The objective of this project is to create a TIPPERS service that utilizes the TIPPERS' current location directory and occupancy data to facilitate navigation and meetups for people on campus. This service aims to find an ideal location, calculated based on occupancy and proximity, for a group of people on campus to meet up.

The TIPPERS project is headed by Professor Sharad Mehrotra at University of California, Irvine (UCI) that aims to provide methods to conduct privacy research and test privacy technologies. A smart space system was set up in UCI Donald Bren Hall with intention of using technologies like sensors to extract information about the space without violating the privacy of the occupants.

Potential services that can be created from the data extracted from the TIPPERS smart space can be as follows:

- **Emergency services**:
  - Use occupancy data as a tally count during evacuations
  - Monitor the activity of an intruder

- **Human Accommodations**:
  - Use occupancy/occupant information to adjust thermostat, ventilation, etc.

- **Navigation**:
  - Use current location directory and proximity alert to facilitate face-to-face meetups

This service can be accessed through a web application. The application's user interface consists of two sections: a meetings inbox page, which has all of the user's scheduled meetings, and a setup meeting page, which is used to schedule meetings.

The following is a summary of the software, frameworks, APIs, and more used throughout the project:

Frontend: HTML, CSS, JS
- MapBox API
- Materialize CSS Framework

Middleware
- MySQL Workbench
- TIPPERS API

Backend (Python)
- Django Framework
- TIPPERS API
- TIPPERS Data APIs
- Takes data gathered and makes it accessible via API

The TIPPERS API returns occupancy data as a number and the location as a set of longitude and latitude points. The algorithm to find the 'ideal' location is temporarily designed to be as follows:

1. Log in Page
   - Each user has a login that is their Ucnet id.
   - For first-time users, they need to create an account on the TIPPERS portal and register a WiFi device

2. User 1 sets up meeting
   - Fills out form on setup page
   - Includes name, email, location, date, and time

3. Backend: Database and Location Setup
   - Database
     - User submission, the meeting will be submitted into the database and all locations of the records
   - Location Setup
     - Retrieve (1) approximate locations of everybody listed and (2) the occupancy of surrounding areas from the TIPPERS API (location/occupancy data extracted from the smart space sensors, such as WiFi Access Point)
     - Calculate an ideal location for meeting up using occupancy and location data

4. User 2 Receives it in INBOX
   - User goes onto the inbox tab, views their message and the location on the map

References