Empowering Environmental Justice Communities with Smart and Connected Technology: Air and Noise Pollution, Wellbeing, and Social Relations in Times of Disruption

Award Number: 1952223

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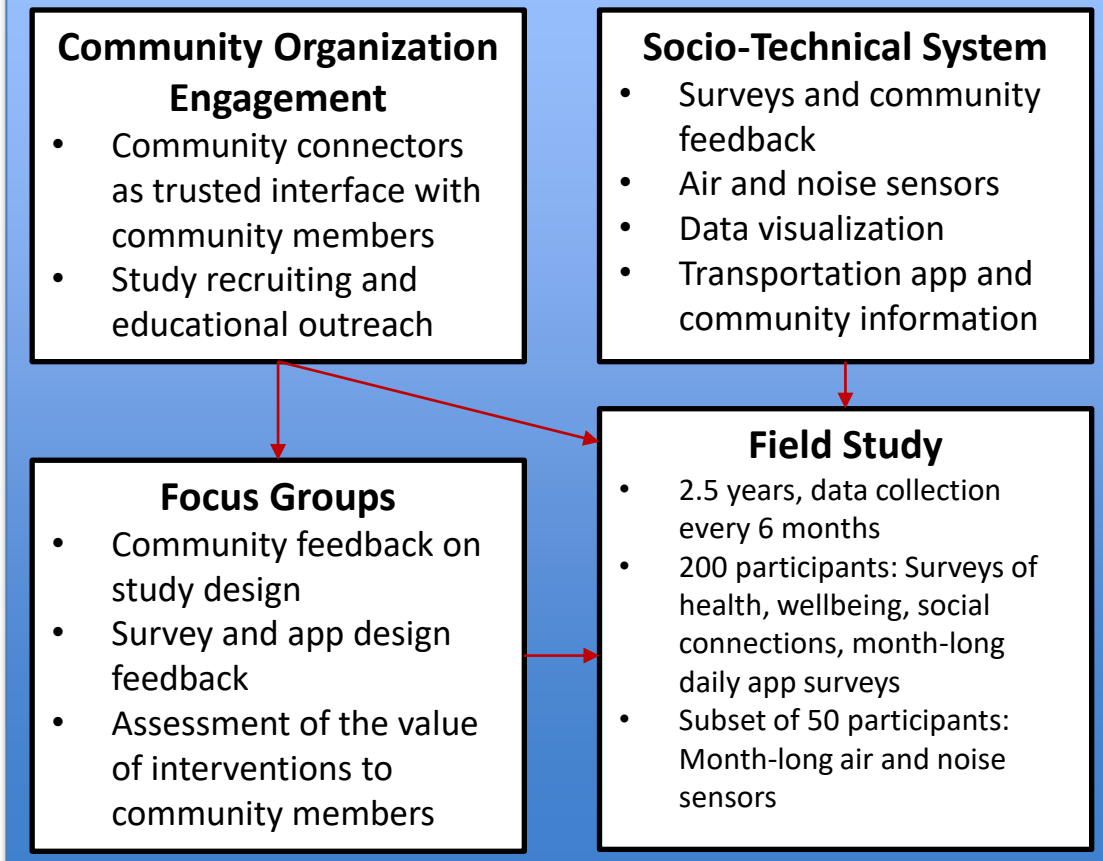
- Globeville, Elyria-Swansea Coalition
  - Nola Miguel, Director
- GrowHaus
  - Nina Roumell
- Energy Outreach Colorado
  - Luke Ilderton, Deputy Director
- Denver Department of Public Health and Environment
  - Michael Ogletree, Air Quality Program Manager

Project Overview

Visual Schematic



Project Vision

1. To develop and deploy a socio-technical system for conducting environmental justice research capable of collecting surveys in an app, collecting sensor data from participants' environment, and acting as a platform to provide information to participants.

2. Engage with an environmental justice community to assist in the design of research through focus groups, in the conduct of research through recruiting, outreach, and citizen science, and in the community use of research findings by informing policy recommendations.

Project Overview

Use-Inspired Research

1. Globeville-Elyria-Swansea-Cole (GESC), a group of neighborhoods in Denver, CO, USA, is one of the most polluted urban areas in the USA, and nearby large-scale construction projects are actively contributing to additional deterioration of this community's environment.
2. Focus groups are a platform for community members to provide feedback on study design prior to study start.
3. A socio-technical system was developed to as a way of engaging citizen scientists in environmental justice research.

Fundamental Research Contributions

1. Determine how construction-related disruptions impact personal wellbeing, social relations, and environmental exposures to air and noise pollution in an environmental justice community.
2. Determine how construction-related disruptions impact the movement of people in the community.
3. Determine how home retrofit-based mitigation efforts can reduce environmental exposures during construction-related disruptions.
4. Determine how app-based interventions providing community members synthesized information about the construction and transportation disruptions can mitigate the impact from construction-related disruptions.

Project Update

Technology Team Focus:

PUREmotion App Review Iterations

- 2-week cadence for team reviews:
  - 1-week of team comment
  - 1-week for updates
- App Pilot is ongoing (separate IRB)
- Expect app will be ready for study deployment for collecting daily survey data during Q4 2021

Env. Engineering Team Focus:

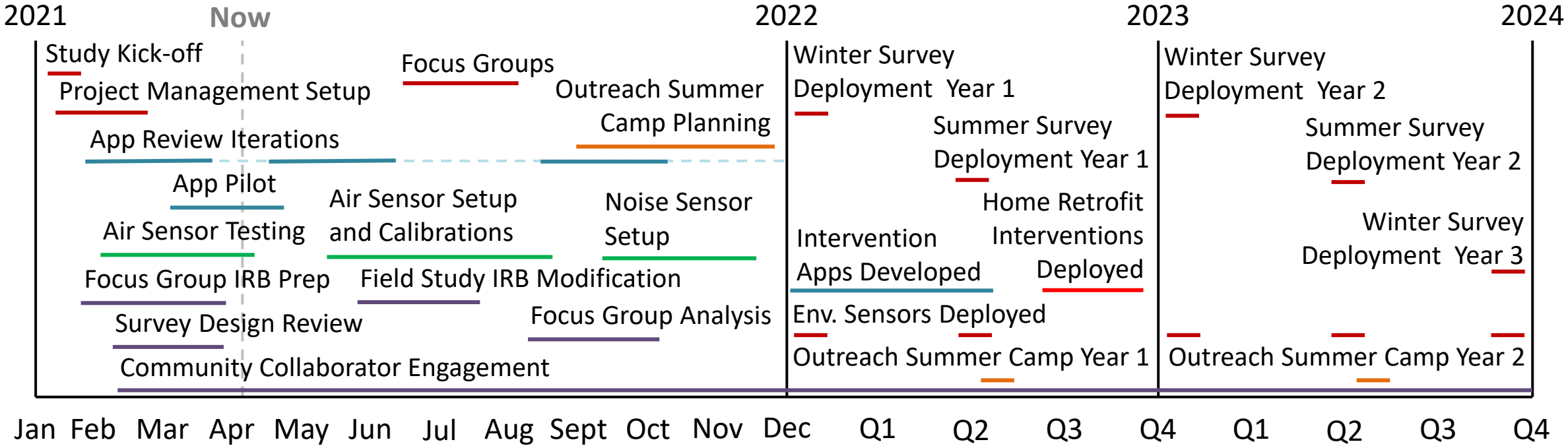
Personal Air Sensor Evaluations and Regional Air Monitoring/Modeling Data

- Testing two options for personal air quality monitoring, Atmotube and Flow 2
- Reviewing approaches to ambient and personal noise monitoring
- Connected with local air monitoring agencies and modeling companies to establish data sharing relationships

Social Science Team Focus:

Focus Groups and Community Collaborator Engagement

- Onboarded 4 community collaborator organizations to project
- Hiring two community connectors
- Focus group IRB submitted
- Survey design review is ongoing
- Submitting abstract to AAAR conference session on env. justice



Project Evolution

Challenges we have learned about during conversations with GESC community collaborators:

*"Recruiting for a three-year study in this community will be difficult due to rapid displacement of the population driven by **gentrification**."*

*"Building **trust** with the community will be critical, as this community has been engaged for environmental justice research in the past, but that research has not always been to the **benefit of the community**. Some community members may be getting **burnt out** from such efforts (e.g., being over-surveyed). Community should not feel like **'test subjects'** in an experiment providing no benefit to them."*

*"Leverage community organizations and the hired community connectors to be trusted front-line **'community champions'** engaging with the community members for recruitment and outreach."*

*"How can this study be **timely and relevant right now**, rather than waiting 2+ years for study results to be shared?"*

*"Housing stock can be very poor quality in this community, and we need to be prepared to deal with **difficult home situations**, such as overcrowding, severe home damage, language barriers, and vulnerable or mistrusting individuals."*

*"How can we implement an **equitable intervention**, and is it fair that only 25 of the 200 participants will be receiving home retrofit interventions?"*

*"Providing a platform for the community to give feedback is powerful, must make community feel **listened to**."*

Anticipated outcomes & success measures for next year

Milestone #1: Focus groups with community members are conducted during the summer of 2021 and the study design is modified according to the feedback received.

- Focus group IRB application is submitted and under review.
- Established relationships with four community organizations to help in recruiting.

Milestone #2: Preparation of the PUREmotion app, air and noise sensors, and study recruiting are complete, and the initial deployment of the research tools for the Winter Year 1 deployment is complete.

- Pilot deployment of the PUREmotion app is currently ongoing.
- Air sensor evaluation is currently ongoing. Planning to finalize sensors to be used and begin validation testing and calibrations once air sensors are purchased.
- Exploring options for ambient and/or indoor air and noise monitoring.
- Working with local agencies (CDOT, CDPHE, DDPHE) and companies (Breezometer) to collect historical monitoring and modeling air quality data from the area, as well as establish these relationships for receiving data going forward.
- Community organizations are engaged and ready to help with recruitment.