CIVIC INNOVATION CHALLENGE

RAPID. LOCAL. CO-CREATED. IMPACTFUL.

CIVIC II

Washington D.C.

October 2024

NSF · U.S. Department of Homeland Security · Department of Energy · USDA · METRO LAB NETWORK

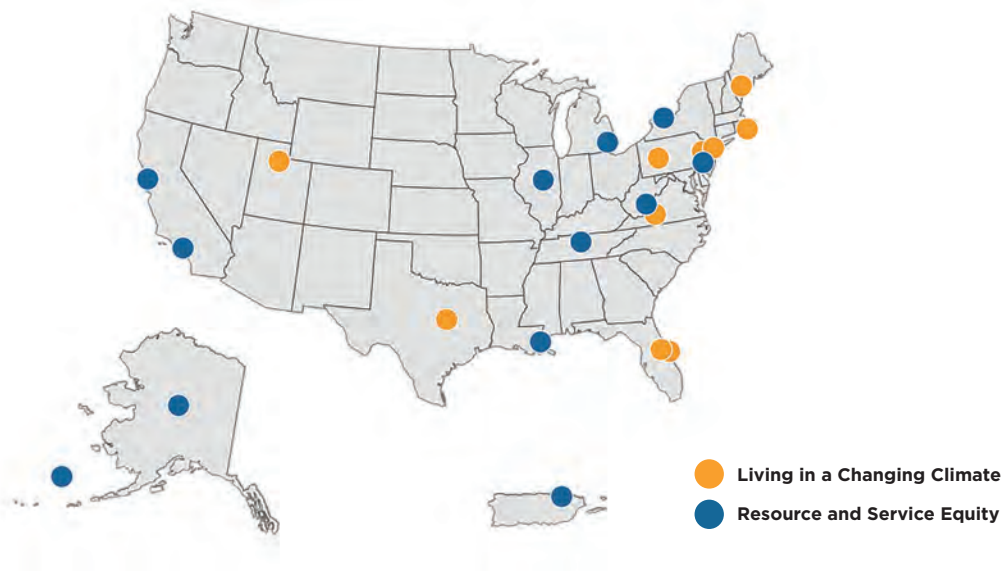
RAPID.
LOCAL.
CO-CREATED.
IMPACTFUL.

CIVIC INNOVATION CHALLENGE

A NATIONAL RESEARCH & ACTION COMPETITION DRIVEN BY COMMUNITY PRIORITIES

The Civic Innovation Challenge is a multi-agency, federal government research and action competition that aims to fund ready-to-implement, research-based pilot projects that have the potential for scalable, sustainable, and transferable impact on community-identified priorities. It aims to flip the community-university dynamic, inviting communities to identify civic priorities ripe for innovation and to then partner with researchers to address those priorities.

For more information, visit nsfcivicinnovation.org



Track 1

Living in a Changing Climate

Pre-Disaster Action Around Adaptation, Resilience, and Mitigation

1 **New Jersey | PI: Clinton Andrews**
Smart Kids and Cool Seniors.

2 **Florida | PI: Jason Evans**
Assessing the Performance of Green Stormwater Infrastructure for Climate Adaptation and Coastal Resilience and Water Management in the City of Cape Canaveral, Florida.

3 **New York | PI: Chen Feng**
Full Building Scans for Targeted Micro-retrofits using Drones, Radars, and Deep Learning.

4 **Texas | PI: Lulin Jiang**
Novel Fuel-Flexible Combustion to Enable Ultra-Clean and Efficient Waste-to-Renewable Energy in Changing Climate.

5 **Utah | PI: Kerry Kelly**
Community Resilience through Engaging, Actionable, Timely, High-Resolution Air Quality Information (CREATE-AQI).

6 **Virginia | PI: Theodore Lim**
Youth-centered civic technology and citizen science for improving community heat resilience infrastructure.

7 **Maine | PI: Dave Reidmiller**
Codeveloping local flood thresholds and high tide flooding predictions with community science and innovative technology.

8 **Florida | PI: Kelly Stevens**
Reimagining Urban Resilience and Education Hubs Using a Community-Engaged, Equity-Centered Approach.

9 **Massachusetts | PI: Kannan Thiruvengadam**
Kickstarting A Youth-Centered Green Economy For The Environmental Justice Community Of East Boston.

10 **Pennsylvania | PI: Tieyuan Zhu**
Leveraging existing fiber-optic cables to identify and manage urban environmental hazards.

Track 2

Resource and Service Equity

Bridging the Gap between Essential Resources and Services & Community Needs

Smart Kids & Cool Seniors

Project Challenge

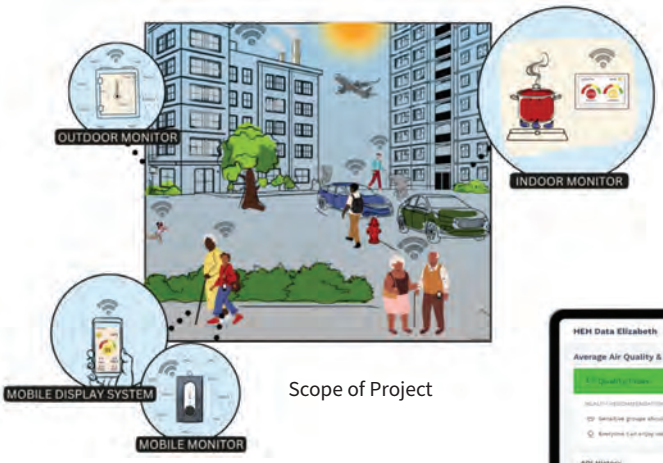
Heat stress and unhealthy air quality are environmental justice concerns for residents living in polluted low-income areas. For vulnerable seniors and youth, extreme temperatures, poor outdoor air quality, and poor indoor air quality pose a risk to their physical and mental well-being. The intricate effects of poverty exacerbate potential vulnerability, and a lack of complete awareness around daily activities and their impact on exposure prevents residents from making educated decisions to reduce exposure.

Research Questions

- What are the effects on residents' behaviors when local air quality and temperature data is shared with them?
- How do personal monitoring devices impact residents' behaviors regarding daily activities?
- What are the short and long-term effects of teaching youth to analyze and map local air pollution and temperature data?

Pilot Outcomes

- The project has created an urban air quality sensor network that includes both indoor and outdoor sensors as well as mobile air quality monitoring devices to help residents understand their personal exposures to heat stress and air pollutants.
- Seniors use real-time and predicted air quality and temperature data flowing from the sensor network to make educated decisions (e.g., stay indoors, visit a cooling center).
- Personal monitoring devices help residents reduce daily exposures through minor changes to daily activities (e.g., opening windows, timing of errands, not burning candles).
- Youth gain a clearer understanding of the sources of air pollution and valuable employment skills.



Scope of Project

Air Quality and Weather Dashboard for Elizabeth, NJ
(Courtesy of Rutgers University)

Elizabeth, New Jersey

NSF Award ID
2322062

PI
Clinton J Andrews,
Rutgers University
New Brunswick

Civic Partners
- Groundwork Elizabeth
- Housing Authority of the City of Elizabeth

Research Partners
- Rutgers University

Assessing the Performance of Green Stormwater Infrastructure for Climate Adaptation and Coastal Resilience in the City of Cape Canaveral, Florida

Project Challenge

The City of Cape Canaveral is a small coastal municipality that is facing increased flood risks due to sea level rise, severe rainfall events, and failing stormwater drainage systems. In addition, the adjacent Banana River Lagoon has in recent years suffered from poor water quality, harmful algal blooms, and fish kills driven in part by regional stormwater pollution. Cape Canaveral's Resilience Division and Stormwater Program have embraced "green stormwater infrastructure" (GSI) techniques that use natural systems to capture, store, and treat stormwater as a primary tool for reducing urban flood risk while at the same time improving water quality. To objectively test the efficacy of GSI to meet these challenges, this project implemented a large "smart rain garden" system in a flood prone area of Cape Canaveral and established a program for monitoring the system's performance in reducing flood risk, improving water quality, creating urban pollinator habitat, and becoming a community amenity.

Research Questions

- How much stormwater can the rain garden sustainably divert from the streets of Cape Canaveral and remove from old stormwater pipe systems that discharge directly into the Banana River Lagoon?
- How well are rain garden's soils and plants treating major pollutants such as phosphorus, nitrogen, heavy metals, and microplastics?
- What is the diversity and abundance of pollinator species in the rain garden, and how will pollinator populations change over time?

Pilot Outcomes

- Construction of the rain garden was completed in April 2024, several months ahead of schedule.
- A sensor network installed in the rain garden is providing real time data for soil moisture, water table level, rainfall, and water quality.
- High resolution multi-spectral imagery and elevation data was collected using advanced uncrewed aerial systems (i.e., drones).
- A citizen science pollinator monitoring program documented the endangered Atala butterfly (Emaeus atala) breeding in the rain garden.

Cape Canaveral, Florida

NSF Award ID
2321162

PI
Jason Evans, Stetson University

Civic Partners
- City of Cape Canaveral, FL
- East Central Florida Regional Planning Council
- St. Johns River Water Management District
- Indian River Lagoon National Estuary Program
- Riverside Conservancy
- Brevard Zoo

Research Partners
- Embry-Riddle Aeronautical University
- Florida Sea Grant, University of Florida
- Florida Institute of Technology

Full Building Scans for Targeted Micro-retrofits using Drones, Radars, and Deep Learning

Project Challenge

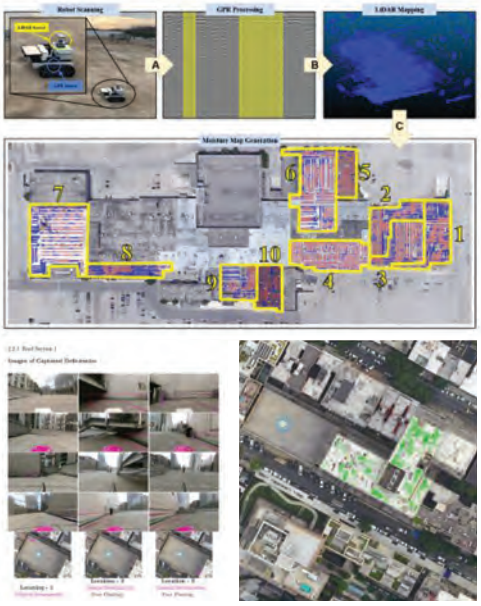
Poorly maintained building envelopes (especially roofs) increase building greenhouse gas emissions and cause quality of life problems. We propose a non-invasive integrated solution to locate moisture intrusion, thermal bridges, and air leaks. This solution will diagnose building envelope issues. The system identifies and quantifies common envelope defects. It applies long-wave radar and deep learning to detect hidden deep moisture penetration and other major envelope defects. With this system, it is possible to perform low-cost, targeted micro-retrofits to address envelope issues.

Research Questions

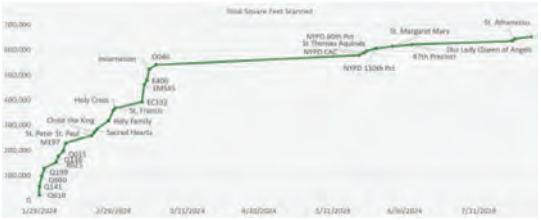
- How effective is AI at finding building envelope issues using thermal and RGB imagery?
- Can self-supervised learning be used to isolate for moisture anomalies?
- How effective is AI at finding moisture in real world roof assemblies?
- How much can micro-retrofits improve occupant quality of life?

Pilot Outcomes

- Finalized technology development and transfer, created BDR, Inc.
- Scanned and analyzed 27 building, covering 600,000+ sqft roofs
- Micro-retrofit on the detected defects
- Technical Comparisons and Social Evaluations (e.g., barriers to adoption)
- Building Inspection Workforce Training



Roofus: Our robotic mapping & AIbased GRP leakage detection.



Scanning progress chart. We finished 27 buildings, more than our original goal of 17 buildings.

Brooklyn, New York

NSF Award ID
2322242

PI
Chen Feng, NYU Tandon

Civic Partners
- Building Diagnostic Robotics
- Archdiocese of New York
- RETI Center
- New York City Office of Technology and Innovation
- NYC 2030 District
- New York City Department of Citywide Administrative Services

Research Partners
- AI4CE Lab
- Diana Hernandez

Novel Fuel-Flexible Combustion to Enable Ultra-Clean and Efficient Waste-to-Renewable Energy in a Changing Climate

Project Challenge

- Biomass waste from landfills, industry, and farms contributes methane which has ~28-36x higher global warming potential than that of CO2.
- Existing landfill flares (LFs) destruct methane but emit other pollutants.
- Existing combustion systems have low fuel flexibility, requiring complex pre- and post-processing for waste-based renewable energy.
- This project is to pilot a Climate-Smart, Waste-Energy Combustor (CSWEC) that enables clean LFs and waste-to-energy (WtE) with high fuel flexibility, near-zero emissions, high resilience for City of Waco and beyond.

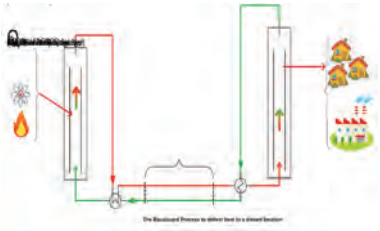
Research Questions

- Will the pilot CSWEC co-enable clean waste management and resilient energy using fuels from various waste with minimal processing?
- How will the pilot CSWEC technology impact air quality, climate, resilience, economy, and equity locally to nationally?

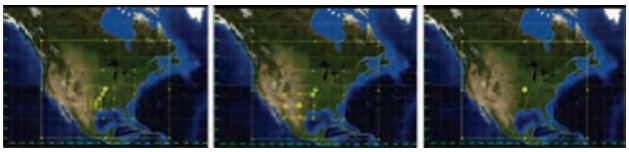
Pilot Outcomes

- A trailed-mounted flare system was sorted out to accommodate designed flare tips integrating Baylor's proprietary CSWEC technique.
- A Qnergy Stirling engine is being modified to integrate CSWEC tech and enable fuel-flexible WtE with near-zero emissions and high resilience.
- Air and climate modeling is established to evaluate the air and climate benefits of the CSWEC over Texas and beyond.
- Techno-economic analysis of the CSWEC-based combined heat and power generation (CHP) for community integration is compared to the Boudouard Process, a CHP concept developed at Baylor.

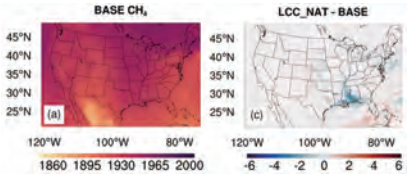
Integration of Baylor's CSWEC tech for clean flare and WtE



The Boudouard Process to deliver heat to a distant location



Air-climate modeling setup locally (Left), regionally (Middle), and nationally (Right)



(Left) Surface CH4 concentrations (ppbv) with current landfill emissions; (Right) Concentration differences between BASE and the scenario with converted CH4 emissions to CO2 nationally.

Waco Hannah Hill Landfill, Waco, Texas

NSF Award ID
2322319

PI
Lulin Jiang, Baylor University

Co-PIs
Alexandre Yokochi, Yang Li, Charles Dowdell

Civic Partners
- The City of Waco
- Vistra Corp.
- Waco Sustainability Network (Green Communities Conference)
- Keep Waco Beautiful
- Cen-Tex Hispanic Chamber of Commerce

Research Partners
- The Perryman Group

Community Resilience through Engaging, Actionable, Timely, High-REsolution Air Quality Information (CREATE -AQI)

Project Challenge

More than 40% of Americans — over 137 million people — live in areas with unhealthy levels of outdoor air pollution. Utah periodically experiences the worst air quality in the US; yet state-run monitoring stations are sparse. Over one half of Utah's counties have no regulatory monitors and receive no air quality forecasts. Children and student athletes are particularly vulnerable to unhealthy air because their lungs are developing. Consequently, individuals making decisions about youth activities lack adequate resources to protect these vulnerable individuals from air quality hazards.

Research Questions

- Can we develop high-resolution, automated hourly air quality forecasts, particularly for locations that lack them?
- Can we effectively deploy a cost-effective air quality sensing network to understand air pollution hazards?
- Can we co-develop effective strategies to translate air quality information into actionable, science-based solutions to protect youth participating in outdoor activities?

Pilot Outcomes

- Deployment of cost-effective air quality sensors on 40 athletic fields and in 17 pre K schools in Utah.
- Co -development of an engaging user interface to access location-specific current and forecasted air quality.
- Development of high-resolution (12 12-km horizontal resolution, hourly) automated, numerical forecasts of air pollution.
- Co -development of guidelines across the state of Utah t o uniformly protect youth in a way that is operationally sound.

Utah

NSF Award ID
10067992

PI
Kerry Kelly, University of Utah

Civic Partners
- Utah Athletic Trainers Association
- Utah High School Activities Association
- Utah State Board of Education
- Utah Parent Teachers Association
- Utah Department of Health and Human Services

Research Partners
- Atmospheric Sciences
- Chemical Engineering
- Communications
- Occupational Health

Youth-Centered Civic Technology, Science, and Art for Improving Community Heat Resilience Infrastructure

Project Challenge

Climate change is increasing the frequency, intensity, and duration of heat waves and is expected to increase their impact on human health and the economy. Urban planning interventions can help communities stay cool. However, community capacity and trust must be built in a way that recognizes lived experiences of historically marginalized communities. The project aims to create social and digital infrastructures for community resilience to extreme heat through deploying youth technology, arts, and urban planning programs in partnership with city government and existing community development and faith organizations.

Research Questions

- How can historical and current trauma in communities be addressed through planning with youth for future community resilience to urban heat?
- How does participation in cross-organization, youth-focused partnerships affect organizational conceptualizations of the problem of urban heat and potential approaches?
- How can digital infrastructure for diverse types of data be designed to facilitate sense-making for the problem of urban heat and priorities for heat resilience?

Pilot Outcomes

- Collaborative planning resulted in the development of Roanoke's first partnership between government and Northwest community-based organizations to apply for federal capital improvements funding
- Partnerships were formed between 16 community-based organizations, 7 government agencies, 6 area churches, and 2 school districts around planning for heat resilience. Total of 606 person-hours spent in collaborative planning
- 8 African-American high school students engaged in 1920 person-hours of community planning instruction and activity; each received 2 college credits
- Hundreds of arts, spirituality, and scientific artifacts uploaded to digital hub to support community resilience planning

HOPE FOR HEAT RESILIENCE

VIRGINIA TECH · ROANOKE · Community ARTS Reach · Ancestral Perspective

ROANOKE COLLEGE · RAISE Roanoke Area Interfaith Stewards of the Earth · Hope Center HELPING OTHERS PURSUE EXCELLENCE · RRHA CITY of ROANOKE REDEVELOPMENT and HOUSING AUTHORITY PARTNERS IN PROGRESS

Northwest Community of Roanoke, Virginia

NSF Award ID

2322085

PI

Theodore Lim, Virginia Tech School of Public and International Affairs

Civic Partners

- City of Roanoke
- Roanoke Redevelopment and Housing Authority
- The Hope Center
- One World Arts
- Ancestral Perspective
- Community ArtsReach
- Roanoke Area Interfaith Stewards of the Earth

Research Partners

- VT Forest Resources and Environmental Conservation
- Roanoke College
- VT Center for Educational Networks and Impacts
- VT Population Health Sciences
- VT Sanghani Center

Co-Developing Local Flood Thresholds and High Tide Flooding Predictions with Community Science and Innovative Technology

Project Challenge

Communities along Maine's 5,000+ miles of tidally-influenced coastline face an urgent need to adapt as a result of sea level rise driving more frequent and widespread flooding. Near and long-term flood projections that combine local water level observations with impacts are foundational to adaptation. However, Maine faces significant barriers to building coastal flood resilience due to 1) sparse tide gauge coverage and observation-based flood thresholds; and 2) the lack of a network of researchers, civic leaders, engaged community members, and resilience practitioners ready to leverage data to support coastal planning and resilience.

Research Questions

- Can we develop a scalable, transferrable, and community-collaborative process for siting, installing, and surveying low-cost tide gauges that can be leveraged for coastal planning and multi-generational engagement?
- Can a well-designed community science program and data platform yield information to support coastal planning and catalyze community engagement, particularly among youth?

Pilot Outcomes

- 5 years of fully supported coastal water level data in 4 communities, with improved data quality via advancements in surveying, tidal datum calculations, and use of radar technology
- 5 local organizations developed place-paced capacity for running and sustaining coastal flooding community science programs
- Data platform for co-displaying water level data and flood impact observations, with over 500 observations contributed to date by Maine community members and students
- 30 classrooms engaged in data collection and multi-generational community climate change conversations through piloting of a new middle and high school sea level rise and coastal flooding curriculum
- $112,000 in non-competitive mini grants to partner communities
- Transferable blueprint for leveraging low-cost water level monitoring and community science to support near-term flood forecasting and long-term planning

Coastal Maine communities of Machias, St. George, Boothbay Harbor, and Portland

NSF Award ID

2321506

PI

David Reidmiller, Gulf of Maine Research Institute

Civic Partners

- Portland Dept. of Public Works
- St. George Selectboard
- Machias Downtown Resilience Committee

Community and Education Partners:

- Portland Trails
- King Middle School
- Herring Gut Science Center
- St. George School
- Maine State Aquarium
- Boothbay Region High School
- Downeast Coastal Conservancy
- Maine Coast Heritage Trust
- Washington Academy

Research Partners

- NOAA National Weather Service
- Hohonu, Inc.
- Northeastern Regional Association of Coastal Ocean Observing Systems (NERACOOS)
- US Harbors

Reimagining Urban Resilience and Education Hubs Using a Community-Engaged, Equity-Centered Approach

Project Challenge

The City of Orlando has identified a recurring need for equitable resilience to enhance Orlando's ability to deliver efficient and secure public services, such as reliable electricity and internet connectivity. Climate change is exacerbating the frequency and severity of extreme weather events that disproportionately impact historically marginalized communities. The Resilience, Education, and Advocacy Center for Hazard preparedness, or REACH hub designed in this project will provide pre- and post-disaster necessities and connectivity and serve as hands-on STEM education centers during non-emergency times.

Research Questions

- What are the benefits of a localized resilience hub for historically marginalized community members?
- What are the key attributes of a portable, scalable, and modular hub design so it can easily be used by the community?

Pilot Vision

- Build 1 pilot REACH hub using design from NSF CIVIC Stage 1 below.
- Conduct 4 test-run demonstrations at 2 community partner locations: Boys & Girls Clubs of Central Florida Levy-Hughes Clubhouse and one other location during "blue" and "gray" skies.

More Information

Visit our project website: https://rises.research.ucf.edu/nsf-civic/

Or contact Kelly Stevens, at Kelly.Stevens@ucf.edu

REACH hub design: Portable, solar powered hub with device charging, broadband internet, display screens, hazard and STEM learning stations, freezer, refrigerator, and inflatable cooling tent using hybrid AC/DC power distribution system.

Orlando, FL

NSF Award ID
2321572

PI
Kelly A. Stevens,
University of Central Florida

Civic Partners

- City of Orlando (M. Hess)
- U.S. Green Building Council (I. Lahiff)
- Boys & Girls Clubs of Central Florida Levy-Hughes Clubhouse
- Hebni Nutrition Consultants

Research Partners

- UCF: School of Public Administration (K. Stevens, Y. Ge, C. Emrich, M. Concha), Electrical and Computer Engineering (Z. Qu), Learning Sciences and Educational Research (L. T. Marsh), Computer Science (L. Wang), Materials Science (K. Davis)

Kickstarting A Youth-Centered Green Economy For The Environmental Justice Community of East Boston

Project Challenge

East Boston is an environmental justice community in the frontlines of climate change. A just transition to a green economy cannot be achieved while leaving youth in such communities behind. How can the youth be the transition? How can they be empowered to discover and overcome impediments, while improving the quality of lives in their own communities right now? What skills do they need to take a scientific and ethical approach in this pursuit?

Research Questions

Social Science

- Why don't people adopt programs with economic, ecological benefits?
- How to connect low-income communities with green jobs?

Bio Science

- How can plant population and diversity improve coastal resilience?
- How can planting and care best practices improve coastal resilience?

Pilot Outcomes

- Through education at Eastie Farm, 40 youth are now empowered to respond to climate concerns. Youth learned through a hands-on approach, working on projects such as Eastie Farm's geothermal greenhouse; a rain garden that reduces flooding in East Boston's greenway; and working to increase adoption of more affordable and healthier options like Boston Community Choice electricity.
- More than a 100 families benefited from this work, by accessing cheaper greener electricity, reducing food waste, and reducing energy bills. These adoptions have saves families money, improved quality of life in the community, and mitigated climate change by cutting carbon.
- Youth are now connected to educational and vocational opportunities through direct links to green job providers, educators, and mentors
- Youth can identify the difference between causation and correlation; they know how to take an experimental and iterative approach to research.
- Youth participants experienced mentorship and care from adults, formed strong bonds with their peers, and have acquired team-work skills.
- They have connected across cultural, ethnic, and linguistic boundaries.

Erosion control in East Boston Greenway

Coastal resilience in tidal wetland

Learning about marine life at Northeastern

Eastie Farm Greenhouse, Boston, MA

Northeastern University, Nahant, MA

Tidal wetland: 102 Border St, Boston, MA

NSF Award ID
2322178

PI
Kannan Thiruvengadam, Eastie Farm

Civic Partners
- East Boston CDC

Research Partners
- Emerald Tutu
- Northeastern
- MIT

Leveraging Existing Fiber-Optic Cables to Identify and Manage Urban Environmental Hazards

Pittsburgh, PA

NSF Award ID
2228314

PI
Tieyuan Zhu, Penn State

Co-PIs:
Lauren McPhillips, Penn State
Zhen Lei, Penn State
David Himes, Franco Harris Pittsburgh Center

Civic Partners
- Kyla Prendergast - City of Pittsburgh
- Beth Dutton - Pittsburgh Water Sewer Authority
- DQE Communications

Research Partners
- Karen Lightman, Metro21 / CMU

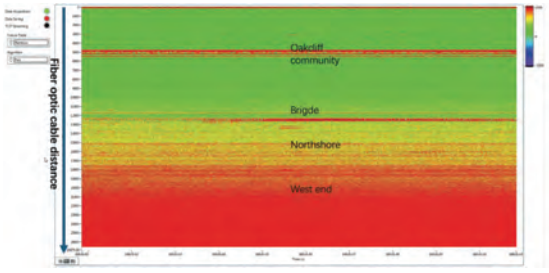
Frequent geohazards, typical in the wet season (April - September)

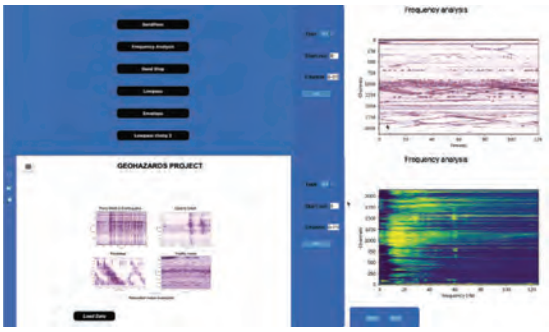
Recently relaunched EngagePGH interactive website with fiber optic sensing array route

Lessons from field experiments:

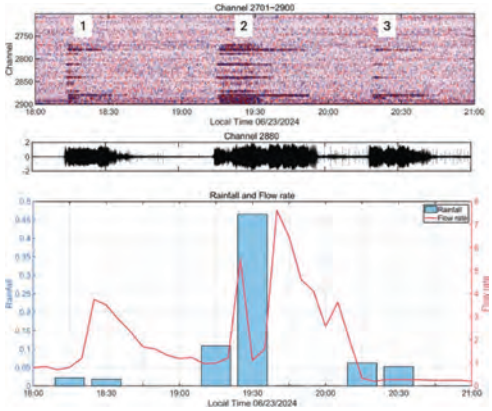
- Sufficient lead time needed with the telecom partner to setup and revise route (6+ months)
- The aging fiber optic network has imbalanced coverage and inefficient routing leading to
- Extensive splicing introducing significant signal loss (75 splices required over 18km)
- Downtown GPS antennae require rooftop mounting which requires permitting.

Real time, remote data view and open-source, non-technical app

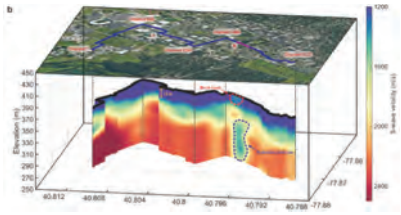




Sewer water flows



Sinkhole detection



Placekeeping: A Co-designed Model for Intergenerational Co-housing & Coalition Building in a University-Adjacent Community

Project Challenge

In response to rapid gentrification and Black American residential displacement, the team is pursuing a community-driven, sustainable equitable development strategy in Mantua– a West Philadelphia Promise Zone neighborhood. In the pilot phase, the collective comprised of researchers, artists, architects and West Philadelphia residents have been co-developing, implementing, and evaluating the Second Story Collective arts-centered model for intergenerational co-housing as an anti-displacement and aging-in-place strategy. This model has the potential to be replicated in similar communities throughout the US, particularly those that have been historically marginalized.

Research Questions

- How can an arts-centered community driven co-housing strategy foster and seek to sustain equitable development in a university-adjacent community?
- How and to what extent does an arts-centered community driven co-housing strategy address systemic inequities in Black American homeownership?
- How and in what ways does an arts-centered community driven co-housing strategy cultivate and seek to sustain social cohesion amongst a diverse, intergenerational collective in a university-adjacent Promise Zone community?

Pilot Outcomes

- Create a home sharing network with an anchor hub for public programming centered around the arts and creativity. Students and neighbors live together in intentional communities rooted in storytelling and sharing
- Provide viable affordable housing and anti-displacement options that benefit the community. Leverage partnerships with city agencies and nonprofits to help older homeowners repair and retrofit their homes
- Support neighborhood families to become homeowners and create generational wealth by partnering with LREP to produce 18 new homes designed from the foundation up as intergenerational co-housing

West Philadelphia, Pennsylvania

NSF Award ID
2322329

PI
Ayana Allen-Handy, Ph. D.
Drexel University

Co-PIs
Rachel Wenrick, MFA &
Christopher Wright, Ph. D.
Drexel University

Civic Partners
- Mantua Civic Association
- Lomax Real Estate Partners
- Studio HADA

Research Partners
- Justice-oriented Youth (JoY) Education Lab
- Writers Room
- Drexel Design Research for Health Lab
- Informal Learning Linking Engineering Science & Technology (ILLEST) Lab
- Museum of Black Joy

Scan QR code to view a complete list of partners and sponsors.

Community Food Mobilization in Chicago

Project Challenge

CF-MOB investigates mechanisms to transform the structures of food production and distribution in ways that center racial justice, sovereignty and community food access. It aims to advance understanding of public procurement's role in investing in local, equitable food supply chain development, while empowering and creating space for Black, Indigenous and People Of Color (BIPOC) food stakeholders to self-determine their participation in it.

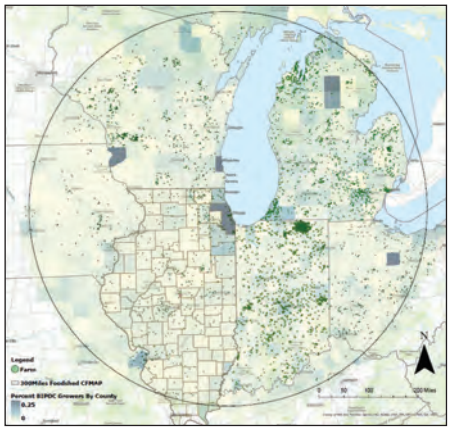
Research Questions

- How might we effectively and equitably incorporate diverse stakeholders' values, meanings and visions for food systems transformation?
- What information, data and models enable greater institutional purchasing from BIPOC producers, leveraging the Metro Chicago Good Food Purchasing Initiative (GFPI) goals?
- What supply chain, policy and participation structures engage BIPOC food communities in culturally affirming, scale-preferred and appropriate strategies?
- What knowledge sharing platforms help to build an inclusive food system culture that honors pluralistic values, offers flexibility in market channels and guides community food mobilization goals?

Pilot Outcomes

- Visualization of pathways and scenarios to inform strategic planning with the Chicago-based coalition
- A catalog of investment opportunities for hard and soft infrastructures needed to rebuild the middle of the regional food supply chain
- A data maturity roadmap to inform values-based purchasing and celebrate an equitable food ecosystem

cf-mob
Community Food Mobilization in Chicago



Growers in Chicago's 300-mile foodshed

Chicago & Cook County, IL

NSF Award ID

2024-67022-41533

PI

Weslynne Astyon,
Illinois Institute of Technology

Civic Partners

- Chicago Food Policy Action Council
- City of Chicago
- Cook County
- Chicago Public Schools
- Chicago Dept. Family & Support Services
- Cook County Juvenile Temporary Detention Center
- Center for Good Food Purchasing
- ChangeLab Solutions
- Community Food Navigator
- Heal Food Alliance

Research Partners

- Illinois Institute of Technology
- Roosevelt University
- DePaul University
- Chicago State University

BRAIDED Food Security: Building Research Aligned with Indigenous Determination, Equity, and Decision-making

Project Challenge

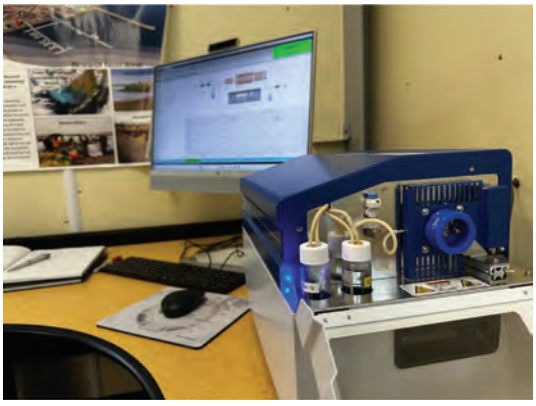
Uncertainty surrounding the safety of traditional foods, due to environmental toxicants, climate change, and natural disasters is a significant challenge for rural coastal Alaskan communities, which are predominantly Indigenous Alaska Native. This project tackled these challenges by empowering coastal communities to take a leadership role in monitoring natural resources by anchoring existing research technology and culturally appropriate training within a Tribal institution, as opposed to an external academic, agency or contract lab.

Research Questions

- Does creating a Tribally-led research program address inequities in food safety, and enhance resilience for Alaskan coastal communities?

Pilot Outcomes

- Developed and delivered workforce training curriculum for community members that braids Indigenous Knowledge and western science, increasing capacity related to food safety monitoring.
- Established fully operational instrumentation for testing traditional foods within the Tribally-owned Bering Sea Research Center.
- Analyzed over 100 samples of traditional foods donated by community members for mercury.
- Created a data-dashboard platform within the Indigenous Sentinels Network for data collection and archival, with Tribal data sovereignty.
- Reduced delays in resident access to and engagement with contaminant data for informed decision-making that balances potential risks with the health benefits of traditional foods and their importance for cultural continuity and community well-being.
- Mentored early-career, student researchers



Analysis instrumentation set up in the Bering Sea Research Center

Dr. Barst and elder Marfa Rukovishnikoff sampling a rockfish for mercury testing

St. Paul Island, Alaska

NSF Award ID

2024-67022-41558

PI

Amy Bishop, University of Alaska Anchorage

Civic Partners

- Aleut Community of St. Paul Island Tribal Gov.

Research Partners

- University of Alaska Fairbanks

Everyday Respect: Measuring and Improving Police Officer Communication During Motor Vehicle Stops

Project Challenge

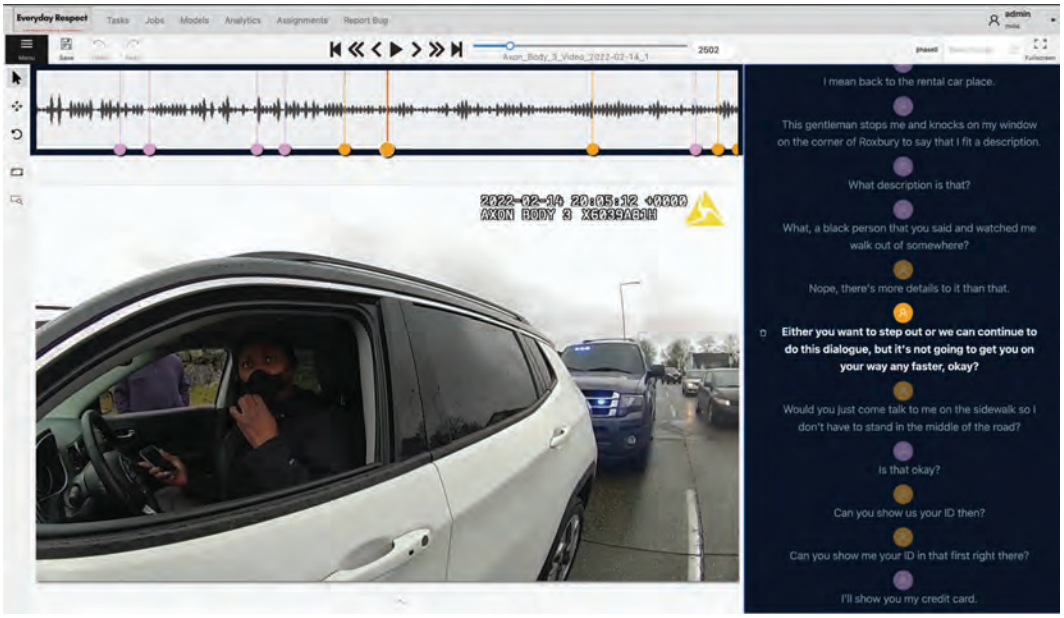
High-quality, equitable policing requires high-quality, equitable communication. Currently, most police-civilian interactions are captured on body-worn video (BWV), but unless something tragic occurs, these recordings are rarely viewed or learned from. Through a partnership with the LAPD and with input from a broad array of community organizations, we are building community-informed, equitable AI tools to analyze these recordings at scale.

Research Questions

- How do views regarding "good" communication from police officers during motor vehicle stops vary across different stakeholder groups? How do views vary across different communities across Los Angeles; LAPD patrol officers; LAPD leadership?
- What situational factors influence the tone and content of officers' initiation communication during motor vehicle stops?

Pilot Outcomes

- Introduction of an open-source platform for annotating body-worn video containing AI tools to assist in annotating multimodal data
- Develop new multimodal, multi-perspective AI models to analyze police body-worn video
- Analyze "good" communication and (de)escalation to inform police training, policy, and practice
- Publicly release new AI tools to foster transparency and accountability



(User interface of the multimodal annotation tool, CVAT-BWV)

Los Angeles, California

NSF Award ID

2322026

PI

Morteza, Dehghani, USC

Civic Partners

- LAPD
- Los Angeles Police Academy
- LAPD Office of Constitutional Policing and Policy
- LEWIS
- USC Safe Communities Institute

Research Partners

- University of Southern California
- University of California, Riverside
- The University of Texas at Austin
- Georgetown University

USC University of Southern California

UC RIVERSIDE

1789 GEORGETOWN UNIVERSITY

TEXAS The University of Texas at Austin

Design for Community Resilience: Participatory Civic Technology to Close the Last-Mile Disaster Relief Gap in Puerto Rico

Project Challenge

Located in the northeast Caribbean Sea and home to 3 million people, Puerto Rico faces a range of natural hazards. Due to climate change, places like Puerto Rico will face more frequent and more destructive disasters. The need to better prepare the archipelago for future disasters is immense and urgent. In particular, recent back-to-back disasters highlight the current information, coordination, and accountability gaps between local communities and agencies in the allocation and distribution of disaster relief resources and services across a multitude of individuals and organizations.

Research Questions

1. How might we deploy participatory design processes to build a more inclusive information and technology platform to overcome the existing barriers across residents, community groups, and agencies?
2. To what degree can stocks of social capital be increased and maintained to increase disaster resilience through this civic technology initiative?
3. How might we incorporate behavioral science principles to effectively sustain and augment people's natural inclination to help others in times of need?
4. What did the participatory design processes we developed to address the questions above teach us about the potential for these processes to serve as models for other similar contexts to build resilience?
5. How might we ensure our software, engagement, and data models for collection, management, and communication are suitable for very different user groups with different technical skills and jobs to be done?

Pilot Outcomes

Launched re+connect, a mobile app that connects people and organizations through collective action and crowdsourced data. The app strengthens community bonds through daily activities, fosters collective preparedness, and enhances disaster relief by encouraging knowledge sharing.

Deeply engaged hundreds of residents, community leaders, civil society/NGO, and government representatives across Puerto Rico through collaborative design and user testing workshops, interviews, and surveys, ensuring the tech is effective, equitable, and inclusive, and fostering ownership, transparency, and collaboration within the communities we serve.

Puerto Rico

NSF Award ID
2321969

PI
Soledad Gaztambide, Foundation for Puerto Rico

Co-PI
Yiyuan Jasmine Qin, re+collective; Robert Soden, University of Toronto; Daniel P. Aldrich, Northeastern University

Civic Partners
- Surcando la Historia
- Ponce NHS
- Junta Innovadora Comunal Villa del Carmen, Inc
- Fundación Ángeles Del Centro Inc.
- Junta comunitaria Residentes de Parcela Suárez Inc.
- OCA
- Escuelas Libres de Sanación
- Academia Menay
- Fundación La Motita Blanca Inc.
- Comunidad Hill Brothers Sur

Research Partners
- re+collective
- Northeastern University
- University of Toronto
- Massachusetts Institute of Technology
- 3 Sided Cube
- Response Innovation Lab
- PollyLabs
- Let's Envision!
- Data Friendly Space

Designing a Decarbonization-Ready Common Home Assessment

Project Challenge

Thousands of households in Detroit, MI need billions of dollars in home repairs to address urgent health and safety risks and high energy burdens. No single funding assistance program can address the myriad needs at scale. Navigating duplicative home assessments confuses households, frustrates provider organizations, and misses decarbonization opportunities. Diverse stakeholders are open to collaboration to develop and share resources to improve outcomes for low-income households.

Research Questions

- What practices from the pilot should be continued or added to ensure long-term sustainability?
- In what ways does the decarbonization module add value for stakeholders?
- What other considerations must be addressed to bring the pilot to scale and support transferability?

Pilot Outcomes

- Developed a decarbonization-readiness home assessment module that is integrated with the Detroit Home Repair Fund assessment and surveys to receive feedback from stakeholders and clients
- A transferable model for integrating beneficial electrification, solar readiness, and other health, safety, weatherization, and efficiency
- Predictive home energy modeling showing the interaction between local utility prices and energy savings from home energy upgrades to optimize savings and decarbonization

Comprehensive protocols could reduce confusion, streamline access to funding, accelerate decarbonization, and improve outcomes for low-income households.

Detroit, Michigan

NSF Award ID
2321865

PI
Anissa Rodriguez Dickerman, Pecan Street Inc.

Civic Partners
- Jefferson East, Inc.
- Green & Healthy Homes Initiative (GHHI)

Research Partners
- Pecan Street
- University of Michigan

Community Informed AI-Based Vehicle Technology Simulator with Behavioral Strategies to Advance Neurodiverse Independence and Employment

Project Challenge

Address the transportation and employment challenges autistic adults face in the US with an affordable AI-driven virtual driving platform and an innovative curriculum. This project enhances AI algorithms for customized driving instruction, promoting independence and employment for autistic individuals. It contributes to a more inclusive community and impacts broader areas such as community planning, health, and well-being, fostering a society that values neurodiversity.

Research Questions

- Technical Question: What modifications are needed to enhance our virtual driving simulator, curriculum, and implementation guides to meet community needs better?
- Social Science Question: What factors influence the implementation and sustainability of our virtual driving training program across different settings?
- Outcomes Question: How successful is the pilot deployment of our driving simulator and curriculum in terms of system use, individual outcomes, community impact, and long-term viability?

Pilot Outcomes

- **Cohort 1 Deployment:** Successfully implemented the virtual driving simulator and curriculum across 3 service settings.
- **Technology & Curriculum Enhancements:** Added new simulator features (e.g., lane-keeping errors, improved eye gaze data) and updated user manual and curriculum with clearer terminology and additional content.
- **Cohort 2 Preparation:** Integrated feedback from Cohort 1, updated equipment, and prepared for program delivery at 4 new sites.
- **Sustainability Planning:** Launched tech transfer and commercialization efforts, aiming for self-sustainability by 2025.

The project's virtual driving platform features a simulated environment, eye-tracking technology, physiological sensors, and an innovative curriculum. This setup enables in-depth data collection on driver performance, attention, and cognition, leading to insights that enhance driving safety and improve driver education.

Nashville, TN
San Diego, CA
Wilmington, DE
Pittsburgh, PA
Knoxville, TN

NSF Award ID

2322029

PI

Nilanjan Sarkar,
Vanderbilt University

Civic Partners

- Intricate Mind Institute
- The Precision Institute
- ABS Kids
- Autism Tennessee
- Pittsburgh Public Schools
- Breakthrough Clinic
- San Diego Unified School District: T.R.A.C.E.

Research Partners

- San Diego State University
- The Frist Center for Autism and Innovation

Creating the West Virginia Flood Resiliency Framework for comprehensive disaster response and long-term community recovery

Project Challenge

West Virginia has extremely high flood risk and lacks adequate resources for disaster preparation, response, and recovery. The West Virginia Flood Resiliency Framework (WVFRF) is a freely available online toolkit that is designed to serve as a hub of information to assist communities across the disaster management cycle from understanding flood risk to preparation for and management of a flood disaster.

Research Questions

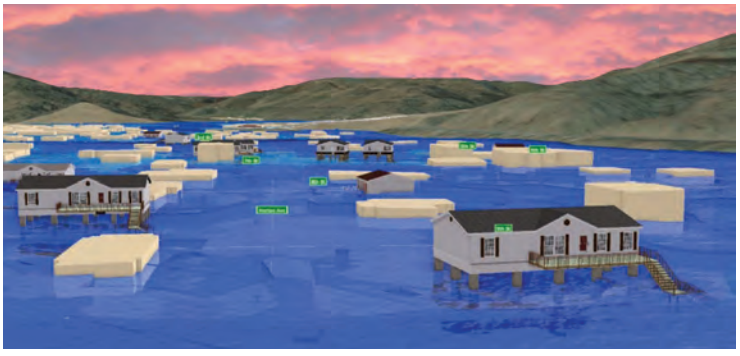
1. How fully have West Virginians recovered from past floods, and how resilient are they against future flooding?
2. What flood risk knowledge is needed to promote resiliency in WV?
3. What are best practices for flood response and recovery in WV?

Pilot Outcomes

The West Virginia Flood Resiliency Framework contains:

- Results of a statewide flood vulnerability survey
- A best practices guide for disaster preparation and flood response
- Floodplain management trainings
- The WV Risk Explorer tool that can be used to understand and visualize riverine flood risk at nine geographic scales

WVFRF Team at Flood Symposium



Inundation scenario of a 1%-annual-chance (100-year) flood in Rainelle, WV

West Virginia

NSF Award ID

2228492

PI

Jamie Shinn, SUNY College of Environmental Science and Forestry (ESF)

Civic Partners

- WV GIS Technical Center
- WV State Resiliency Office
- WVU Land Use & Sustainable Development Law Clinic
- WV Voluntary Organizations Active in Disasters
- Meadow River Valley Association
- Greenbrier County Homeland Security & Emergency Management

Research Partners

- Aaron Maxwell, West Virginia University
- Julian Levine, WV School of Osteopathic Medicine

Bridging the Rural Justice Gap: Innovating & Scaling Up Civil Access to Justice in Alaska

Project Challenge

92% of civil legal issues facing low-income Americans go unaddressed, including evictions, domestic violence, and illegal debt collection. In Alaska, the rurality of the population, and particularly of Alaska Native communities, only compounds these challenges. Through regulatory, technological, and programmatic innovations, the Community Justice Worker (CJW) Program trains and supervises qualified non-lawyer justice workers to scale access to justice throughout rural Alaska.

Research Questions

- How should the program be structured to effectively recruit advocates and win the support of the public and regulatory bodies?
- How can CJWs be supported to succeed in their legal practice and within the communities they serve? What will help CJWs and the program thrive?
- What data will provide the most robust, useful data for program evaluation?

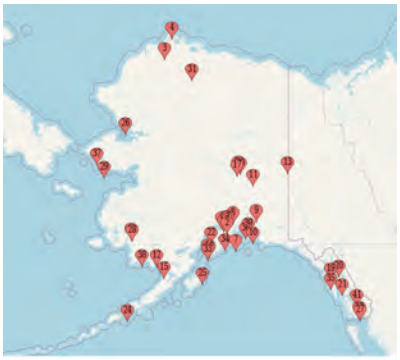
Pilot Outcomes

Launched the Community Justice Resource Center, leveraging skills, technology, trusted relationships and regional expertise to advance justice work through development of a credentialing system and CJW support best practices focusing on CJW retention, expansion, and workforce development.

Expanded CJW presence to over 40 communities statewide.

Received grant commitments and state and federal funding totaling approximately $6 million to grow and sustain the Resource Center.

The four-pronged approach will result in effective, evidence-based practices that scale and sustain the CJW program.



The Community Justice Worker Resource Center supports CJWs statewide. The map shows communities that currently have at least 1 trained CJW.

Alaska

NSF Award ID
2228588

PI
Michele Statz, University of Minnesota Medical School

Civic Partners
- Alaska Legal Services Corporation
- Alaska Native Tribal Health Consortium
- Alaska Pacific University

Research Partners
- University of Minnesota Medical School
- American Bar Foundation

Bridging the Gap between Essential Emergency Resources and Services and the Deaf and Hard of Hearing Community in Monroe County NY: A Geospatial-Visual Approach

Project Challenge

Hearing loss affects many in the U.S., yet the Deaf and Hard-of-Hearing (DHH) community is often overlooked in emergency management, creating critical gaps. Our pilot in Monroe County, New York - home to the largest per capita DHH population - aims to address these gaps. We explore how emergency protocols can be adapted to serve DHH individuals better and what strategies public safety professionals can implement to improve communication and inclusivity during crises.

Research Questions

- What are the spatial relationships between the DHH community and hazards that may reveal specific gaps in emergency services for the DHH?
- What are the messaging and communication needs of the DHH community during all phases of the emergency management cycle?
- What pedagogical practice is needed for education and workforce development of emergency management practitioners on the needs of the DHH community and the inclusion of DHH community members in emergency management training?

Pilot Outcomes

- Disability and language access research
- DHH population mapping tools
- First responder DHH communication booklet
- Visual and haptic DHH alert system
- DHH emergency education modules
- Emergency management education and career pathways for DHH students

This emergency communication booklet helps public safety officials communicate directly with Deaf and Hard-of-Hearing individuals using visual tools during emergencies.
Photo: Jason Rotoli, MD.

Pilot Location: Rochester NY, Monroe County, NY

NSF Award ID
2322255

PI
Brian Tomaszewski, Rochester Institute of Technology

Civic Partners
- Monroe County Office of Emergency Management
- Deaf Refugee Alliance
- Rochester Recreation Club for the Deaf

Research Partners
- Rochester Institute of Technology
- University of Rochester
- National Technical Institute for the Deaf (NTID)
- Center on Access Technology

RIT

RIT
NTID

Streamlining and Supporting Access to Public Assistance Programs in Louisiana

Project Challenge

Public assistance programs are often undersubscribed, with large shares of eligible families not participating despite the apparent short-term economic benefits to families and long-term benefits to children. This project seeks to address the barriers to enrolling in two public assistance programs for young children: public early childhood education (ECE) and the Supplemental Nutrition Program for Women, Infants, and Children (WIC). During this pilot, randomly selected applicants for the Supplemental Nutrition Assistance Program (SNAP) in Louisiana were offered either (1) information about and links to ECE/WIC or (2) an option to automatically start their applications for these programs using their SNAP application answers.

Research Questions

- What are the effects of providing information about WIC and ECE programs and likely eligibility to SNAP applicants?
- What are the additional effects of streamlining the application process for WIC and ECE programs for SNAP applicants?
- What factor(s) will determine whether the participating government agencies adopt and sustain the use of these information supports and streamlined applications?

Pilot Outcomes

- The pilot is still underway, but to date, 2,610 SNAP applicants with children under age 5 have used the pilot site, with roughly 1,600 applicants offered information or application support for WIC, and 350 offered information or application support for ECE.
- When offered the option to receive information about WIC or ECE, roughly 60% of applicants said that they were interested in these programs. When offered the option to start their applications, 40% said yes.
- Interviews with government agencies are underway to identify factors that would facilitate the long-term adoption of a streamlined application.

New Orleans, Louisiana

NSF Award ID

2322214

PI

Lindsay Weixler,
Tulane University

Civic Partners

- Agenda for Children
- Jefferson Parish Schools
- Louisiana Dept. of Children & Family Services
- Louisiana Dept. of Health
- New Orleans Mayor's Office of Youth and Families
- New Orleans Public Schools

Research Partners

- Tulane University
- Brookings Institution
- Code for America

Participatory Action Research to Enhance Equity and Prevent Moral Injury in Community Paramedicine

Project Challenge

In San Francisco and across the United States, community paramedicine (CP) programs respond to complex problems facing vulnerable populations, including residents experiencing homelessness, addiction, and mental illness. While the populations they serve have experienced inequities, there is little known about how to evaluate and improve equity in access to these lifesaving services. In addition, in the context of inadequate resources and repeated traumatic exposures, community paramedics experience moral distress and injury. This civic-partnered participatory action research study aimed to assess and intervene on the interrelated issues of equity and moral injury at both the structural level and individual level.

Research Questions

- What is the scope of moral distress and injury among SFFD members?
- What intervention strategies prevent moral distress and injury and reduce their negative impacts among street response team members?
- Does a group-based intervention on equity improve community paramedics' understanding of diverse clients?
- Can a city-wide data integration strategy facilitate equity evaluation while reducing the field based data collection burden?

Pilot Outcomes

- The project quantitatively and qualitatively assessed moral injury among first responders, finding symptoms are common in this group.
- The team's peer conversations intervention on equity, ethics, and moral injury were well-received and are being sustained internally.
- SFFD conducted the first equity analysis of CP programs and San Francisco's All Street Outreach Integrated Datasets (ASTRID) data system will soon roll out, facilitating improved client care and system-level tracking, analysis, and modeling to enhance equity.
- The team hosted the first state-wide EMS data equity conference with participants from 22 counties and runs an ongoing Learning Community to build capacity for improving equity state-wide.
- The team has worked extensively with peer support specialists to document how peers can enhance street outreach and crisis work.

San Francisco, CA

NSF Award ID
2322023

PI
Miranda Worthen,
San José State University

Civic Partners
- San Francisco Fire Department (SFFD)
- Richmond Area Multi-Services Inc. (RAMS)

Research Partners
- San José State University (SJSU)
- University of California, San Francisco (UCSF)
- San Francisco Veterans Affairs Health Care System (SFVAHCS)

Collaborative Team:
- SFFD: Joseph Graterol, Michael Mason, Daniel Nazzareta, Simon Pang, and April Sloan
- SJSU: Soma de Bourbon and Miranda Worthen
- UCSF/SFVAHCS: Shira Maguen
- RAMS: Richard Zevin

MetroLab Network

Role within CIVIC

MetroLab Network is a non-profit brings together local governments, universities, and key stakeholders to ensure civic research is actionable and brings catalytic impact into communities. MetroLab Network supports the Civic Innovation Challenge (2223449) by providing expertise on partnerships and pilot projects and connecting this work with a growing ecosystem of innovators.

Priority Questions

When reviewing feedback and designing program support for CIVIC, MetroLab reflects on the following questions.

- What support do CIVIC teams need during Stage 1 to help create a successful Stage 2 proposal?
- What kinds of events and convenings help foster community between teams, and their larger audiences?
- How can MetroLab assist CIVIC teams in achieving transferability, sustainability, and scalability for their Projects?

Outcomes

As part of The Civic Innovation Challenge program team, MetroLab aims to support awardees through both Stages of CIVIC by designing and implementing programming that fosters community, and supports the goals of the grant. More specifically,

- MetroLab Network prioritizes facilitating a community of practice among awardees
- MetroLab supports teams in retaining the transferability, scalability, and sustainability of their projects.
- MetroLab fosters the CIVIC community through in-person and virtual activities, aimed at enhancing the teams' capacity-building, networking, impact, and ability to create methods and solutions transferable to other communities.

METROLAB NETWORK

Washington, D.C.

NSF Award ID
2223449

PI
Kathleen Burns, MetroLab Network

Partners
- The National Science Foundation
- The U.S. Department of Energy
- The U.S. Department of Homeland Security
- The U.S. Department of Agriculture

NOTES

NOTES

MetroLab Network is a non-profit in Washington DC that supports city and university collaboration on innovation. Launched in 2015 as part of the White House Smart Cities Initiative, MetroLab's expertise lies at the intersection of community priorities, civic innovation, and research, drawing from a range of experience leading federal programs. MetroLab Network supports CIVIC, developing a community of practice among the teams to build an ecosystem of community innovators.

JOIN THE CONVERSATION ONLINE

#CIVIC
@metrolabnetwork
@NSFCIVIC

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