Community Collaboration for Co-Creation

Designing Technology for Social Justice & Health

Penn Nursing
University of Pennsylvania

Penn Engineering
University of Pennsylvania

# PENN4C 2ND ANNUAL AWARDEE CELEBRATION

Tuesday, November 19, 2024
5:30-7:30pm EST
University of Pennsylvania, Houston Hall
Ben Franklin Room
3417 Spruce Street, Philadelphia, PA 19104

# Who we are

The Penn4C Collaboratory is an initiative led by the University of Pennsylvania School of Nursing (SON) and the School of Engineering and Applied Sciences (SEAS), based on the recognition that technological solutions should be designed with active engagement of marginalized communities with the explicit goal to challenge rather than reproduce or exacerbate structural inequalities as technology often does. Penn4C focuses on the health care needs of low-resource high-need populations and marginalized groups. We work with a Community Board with members of groups or organizations that can provide the perspectives of high-risk, low-resource communities as well as advice on critical issues of social justice and serve as advocates as we broaden and deepen our community outreach. The priorities of the Collaboratory focus on three areas: Research, Education, and Community Engagement and Outreach.

**Research**

In order to facilitate research activities that address social justice through designing and implementing solutions to improve health, well-being, and safety, we fund research projects that will require engagement of faculty and students as well as active community engagement.

**Education**

Our long-term goal is to foster interdisciplinary educational activities and synergies for students in SEAS and SON (as well as other disciplines) at all levels (undergraduate, graduate and post-doctoral).

**Community Engagement and Outreach**

We invite Community Members to actively serve on our Board. Additionally, we aim to increase awareness of the Collaboratory both within and beyond the Penn Campus so as to allow researchers in the two Schools and on campus to identify and build community partnerships and create a platform that fosters co-creation.

**https://www.penn4c.org**

# Accomplishments

Penn4C has enabled the assembly of new interdisciplinary teams between SON and SEAS, including faculty, students and staff to actively co-collaborate with numerous communities in Philadelphia and beyond.

The research projects address various societal challenges and significant community needs across the area and across the life span. Our community co-collaborators both serve their local communities including Hunting Park-East Tioga (North10), South (Philly Thrive) and West Philadelphia (Rebel Ventures, West Philadelphia Senior Citizens Center), Chester County (LCH Health and Community Services) as well as city wide projects (Creative Resilient Youth, Connectedly). The individual projects collectively support all ages across the lifespan including youth, high school students (expanding to K-8), homebound adults, young adults, senior citizens and the general communities in which they are located. All projects funded by Penn4C have student engagement.

The Penn Community Collaboratory for Co-Creation (Penn4C) has funded eight projects totaling $383,635 in research support. Five projects were awarded in 2023 and an additional three this year. Dollars to the community totaled $141,821.

We have expanded our internal network to engage investigators from other Penn Schools, including the School of Social Policy and Practice, Stuart Weitzman School of Design and the Annenberg School for Communication. Additionally, we continue to expand our connections to local and regional communities and identify opportunities for co-design of innovative solutions that address actual community needs.

# PENN4C EXECUTIVE BOARD

**George Demiris PhD, FACMI**
Associate Dean for Research and Innovation,
Mary Alice Bennett University Professor, School of Nursing & Perelman School of Medicine

**Mark Yim, PhD**
Asa Whitney Professor of Mechanical Engineering
Director, GRASP Lab

**Pamela Z. Cacchione, PhD, CRNP, GNP, FGSA, FAAN**
Ralston House Endowed Term Chair in Gerontological Nursing
Professor of Geropsychiatric Nursing

**Sevile Mannickarottu, MS**
Director, Technological Innovation & Entrepreneurship
School of Engineering and Applied Sciences

**Marion Leary, PhD, MPH,RN**
Director of Innovation
School of Nursing

**Ann Muramatsu**
Penn4C Outreach Facilitator
Associate Director, Personal Health Informatics Lab
School of Nursing

**Stacey D. Brown, MSW**
Project Manager
School of Nursing

# STUDENT MEMBERS

**Shiny Shen**
Bachelor's of Science
Bioengineering
Class of 2026
Student Member

**Julie Szymaszek**
Accelerated Bachelors of Science in Nursing/ Masters of Nursing in Adult – Gerontology Primary Care
Student Member

# COMMUNITY BOARD

**Jovan Bennett**
Director
Penn Center for Community Health Workers

**Ayana Bradshaw, MPH**
Executive Director
The Health Promotion Council of Southeastern Pennsylvania

**Alison Corter**
Director
Strategic Initiatives
NewCourtland

# Community Groups

asian arts initiative

CRY CRY CRY

Connectedly

LCH
HEALTH AND COMMUNITY SERVICES

HUNTING PARK–EAST TIOGA
NORTH10
PHILADELPHIA
STRENGTH ★ PROMISE

PHILLY THRIVE
RIGHT TO BREATHE

WPSCC
LCFS

ReBeL

# 2024-2025 AWARDEES

# Developing an AI Companion Prototype for Homebound Adults

**Community Lead**
Marypat Tracy, MSW, LCSW
Executive Director
Connectedly

**Nursing Lead**
Lea Ann Matura, PhD, RN, FAAN
Associate Professor of Nursing

**Engineering Lead**
Insup Lee, PhD
Cecilia Fitler Moore Professor of
Computer and Information Science

**Engineering Co-Lead**
Oleg Sokolsky, PhD
Research Professor of
Computer and Information Science

# Project Scope

This project aims to address the epidemic of loneliness and social isolation in the United States (US) among homebound older adults. Loneliness increases the risk of premature death by 26% and social isolation by 29%. There is a paucity of interventions that have been rigorously tested to combat loneliness. The interdisciplinary team and community partner (Connectedly©) propose developing an AI companion with input from the end users to determine what the prototype would look like and how it would function. In a multi-phase project, the objective is to develop an AI companion prototype for homebound older adults.

Connectedly

# Community Site

Connectedly has a 40 year history of creating social connections for underserved and vulnerable older Philadelphians by strengthening community support networks, reducing social isolation, and improving the well-being of older adults, especially women and their families.

https://connectedly.org

# LCH Community Health Center Patient Engagement: A Collaboration Exploring Digital Determinants of Health for Promoting Health Equity

**Community Lead**
Margarita Garay-Zarco
Director of Human Resources
LCH Community Health Center

**Nursing Lead**
Adriana Perez, PhD, ANP-BC, FAAN
Anthony Buividas Term Chair in Gerontology
Associate Professor of Nursing
Senior Fellow at the Leonard Davis Institute of Health Economics, University of Pennsylvania

**Nursing Co-Lead**
Carmen Alvarez PhD, CRNP, CNM, FAAN,
Associate Professor of Nursing

**Engineering Lead**
Damon Centola, PhD
Elihu Katz Professor of Communication, Sociology and Engineering

# Project Scope

The objective of this Phase 1 formative work project is to use a mixed method design to quantitatively and qualitatively explore digital determinants of health (DDoHs) at the individual, interpersonal, community, and societal levels. In collaboration with LCH Health and Community Services, this study is guided by the adapted National Institute of Minority Health Disparities/National Institute on Aging (NIMHD/NIA) framework that incorporates a digital environment domain to understand health disparities across the lifespan. Findings may inform the development and testing of culturally and linguistically tailored digital health tools to optimize patient health outcomes in a predominantly farm working community.

# Community Site

LCH's mission is to improve the health and well-being of people and communities by providing high quality healthcare, resources, and social services.

LCH sets the highest possible standard for community health and wellness by creating and sustaining the resources, conditions, and opportunities that enable all LCH patients and community members to experience their optimal health and wellness.

**https: //lchcommunityhealth.org/**

# Building a Virtual AI Platform for Finger Exercise to Increase Exercise Accessibility and Social Interaction for Older Adults with Disabilities

**Community Lead**
Rose Richardson
Executive Director
LCFS's West Philadelphia Senior Community Center

**Nursing Lead**
Jianghong Liu, PhD, RN, FAAN
Marjorie O. Rendell
Endowed Professor in Healthy Transitions
Professor of Nursing

**Engineering Lead**
Jianbo Shi, PhD
Professor of Computer and Information Science

# Project Scope

This proposal aims to develop and test an AI-driven virtual platform for finger exercise, designed to enhance health and well-being in older adults  with disabilities by providing real-time monitoring and interactive group sessions, making exercise accessible, engaging, and sustainable.

# Community Site

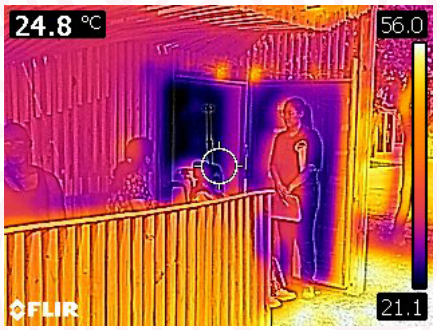
West Philadelphia Senior Community Center, WPSCC, is a program under the Lutheran Children and Family Service. They are driven by their dedication to the well-being and choices of the older adults they serve — with each individual's unique preferences accommodated by the variety of different avenues  provided to age successfully, maintain health, nurture inspiration, build resiliency, and/or renew hope. As a faith-based organization, Liberty Lutheran also partners with churches across eastern Pennsylvania to bring the love, hope and peace of Christ to those who are vulnerable.

https://libertylutheran.org/about-liberty/leadership-team/

# 2023-2024 AWARDEES

## PROJECT UPDATES

# Heat Islands




Penn researchers worked with North10, a nonprofit in North Philadelphia, to bring a prototype cooling shelter to Hunting Park in August. Researchers from the Weitzman School of Design, School of Engineering and Applied Science, and the School of Nursing developed a novel prototype to address Heat Islands. The solar-powered wooden bus shelter, TENOPY (named to reflect the heat canopy and the location at North10) is a fully solar-powered, shaded, open-air urban cooling shelter, with a cooling bench, and condensation-free radiant panels.

The structure was tested in an event at the Lenfest Center, headquarters of the North 10 organization, on August 6 2024. During the event, the structure was erected. This created the opportunity for public experience of the structure. Surveys were conducted amongst local community members in English and Spanish to elicit feedback on response to the TENOPY along with perceptions of the impact of heat stress and heat waves on health and social needs. Survey implementation included the contribution of undergraduate students from the Schools of Nursing and Engineering.

Photo courtesy of Eric Sucar/University Communications

**Community Lead**
Nikki Bagby
Chief External Affairs Officer
North10 Philadelphia

**Nursing Lead**
Sara Jacoby, MPH, MSN, PhD, FAAN
Associate Professor of Nursing

**Engineering Lead**
Paulo Arratia, PhD
Professor of Mechanical Engineering & Applied Mechanics

**Design Lead**
Dorit Aviv, PhD, AIA,
Assistant Professor of Architecture at the Weitzman School of Design

https://penntoday.upenn.edu/news/cooling-shelter-novel-community-driven-response-heat-islands-philadelphia

https://lnkd.in/edEpGkcm

# Digital Healing: Co-Creating Youth Digital Creative Arts Space for Community Wellbeing

To address ongoing mental health challenge of BIPOC young individuals in the Philadelphia region, the Digital Healing project is collaboratively developing an AI-driven youth digital co-creative arts space for community healing . The Digital Healing project is unique in adopting design justice principles in the end-to-end co-design of mental health support to young people through digital creative arts.

The team including Computer and Information Science Students, Sebin Lee and Manvi Kaul, along with Integrated Product Design Student, Eileen Feng, have worked with our community partner Creative Resilient Youth's  Community Lead, Avani Alvarez, and Community Creative Lead, Taylor Townes. Together they have successfully completed the initial phase of their research.

The team has recruited 10 youth BIPOC co-designers and has conducted ten co-design sessions focused on: developing shared language and goals, collaborative learning and synthesis. Additionally they have held one art-making session at their community partner's site, allowing co-designers to connect with others in person through art.

The students have worked alongside the Faculty leads and are co-developing the digital healing web application. They are consolidating the design features and developing a low/mid-fidelity prototype. Once the co-design flow in Figma, is developed the initial tech prototype will be tested with  community members.

**Community Lead**
Andrea Ngan
Co-Director
Creative Resilient Youth (CRY)

**Social Policy and Practice Lead**
Siva Mathiyazhagan, PhD MSW
Research Assistant Professor

**Engineering Lead**
Sharath Chandra Guntuku, PhD
Research Assistant Professor of
Computer & Information Science

**Nursing Lead**
Seul Ki Choi, PhD, MPH
Research Assistant Professor

# Re-Imagining Childhood Asthma and Electronic Health Records: A Community-Based Approach

Asthma is a major non-communicable disease affecting children, especially those from marginalized communities, because of limited access to information. This project will explore how medical information systems can be improved to provide better care for young, marginalized asthma patients.

The team has cultivated and deepened relationships with Philly Thrive through regular meetings and Penn4C hosted events. They have conducted interviews with parents of children with asthma. Preliminary qualitative analysis has provided evidence of (1) what it is that interviewees find useful in their health records for managing asthma; (2) obstacles to use of health records (e.g., digital vs. paper availability); (3) and the stakeholders involved (e.g., what information needs to get communicated to children, the children's teachers, other medical providers, etc.).

The team continues to work towards our goal of designing a community-based EHR system for caretakers of children with asthma.

**Community Lead**
Sonya Sanders
Community Organizer
Philly Thrive

**Nursing Lead**
Kenrick Cato, PhD, RN, CPHIMS, FAAN
Professor of Nursing CE

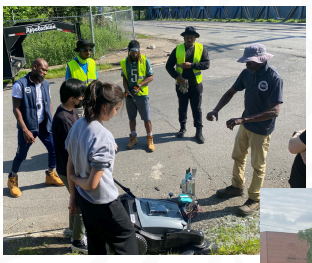
**Engineering Lead**
Andrew Head, PhD
Assistant Professor, Computer and Information Science

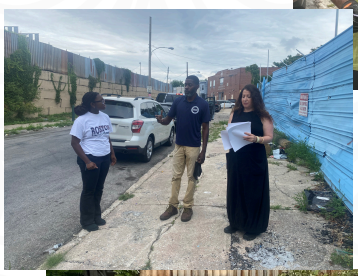
**SP2 Lead**
Aviv Landau, PhD, MSW
Research Assistant Professor
School of Social Policy and Practice

# The impact of land care in North Tioga-East Huntington Neighborhood of Philadelphia: Building occupational and public safety into North10's neighborhood beautification initiatives

Students Ling Xu and Ming Zou worked with the team at North 10 on their Shatter Sweep Device. The NPP team was impressed with the work the students did and had some excellent suggestions. Dr. Carroll is in discussions with Penn's Engineers Without Borders Chapter to take on the project, meet with the NPP team, and work on the adjustments requested.


Meanwhile, Dr. Jacoby and her Research Assistant, Liz Esan, were on site multiple times throughout the summer creating a "green index" to assess the before and after state of the areas the team would green. By listening to the NPP team they were able to adjust the scales to better quantify the impact their work has on the Tioga area.





**Community Lead**
Avarisse Crawford
Chief of Staff
North10 Philadelphia

**Nursing Lead**
Sara Jacoby, MPH, MSN, PhD, FAAN
Associate Professor of Nursing

**Engineering Lead**
Devin Carroll, PhD
Lecturer at University of Pennsylvania

# Smoothie Bikes

The Smoothie Bike Project is a collaboration that engages Penn students, local high school students, and Netter Center staff in re-purposing used bikes and used blenders into educational and joyful kid-powered smoothie making machines.

With the help of engineering student volunteers through the ABCS course MEAM 2300 Bicycles: The Mechanical Advantage, the Smoothie Bike Project was expanded from an initial pilot in one high school (West Philadelphia) to initial program offerings in three partner high schools (adding Sayre and Robeson). Smoothie bike lab spaces were built in all three partner schools. Initial smoothie bike designs ("smoothie bike 1.0") were finalized, and development started on a "smoothie bike 2.0" version that incorporates various improvements. Smoothie bike development labs on Penn's campus have been started for models that will be K-8 friendly.

In the coming weeks, through Monique Dowd's ABCS course Nursing 3750: Nutrition in the Lifecycle, Nursing students will join the Smoothie Bike Project team to support the development of K-12 school-based Health Carnival Activities.

The team also collaborated on a conference paper presented at the American Society for Engineering Educators annual conference.

**Community Lead**
Daniel Merin, MS
Rebel Ventures Board Chairperson

**Nursing Lead**
Monique Dowd, EdD, RD, LDN
Advanced Senior Lecturer of Nutrition Science
Associate Director of Undergraduate Nutrition Programs

**Engineering Lead**
Dustyn Roberts, PE, PhD
Practice Associate Professor
Mechanical Engineering and Applied Mechanics

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