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

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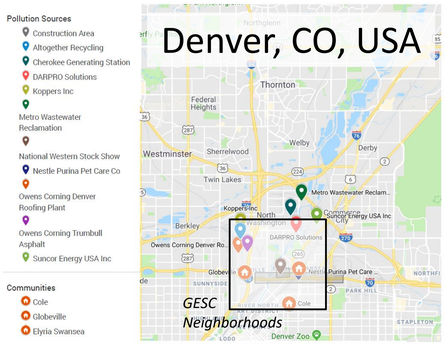
IRG-1 – FY2020

Construction-Related Disruption and Air and Noise Pollution in **Globeville-Elyria-Swansea-Cole (GESC)**

Air and Noise Pollution Sources
- Oil refinery
- Pet food manufacturing
- Asphalt production
- Vehicle traffic
- Industrial emissions

Construction Disruptions
- Central I-70 reconstruction
- Large-scale neighborhood redevelopments

GESC is the most polluted zip code in the USA.



Multidisciplinary Community Engagement in Environmental Justice Research

Engineers, computer scientists, and social scientists collaborating to understand how to best engage with community organizations to:
- Provide value to the community through research;
- Educate the community through research and outreach;
- Conduct citizen science research in an environmental justice community;
- Inform future policy decisions to benefit the community.

Research Organizations ⟺ **Community Organizations**

University of Colorado Boulder

Denver CU IN THE CITY

GROUNDWORK DENVER

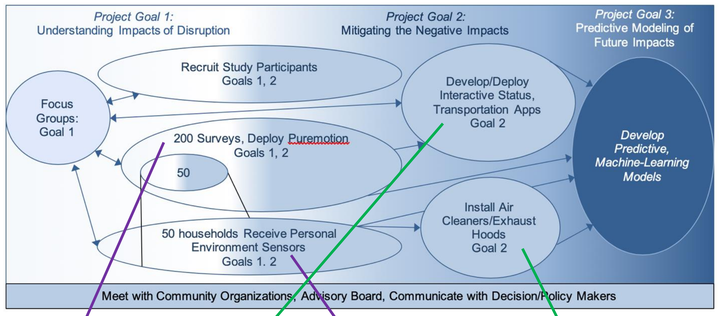
Globeville, Elyria-Swansea Coalition Organizing for Health and Housing Justice

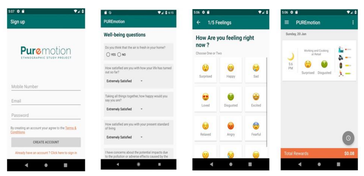
GROWHAUS

ENERGY OUTREACH COLORADO

Research Study Design

Study Goals
1. Understand the impact of construction-related disruptions on an environmental justice community.
2. Mitigate the negative impacts of construction-related disruptions.
3. Predict future impacts of construction-related disruptions.





Key
- Data collection
- Intervention

Research Methods
- **Focus Groups:** 50 participants, starting summer 2021
  - Goal: To understand the community's local knowledge and concerns regarding the interstate reconstruction and neighborhood development projects.
- **Field Study:** 200 participants, starting Q4 2021 and running ~2.5 years
  - 150 Participants: Every 6 months, long-form surveys of health, well-being, environmental acceptability, and transportation acceptability.
    - **Intervention, year 2:** Puremotion app updated for data visualization, transportation assistance, and accessing information regarding construction-related disruptions.
  - 50 Participants: Every 6 months, long-form surveys + one month of daily activities, including:
    - Puremotion short-form surveys of emotional state, health, well-being, environmental acceptability, and transportation acceptability. App also tracks location via GPS.
    - Personal air pollution exposure monitoring.
    - Noise and air pollution monitoring in and outside of homes (method still TBD)
    - **Intervention, year 2:** Half of the participants will receive portable air cleaners and/or kitchen exhaust hood installations to reduce air pollution exposure.

Broader Impacts

Community Engagement
- **Groundwork Denver:** Hiring two community connectors to assist with outreach, recruiting, and field study deployments.
- **GES Coalition, GrowHaus, EOC Colorado:** Assisting with community outreach and recruiting.
- **Study Advisory:** To include leaders from local government (DDPHE) and community collaborators.

Summer Educational Outreach
- Collaborating with the CU Science Discovery to run summer camps for 40 students from the GESC community
- To focus on air and noise sensing to empower **citizen scientists**

University of Colorado Boulder

CU Science Discovery

Project Progress and Next Steps

Focus Groups:
- Methodology developed and IRB submitted in **March 2021**.
- Planning to complete focus groups during **summer 2021** and use this feedback to adjust study design.

Field Study:
- **Q1-Q3 2021** dedicated to planning for initiating field study during **Q4 2021**.
- Puremotion application usability pilot testing is underway, to be complete by end of **Q2 2021**.
- Survey design and implementation is underway, to be complete by end of **April 2021**.
- Personal air pollution exposure sensor testing is underway, calibrations to be conducted **summer 2021**.
- Community organizations are engaged and ready to begin contributing.
  - Hiring two community connectors through Groundwork Denver during **Q2 2021**.
  - Pursuing honoraria for GESC Coalition and GrowHaus involvement.

Project Team

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- Prof. Shelly Miller
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2021 S&CC Principal Investigators' Meeting
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