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# TSA Timers

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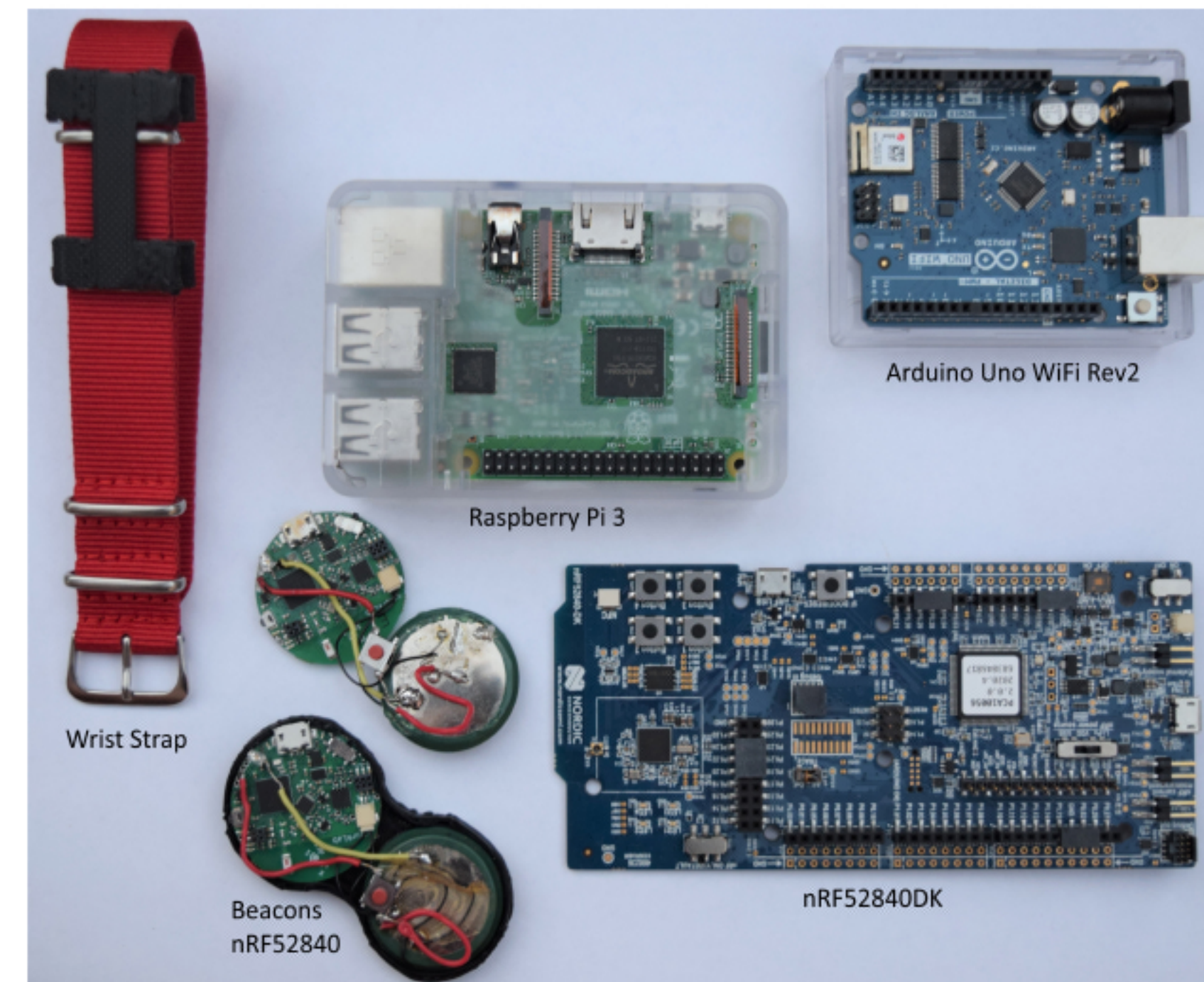
SAN DIEGO STATE UNIVERSITY  
Spring 2021



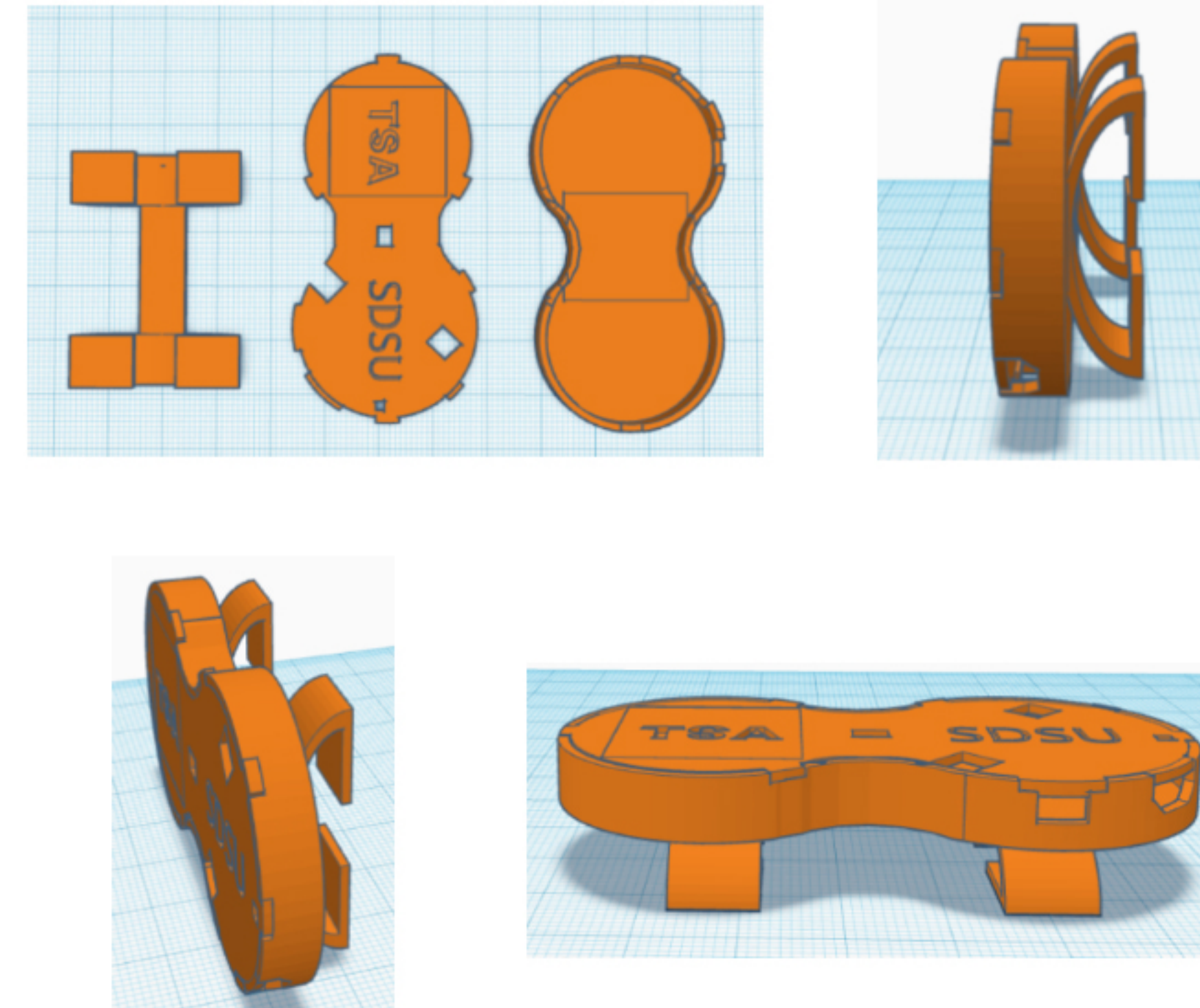
## Project Statement

Using Professor Ozturk's nRF52840 beacon as a base to our project, we designed a system for TSA to time how long it takes for passengers to pass through security, a metric TSA must collect every hour. Our system uses two devices for the collection of timing data, which includes timer start time, timer end time, total time elapsed, Beacon ID number, and a Yes/No value for whether the passenger that was timed went through TSA Pre-Check. This data is then stored on a Raspberry Pi 3 using a MySQL database accessible through an Apache HTML server.

## Final Products



## CAD Casing Design for Ozturk's Beacon

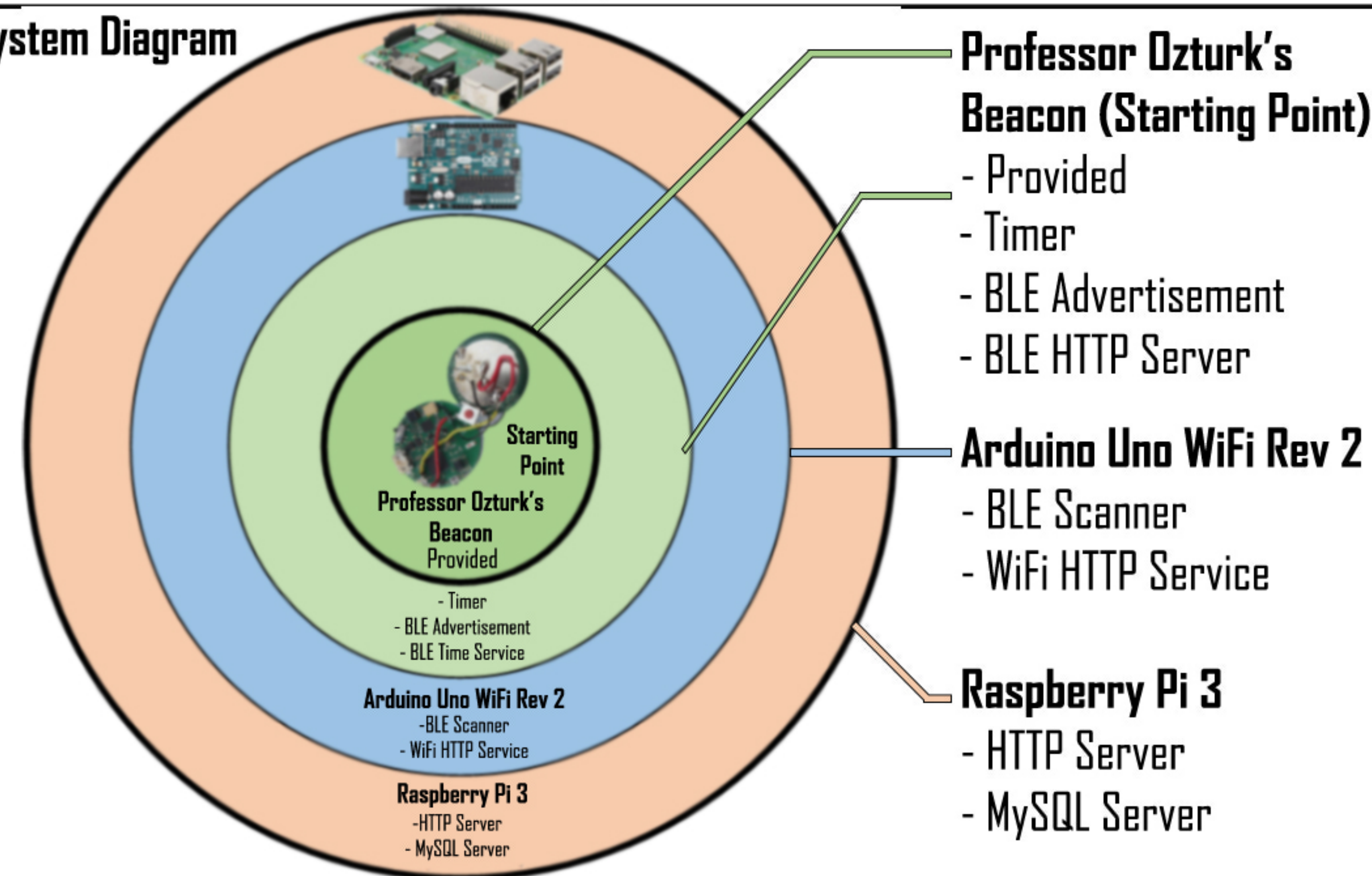


## Meet the Team



(Lto R) - Cesar Oliva, Liam Weinfurtner, Danielle Drinko, Gary Tong

## System Diagram



## HTTP Web Server with Timing Data

| ID Number | Date Recorded | Total Time | Start Time | End Time | Beacon ID | Pre-Check |
|-----------|---------------|------------|------------|----------|-----------|-----------|
| 116       | 2021-04-09    | 00:00:17   | 19:43:34   | 19:43:51 | bcn3      | No        |
| 117       | 2021-04-09    | 00:00:30   | 20:04:02   | 20:04:32 | bcn3      | No        |
| 118       | 2021-04-09    | 00:01:30   | 20:04:28   | 20:05:58 | bcn3      | No        |
| 157       | 2021-04-13    | 00:03:28   | 18:12:15   | 18:15:43 | bcn3      | No        |



**nRF52840**  
Learned:

- Nordic SDK for Programming
- Nordic nRF52840 Microcontroller
- Programming Bluetooth Low Energy Services

**Headed by:**  
Liam Weinfurtner  
Gary Tong

- Challenges:**
- Learning Nordic Code from Scratch
  - Adapting Development Kit Board code to Professor Ozturk's Beacon (shown above with additional button and LED)



**Arduino Uno Wi-Fi Rev 2**  
Learned:

- Wi-Fi Programming
- Bluetooth Low Energy Functions
- HTTP POST Requests to send data to HTTP server

**Headed by:**  
Cesar Oliva  
Danielle Drinko

- Challenges:**
- Fitting memory constraints
  - Switching between BLE and Wi-Fi modes
  - Formatting received byte data and time epoch to useful strings



**Raspberry Pi 3**  
Learned:

- Connecting front end HTML page to MySQL database data using PHP
- PHP files to receive and handle HTTP POST request

**Headed by:**  
Liam Weinfurtner

- Challenges:**
- Changed system from having data hosted on Arduino to separate server due to limited BLE/WiFi capable and memory space