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
- Arduino Uno WiFi Rev 2
  - BLE Scanner
  - WiFi HTTP Service
- Raspberry Pi 3
  - HTTP Server
  - MySQL Server

CAD Casing Design for Ozturk’s Beacon
- 3D printed housing
- Custom design for beacon

Meet the Team
(Lto R) - Cesar Oliva, Liam Weinfurtner, Danielle Drinka, Gary Tong

HTTP Web Server with Timing Data

<table>
<thead>
<tr>
<th>ID Number</th>
<th>Date Recorded</th>
<th>Total Time</th>
<th>Start Time</th>
<th>End Time</th>
<th>Beacon ID</th>
<th>Pre-Check</th>
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<td>00:00:17</td>
<td>19:43:34</td>
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</tbody>
</table>

Advisor: Dr. Yusuf Ozturk, San Diego State University

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:
- WiFiNina Programming
- Bluetooth Low Energy Functions
- HTTP POST Requests to send data to HTTP server

Headed by:
Cesar Oliva
Danielle Drinka

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