# Nate Brewer

## Capstone Project

## Problem Domain

- **Infrastructureless** environments impose **severe bandwidth and power constraints** that **prevent** existing **wireless communication systems** from supporting **human-scale information exchange**.

## Solution

Semantic transmission of the **meaning** of the message and reconstruct **intelligable audio** on the receiving end for **human-understanding**

## Implementation:

- **LoRa mesh network** for transmission and reception - providing a **low-power**, **long-range** interface
- **Sender AI** Extracts semantic meaning from speech
- **Receiever AI** Reconstructs intelligable audio from semantic payload

# Features/Requirements

- Write research paper
  - Abstraction of problem/solution
  - Concrete examples
  - Skeleton
  - Final paper
- Testing different semantic transmission methods
  - TTS
  - Neural Reconstruction
  - Template based
  - Unknown Unknowns
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# Features/Requirements (Cont.)

- Implement LoRa mesh network
  - Begin with Lora P2P network
  - LoRa testing for optimization
- Begin AI training
  - Define Semanic transmission methods and follow one
  - Train sending AI and recieving AI

# Features/Requirements(Fin)

Total Features: 4

Total Requirements: 12

(More on the Way!)

# Sprint Overview

## Sprint 1 Goals

- Write research paper-skeleton
- Testing different sematic transmission methods (TTS, Neural Reconstruction, Template based)
- Implement simple LoRa P2P network
- Begin AI training

# Sprint Overview(Cont.)

## Sprint 2 Goals

- Implement LoRa Mesh network
- Refine and continue to train AI models
- Simulation testing
- Implement LoRa network with AI models and begin testing
- Have final paper and submit

# Learning with AI

1. AI training and hosting
2. LoRa device and protocols

# Questions?

**Thank you for your attention!**