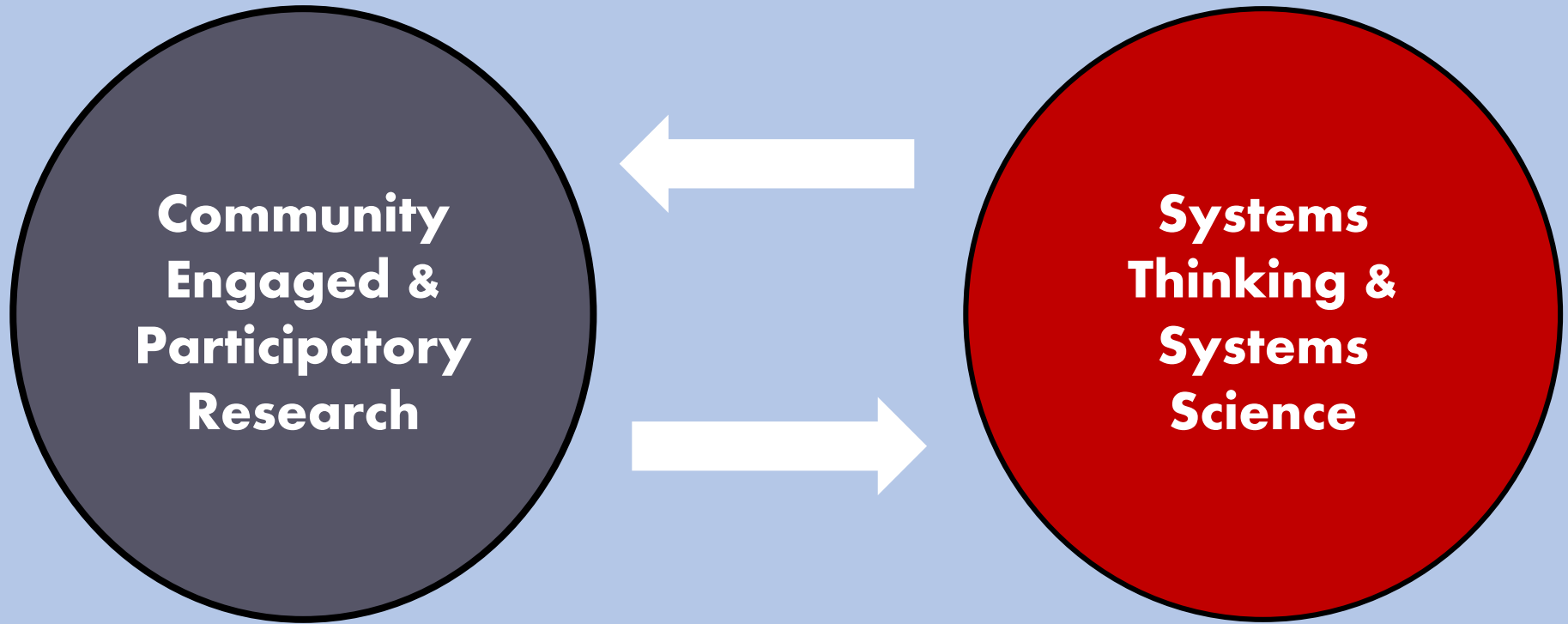


A network diagram consisting of several dark blue circular nodes connected by thin, light blue lines. The nodes are arranged in a roughly circular pattern, with a central node and several peripheral nodes. The connections are dense, creating a complex web of relationships. The background is a gradient of blue, transitioning from a lighter shade at the top to a darker shade at the bottom.

# **Engaged systems thinking for public health and the built environment**

**Leah Frerichs, PhD**  
**Assistant Professor**  
**[leahf@unc.edu](mailto:leahf@unc.edu)**

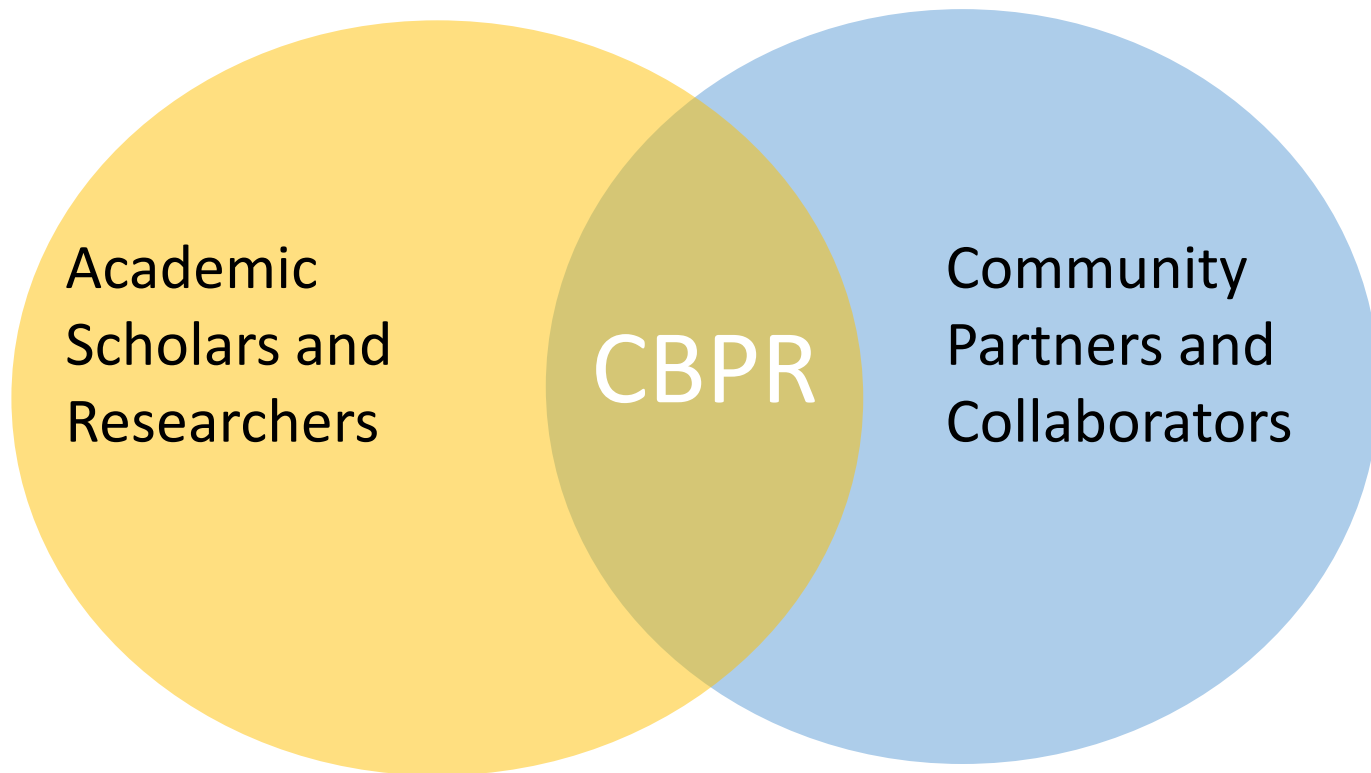


**Frerichs, L., Hassmiller Lich, K., Dave, G., Corbie-Smith, G. (2016) Integrating systems science and community based participatory research – an approach to achieve health equity. *American Journal of Public Health*. 106(2):215-22.**

# Community-Based Participatory Research (CBPR)

CBPR is a collaborative approach to research that equitably involves, community members, organizational representatives, and researchers in all aspects of the research process.

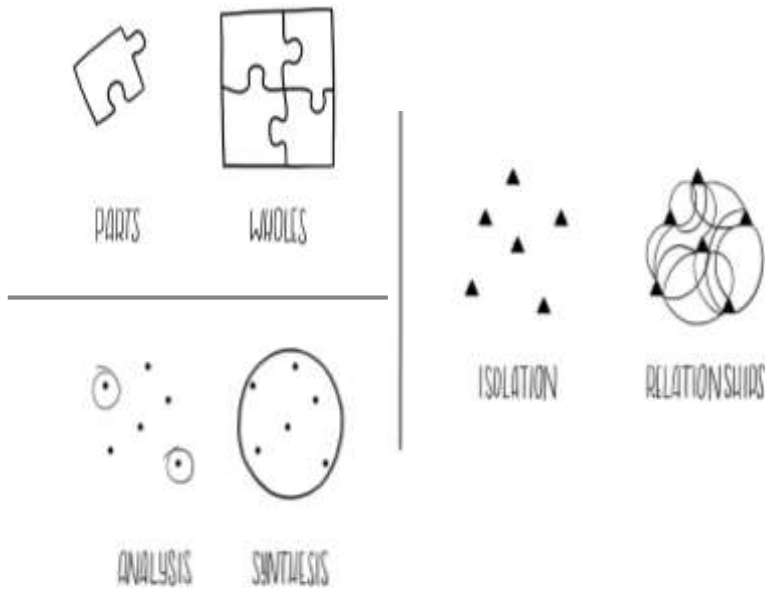
*Israel, et al, 1998*

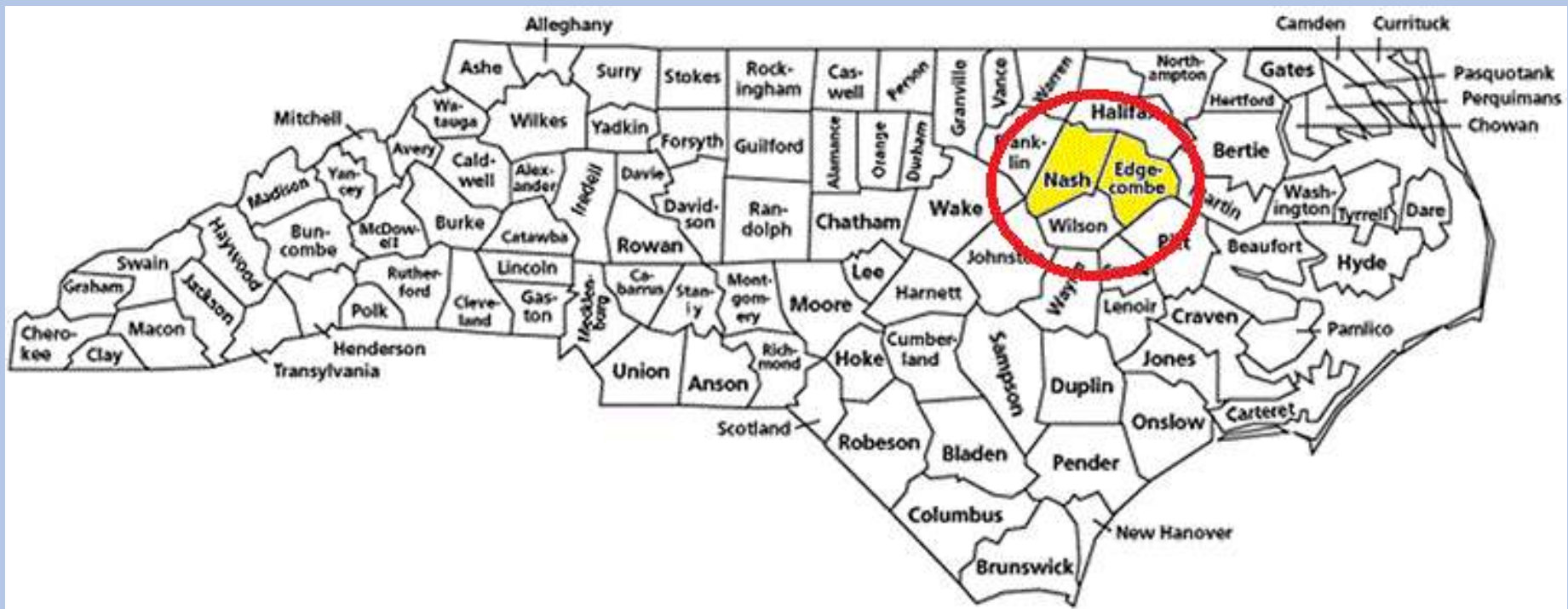


# Systems Thinking

“Systems thinking is a framework for seeing interrelationships rather than things, for seeing patterns rather than static snapshots. It is a set of general principles spanning fields as diverse as physical and social sciences, engineering and management.”

*Peter Senge*





## Nash & Edgecombe County

- The CVD mortality rates for Edgecombe and Nash counties are 1.23 and 1.13 times the overall rate of North Carolina.
- In community health assessments conducted in the last three years, CVD risk factors, such as obesity and hypertension, were among the top 10 health priorities in both counties.

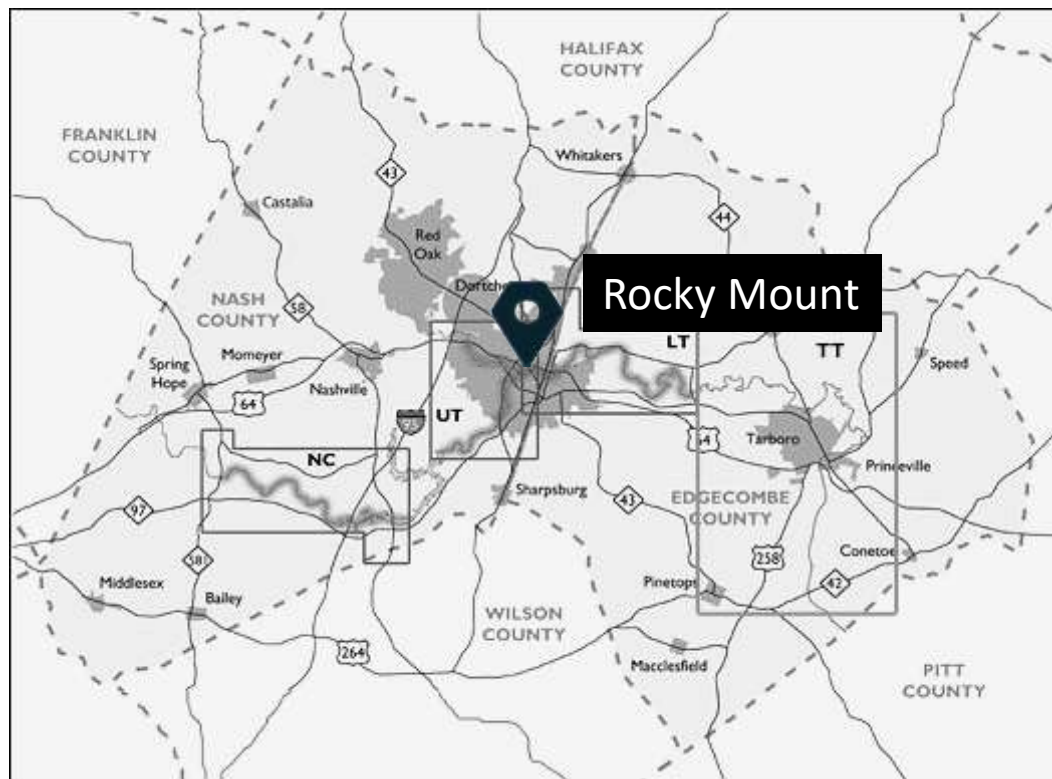
Sources: Nash County Department of Health and Human Services. 2012-2016 NC Resident Race/Ethnicity and Sex-Specific Age- Adjusted Death Rates. & Nash County 2016 Community Health Assessment.

Meaningful

Active

Productive

Science in service to  
communities



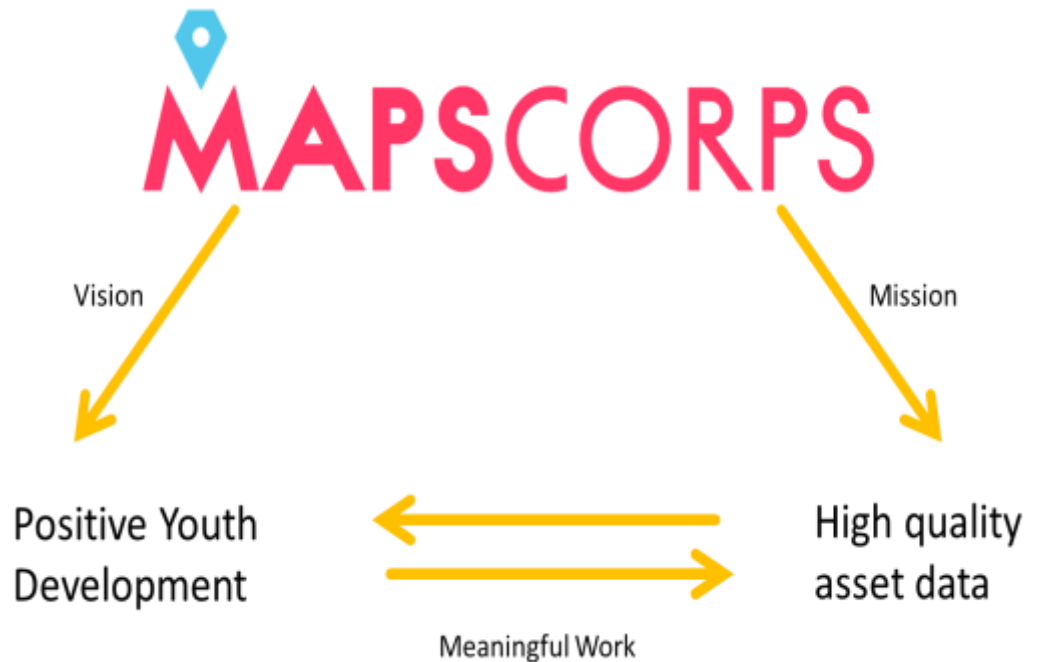
MAPSCorps slides credit:

Nicole Robinson-Ezekwe, MA, MPH; UNC Center for Health Equity Research

**Origins:** The University Chicago, 2009

**Mission:** To train youth to produce high quality data about community assets that everyone can use to improve the human condition.<sup>1</sup>

**Locations:** Chicago, New York City ( Harlem and The Bronx), Niagara Falls and Rocky Mount, NC







## Process

MAPSCorps Nash & Edgecombe partners with local community organizations in order to recruit high school students



A PROGRAM OF  
THE  
CONSERVATION FUND



## Process

MAPSCorps collects data using the MAPSCorps webpage on mobile phones.

Mappers physically walk to each address they're assigned in order to classify them.



## Process

At the end of the program, mappers use the data they collected to create and present community-based research projects at the Scientific Symposium



# Process

After data is cleaned, the data is uploaded and made accessible on [mapscorps.org](https://mapscorps.org)

The screenshot displays the MAPSCORPS website interface. At the top, the logo 'MAPSCORPS' is on the left, and navigation links for 'VISION', 'MISSION', 'HISTORY', 'COMMUNITIES', 'PARTNERS', 'IMPACT', and 'DONATE' are on the right. Below the logo, a 'START YOUR SEARCH' section contains two numbered steps: '1. Select Your Community' and '2. Choose Your Services Below:'. A sidebar on the left lists various service categories with expandable options. The 'Childcare and Schools' category is expanded, showing sub-options like 'Public Schools K-12'. The main content area features a map of Rocky Mount, NC, with several blue location pins. A pop-up window for 'ROCKY MOUNT HIGH SCHOOL' is open, displaying its address, phone number, and contact information. At the bottom right, there is a 'REQUEST DATA' button and a note about obtaining data for Nashville & Edgecombe.

**MAPSCORPS** VISION MISSION HISTORY COMMUNITIES PARTNERS IMPACT **DONATE**

**START YOUR SEARCH**

1. Select Your Community
2. Choose Your Services Below:

Arts and Entertainment

Childcare and Schools

- + Home Daycares
- + Kid Centers
- + Public Schools K-12
- + Private Schools K-12
- + Trade Schools
- + Professional Schools
- + Seminary
- + Public Universities
- + Private Universities
- + Other

Dining

Financial, Insurance, Legal, Taxes

Fitness

Health Services

Industrial

CHICAGO NEW YORK NIAGARA FALLS **NASH & EDGECOMBE**

**ROCKY MOUNT HIGH SCHOOL**  
Public school K-12

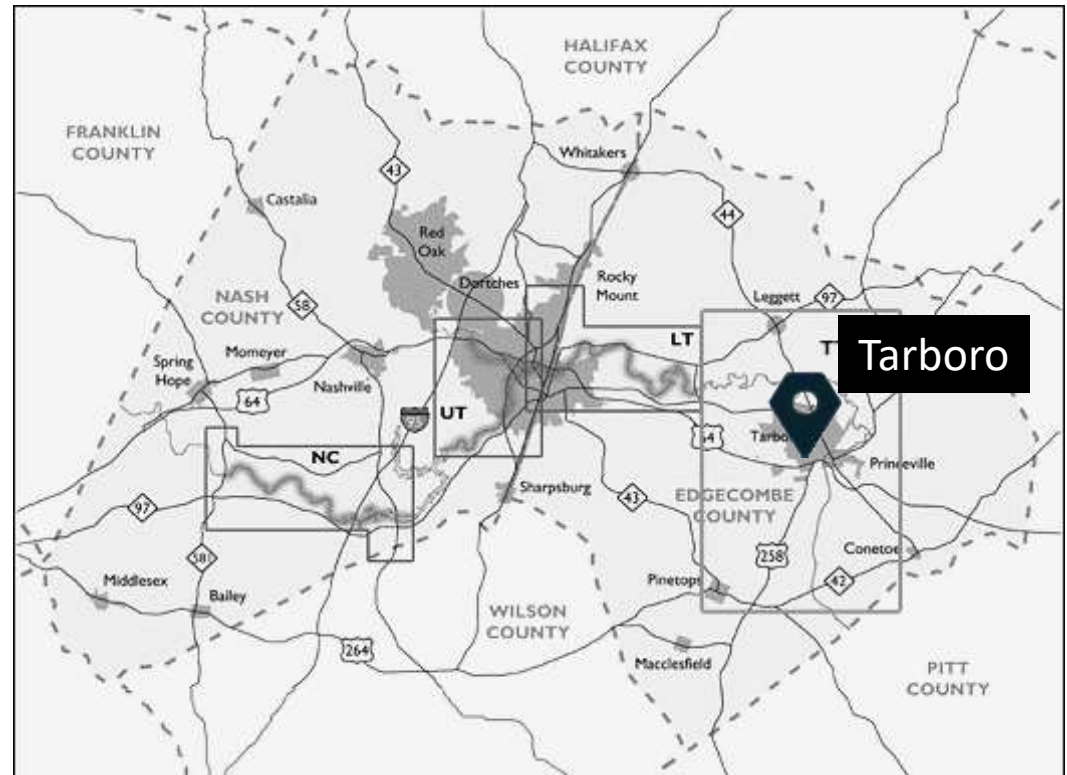
1400 Bethlehem Rd, Rocky Mount, NC  
27803  
Phone: 252-443-6683  
Email: N/A  
Website: N/A

Rocky Mount

Map data ©2018 Google Terms of Use Report a map error

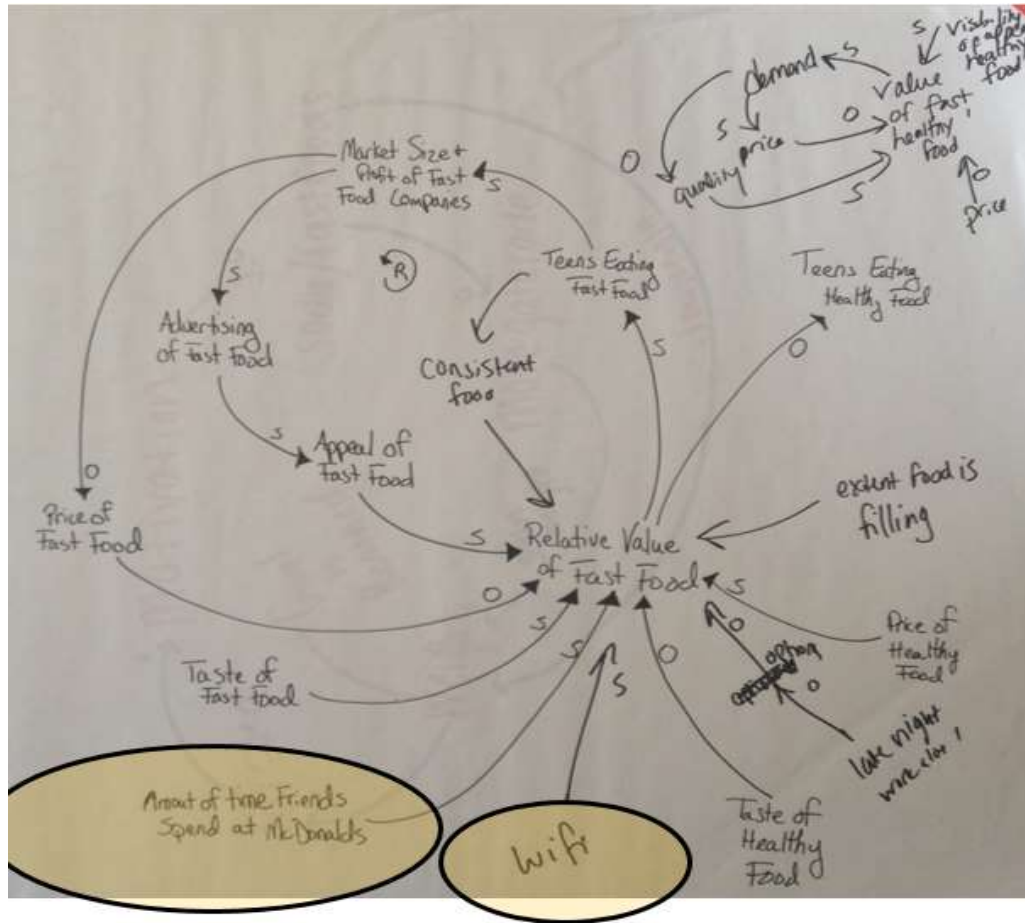
If you would like to obtain our NASHVILLE & EDGECOMBE data, please complete a Data Request Form. **REQUEST DATA**

# Project #2: Awesome catchy program name



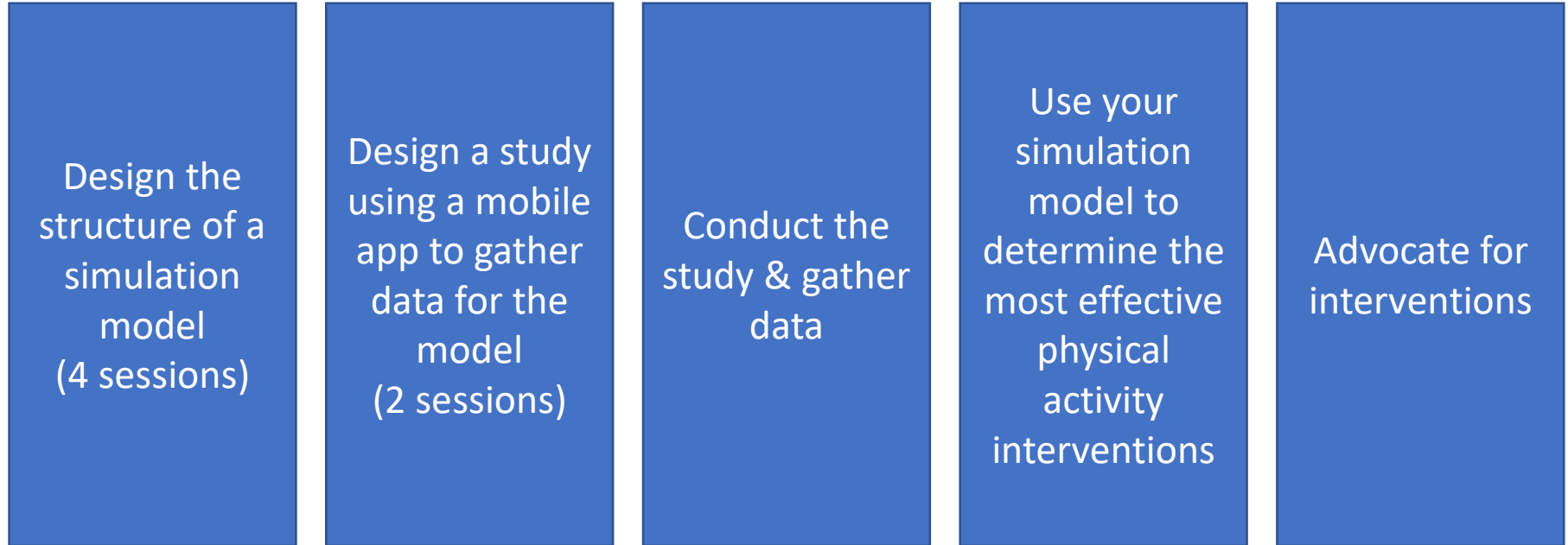
# Training youth in systems thinking

Acknowledgements: Center for Health Equity Research; K24HL105493, PI: Dr. Giselle Corbie-Smith; UL1TR001111, NC TraCS



Frerichs, L., Hassmiller, K., Young, T.L., Dave, G., Stith, D., Corbie-Smith, G. (2017) Development of systems science methods to engage rural African American teens in understanding and addressing childhood obesity prevention. *Health Education and Behavior*. doi: 10.1177/1090198117726570.

# Training youth in systems thinking



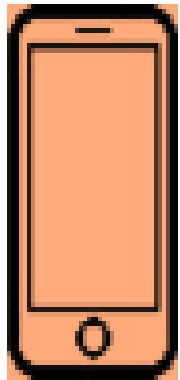
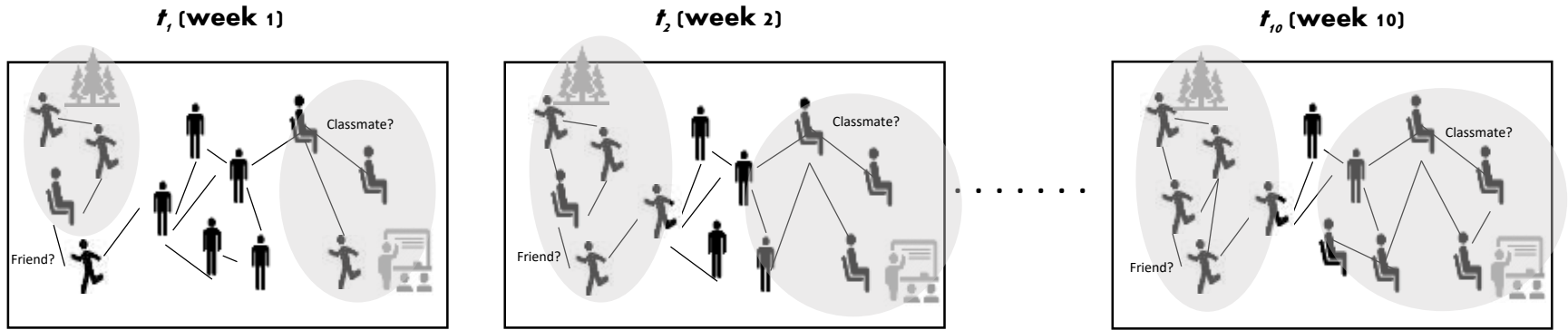
**Now through end of school year**

**Beginning of  
Fall  
Semester**

**Through end of next  
school year**

# Training youth in systems thinking

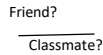
## Schematic of empirical data collection for use in agent based simulation models



**Smartphone tri-axial accelerometer data every 2 minutes for physical activity data**



**Bluetooth media access control identifiers of other participant smartphones for social interaction and network data**



**Short-message surveys (triggered when Bluetooth detected other participant smartphones) on social relationship and information on the context of interaction (same room, talking, touching, etc.)**



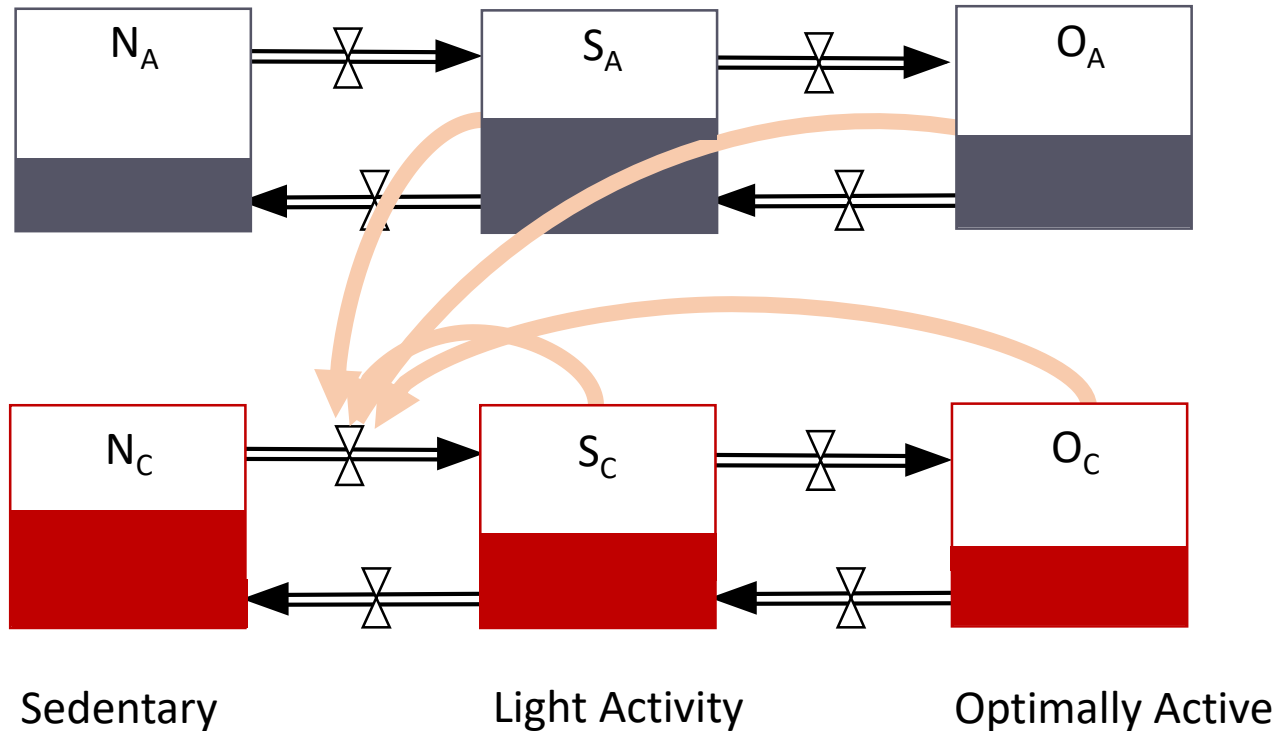
**Unique identifiers and signal strength of wireless internet routers for environmental exposure data**

**Data collected continuously from logs of sensor data using the iEthica smartphone app**



# Training youth in systems thinking

Schematic of Simulation model



## The types of questions we can ask:

- Who is optimal to target in social networks to effectively diffuse positive behavior change?
- What types of multi-level interventions most cost-effectively improve physical activity?

