

# Dataset Generation for Wireless Device-to-Device Communication

Ruben Aguilera, Electrical Engineering  
Mentor: Dr. Ahmed Ewaisha, Assistant Professor  
School of Electrical, Computer, and Energy Engineering



## Objective & Research Question:

Our objective is to generate an extensive dataset comprising channel characteristics among a vast network of users. This dataset holds the potential to facilitate device-to-device communication, eliminating reliance on a base station for connectivity.

## Background:

- Wireless communication traditionally relies on base stations to facilitate communication between devices.
- The development of a comprehensive dataset containing channel information enables the exploration of device-to-device communication without dependence on base stations.
- Efficient device-to-device communication can help minimize reliance on base stations, reducing network overhead and enhancing overall system performance.

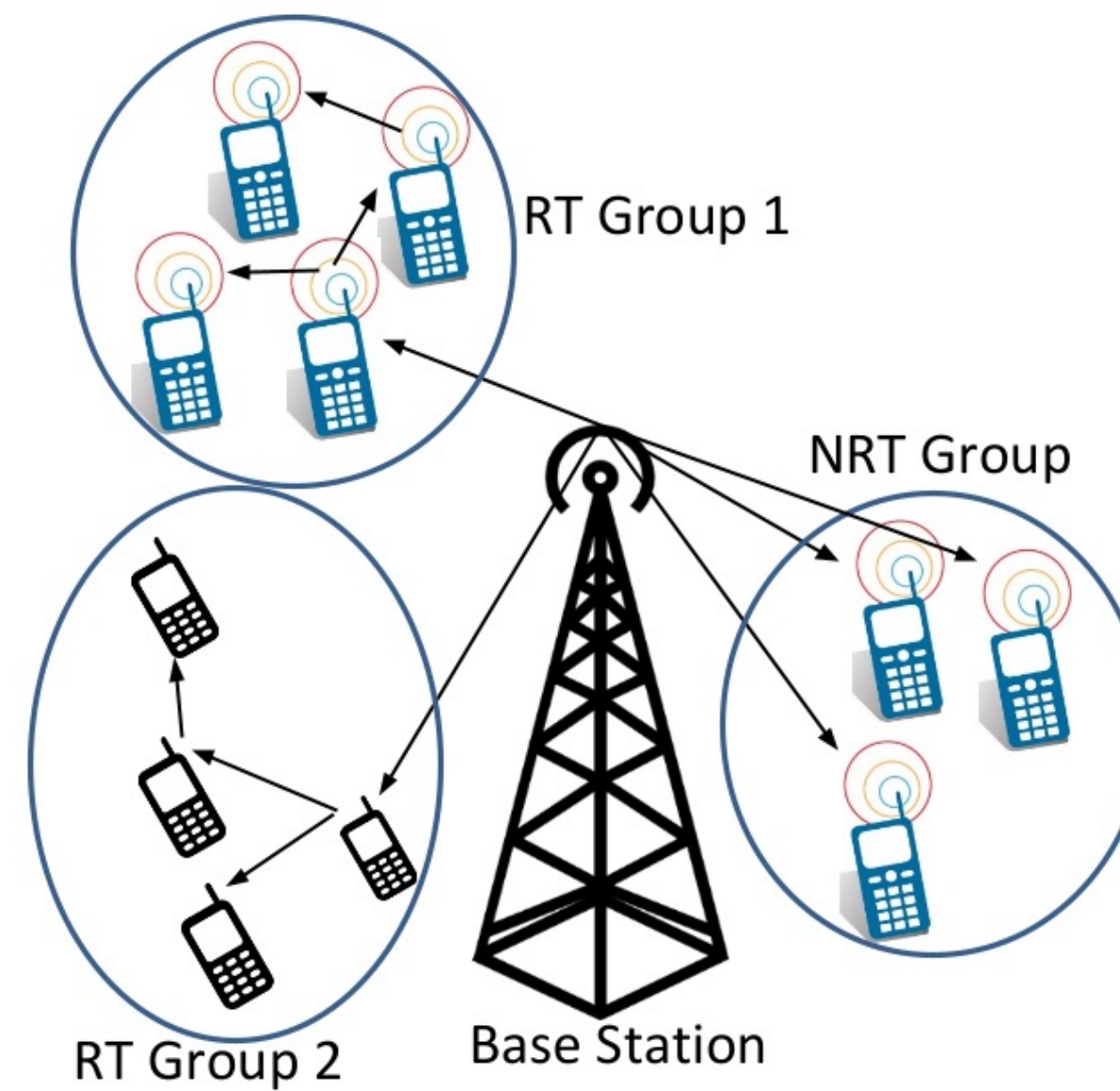


Figure 1: Base station Communication

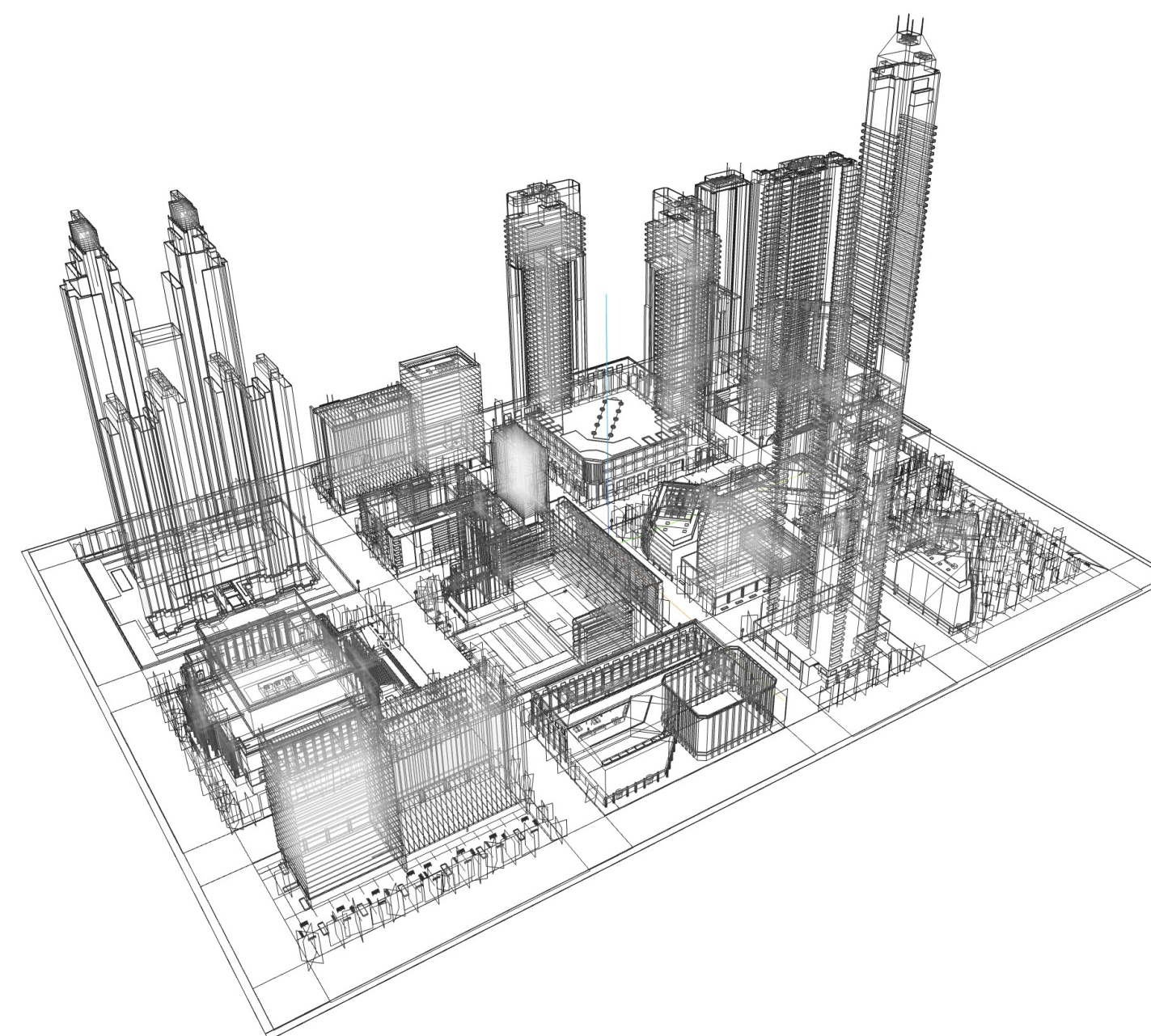


Figure 3: Raytracing Results

## Methods:

- Employ MATLAB's communication toolboxes and raytracing to simulate a user grid.
- Generate grid of users and gather essential channel data.

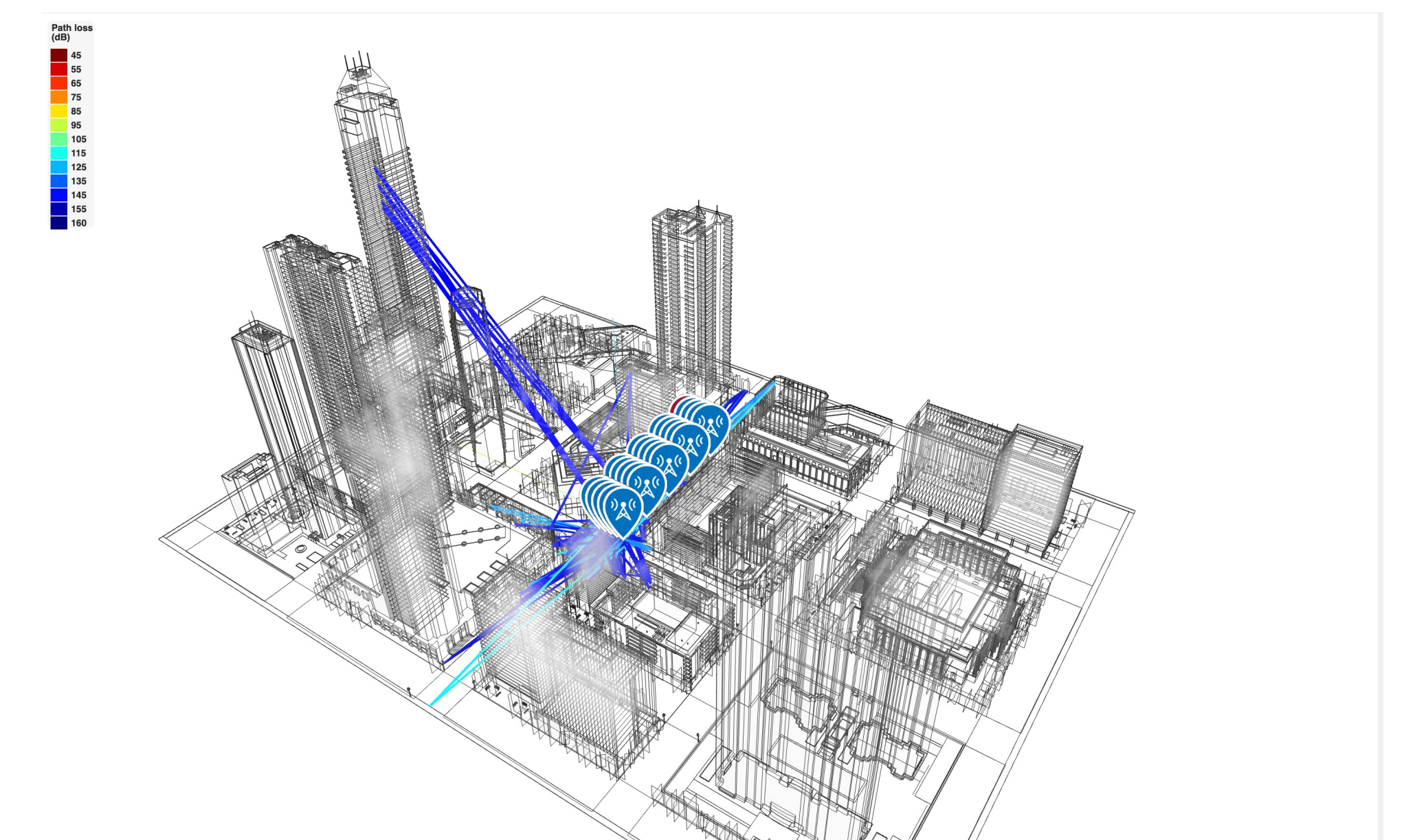


Figure 2: Raytracing Simulation

## Results:

- Authored a script that successfully generates user coordinates in a grid on specified streets and populates transmitter and receiver combinations.
- Successfully generated a small raytracing dataset of 100 users.
- Plans are to maximize efficiency to scale up the number of users.