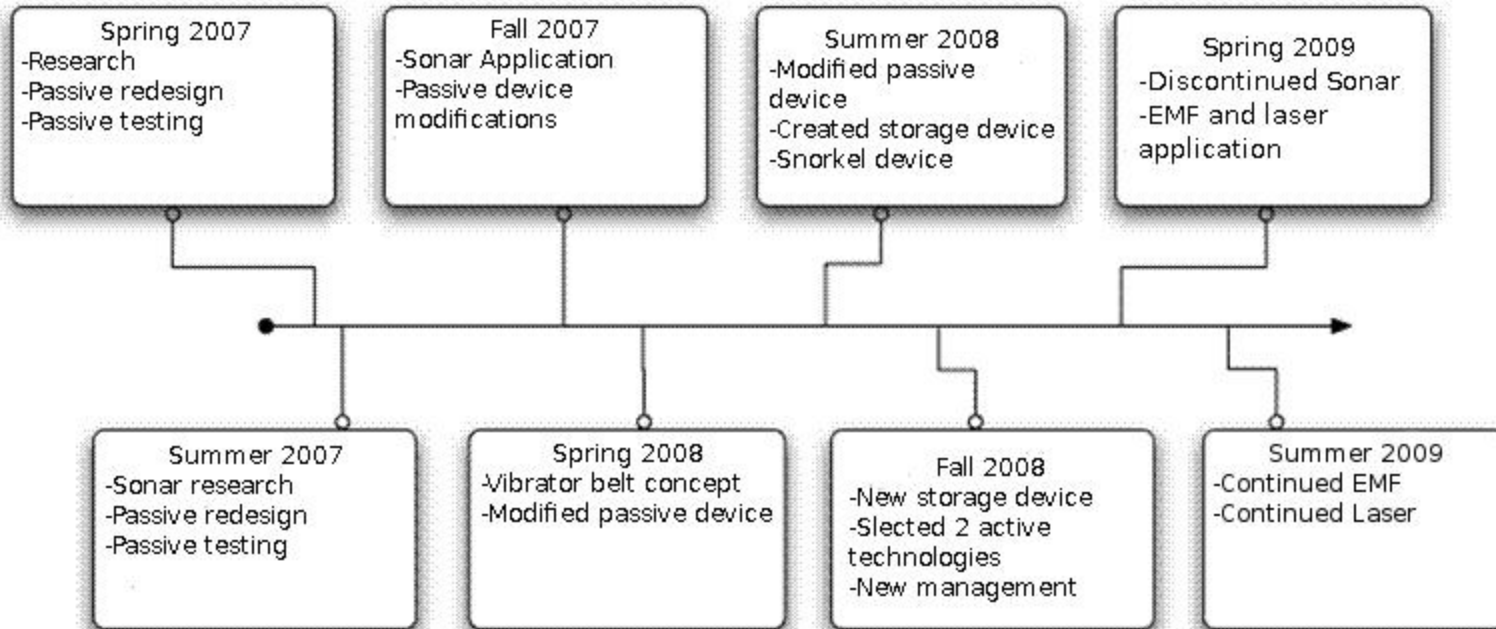
# Outline

- History
- Problem Statement
- Team Organization
- Goals
- Prep. And Supp. Activities
- Progress
- Future Activities





# History



# Problem Statement

## Background:

- 1.8 million people with blind condition in the US (US Census)
- 7.8 million people with blind and visually impaired (BVI) condition in the US (US Census)
- Lack of user input in development of technology to increase physical activity and decrease sedentary lifestyle
- Up to 80% abandonment rate of assistive technology (Michigan Dept of Education)

## Fall 2009 Problems:

- Signal produced by invisible fence is encrypted thus vibrating receiver doesn't work
- Serial problem solving approach was not time efficient

# Team Organization

## Technology Team

Phillip Sirk (CS, CPE): LEAD  
Ross Ludwig (MMAE)  
Jeffrey Reilly (Phys)  
Branden Toro (MMAE)

## Communication Team

Jay Park (Psyc): LEAD  
Kimberly Dykeman (Psyc)  
Michaela Heaton (Chem)  
Timothy Lipman (Psyc)  
Smita Sarkar (BME)

## Documentation

Michaela Heaton (Chem): LEAD  
Jeffrey Reilly (Phys)  
Branden Toro (MMAE)

## Media

Smita Sarkar (BME): LEAD  
Jay Park (Psyc)  
Phillip Sirk (CS, CPE)

## Survey

Kim Dykeman (Psyc): LEAD  
Timothy Lipman (Psyc)  
Ross Ludwig (MMAE)

## Faculty and Advisors

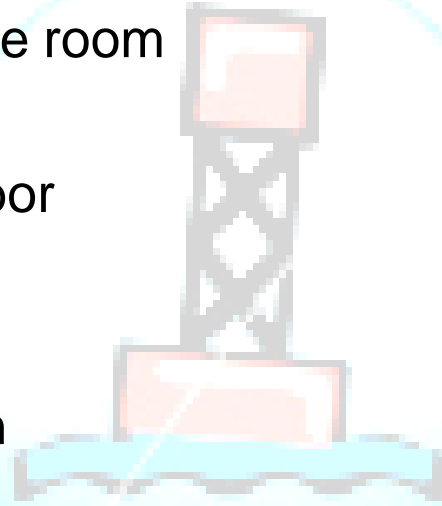
Frank Lane (Rehab Psyc), Ken Schug (Chem), Ruthanna Gordon (Psyc)

# Goals

- Re-design the invisible fence into a radio device and re-design the vibrating receiver to detect signal of new device
- Develop a method of communicating available information between device and swimmer
- Continue BVI community involvement, Maintain website

# Prep. and Supp. Activities

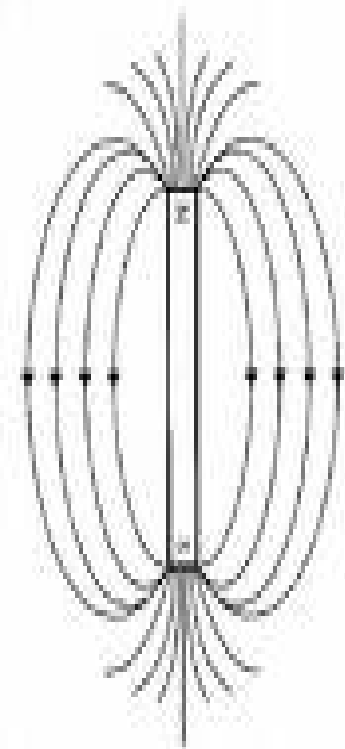
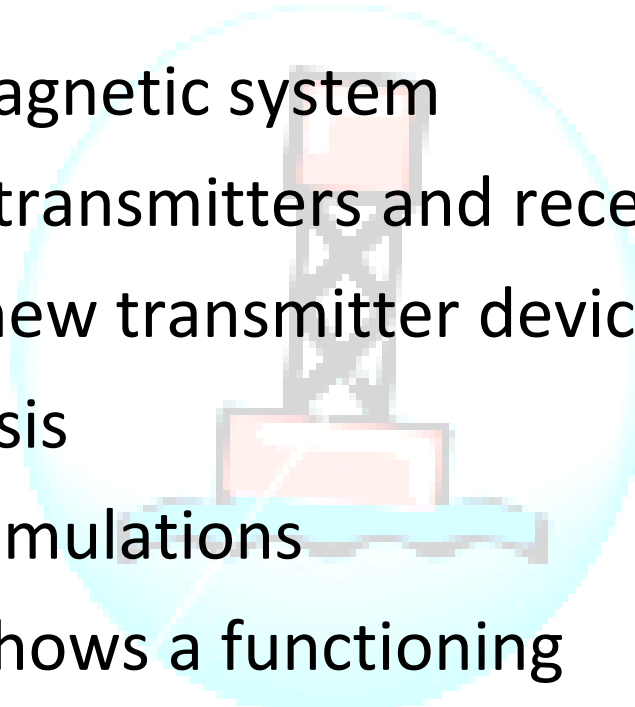
- Team building
- Transition to conference room
- Blindfold experiment
- Strategic division of labor
  - Communication
  - Technology
- Completed project plan
- Posting minutes
- Completed IRB certification
- Ethics training and code of ethics
- Chicago Lighthouse tour and survey planned
- SME blind swimming instructor





# Technology Team Progress

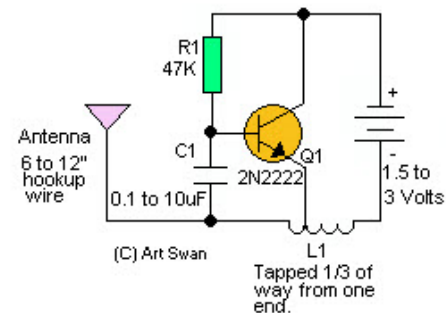
- Ruled out magnetic system
- Researched transmitters and receivers
- Designed a new transmitter device
- Circuit analysis
- Ran circuit simulations
- Simulation shows a functioning transmitter
- Working on circuit for new receiver



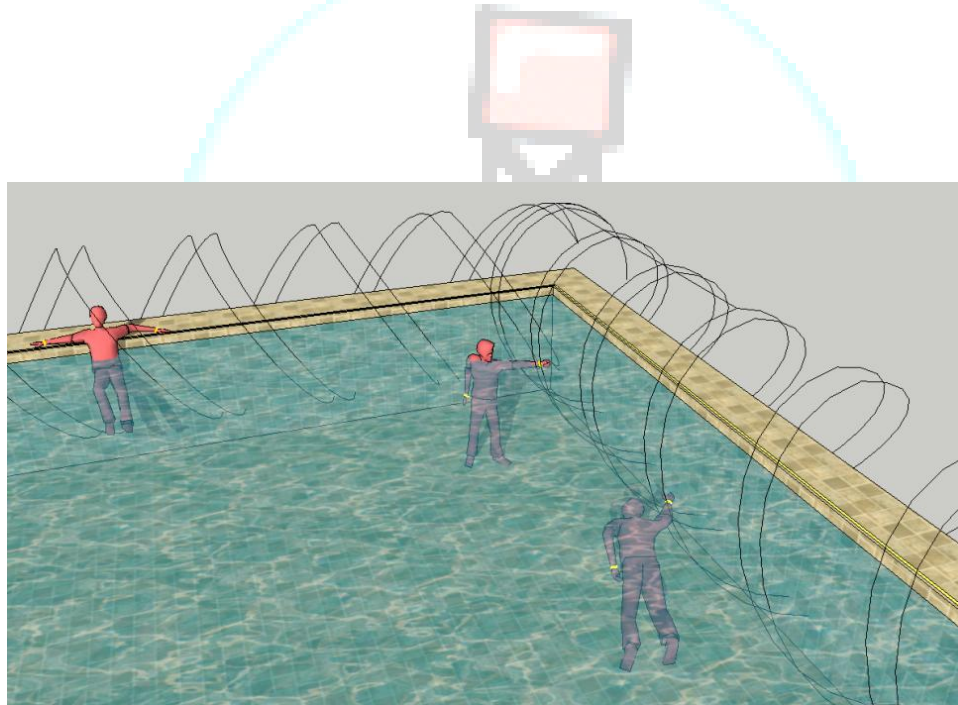
# Radio

- Transmitters produce an invisible wall by broadcasting a unique signal
- Receiver detects signal and produces tactile feedback indicating relative position to obstacles

Simplest RF Transmitter  
<http://www.uoguelph.ca/~antoon>

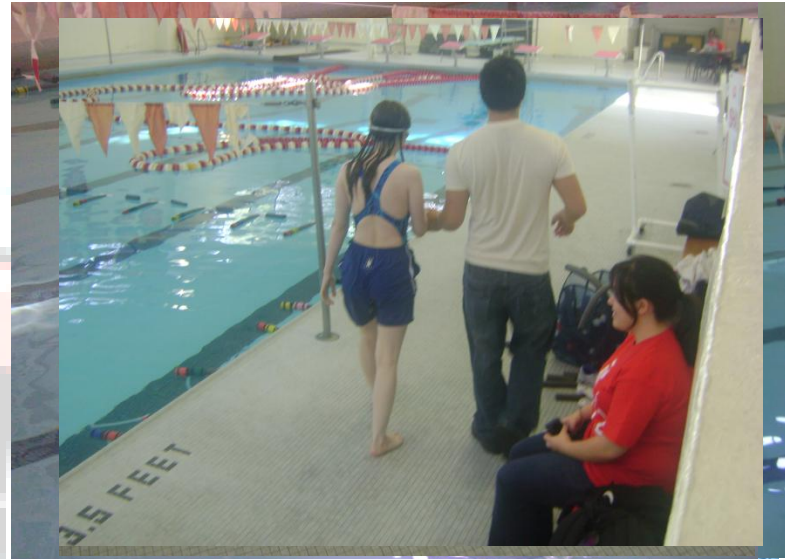
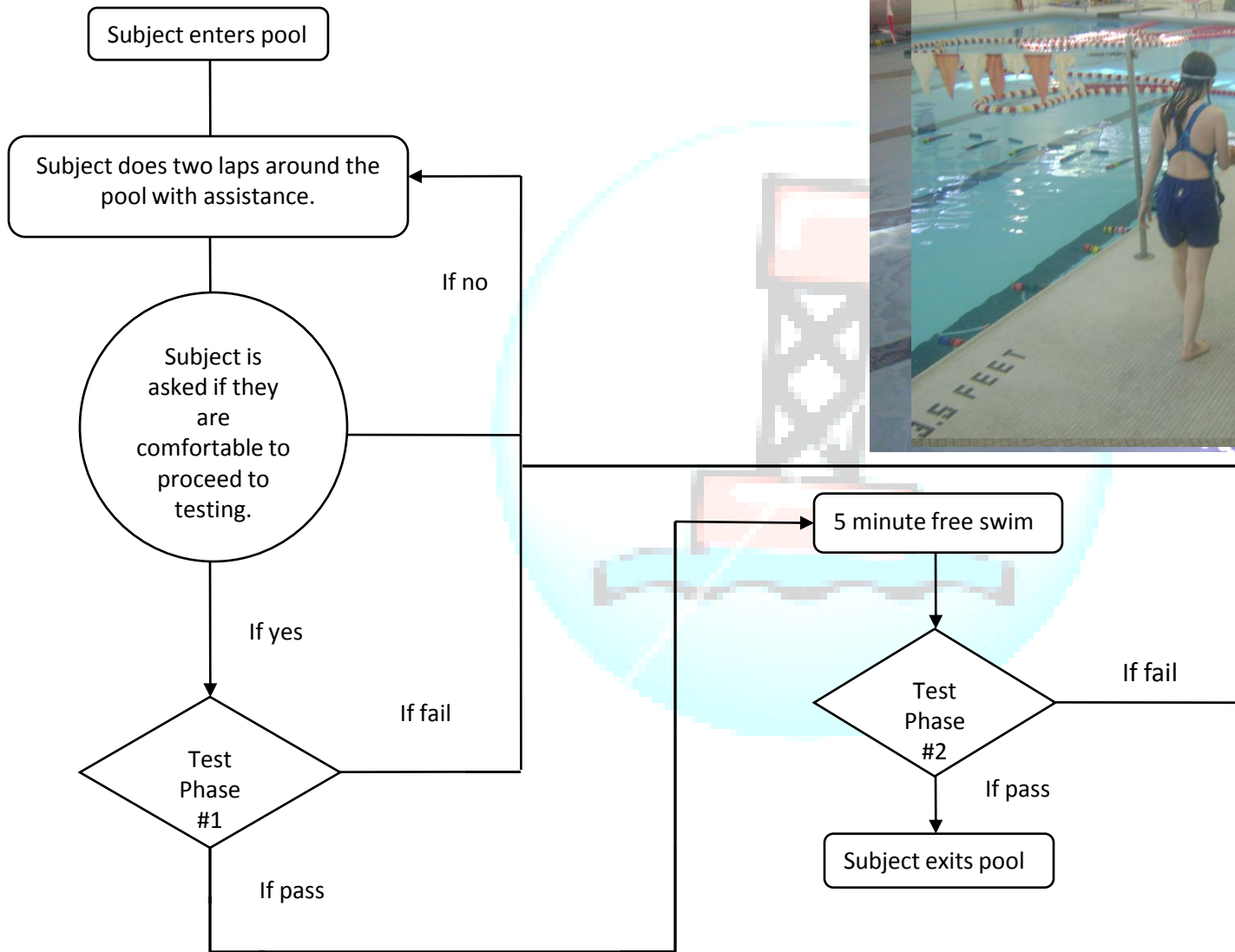


# Radio



# Communication Team Progress

- Review of literature
- Review of methodology for mobility training for BVI individuals
- Established pilot protocol for training
- Tested protocol
- Revised protocol
- Continuing testing



# Future Activities

- Complete design for vibrating circuit
- Build receiver
- Build transmitter
- Implement training protocol
- Visit Chicago Lighthouse for tour and survey
- Determine applicability of device for other exercising activities

# Needs / Questions / Requests

- Continued communication with subject matter experts
- BVI community for testing

