Launching SCORCH: a Climate and Health Center at UAZ

9/29/2023

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Welcome

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Workshop Guidelines

- Everyone participates, no one dominates
- Getting started is more important than being right
- If an idea seems unfeasible, strive to add or identify an alternative instead of just criticizing
- Know when to shelve an idea and move on

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We respectfully acknowledge the University of Arizona is on the land and territories of Indigenous peoples. Today, Arizona is home to 22 federally recognized tribes, with Tucson being home to the O’odham and the Yaqui. Committed to diversity and inclusion, the University strives to build sustainable relationships with sovereign Native Nations and Indigenous communities through education offerings, partnerships, and community service.

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SCORCH CENTER MISSION

Improving health equity in arid lands across the lifespan by enhancing existing community partnerships and supporting adaptation efforts by Indigenous, Latinx, low resource urban and rural communities in the southwestern United States and globally.

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Complex challenges require multi-disciplinary thinking

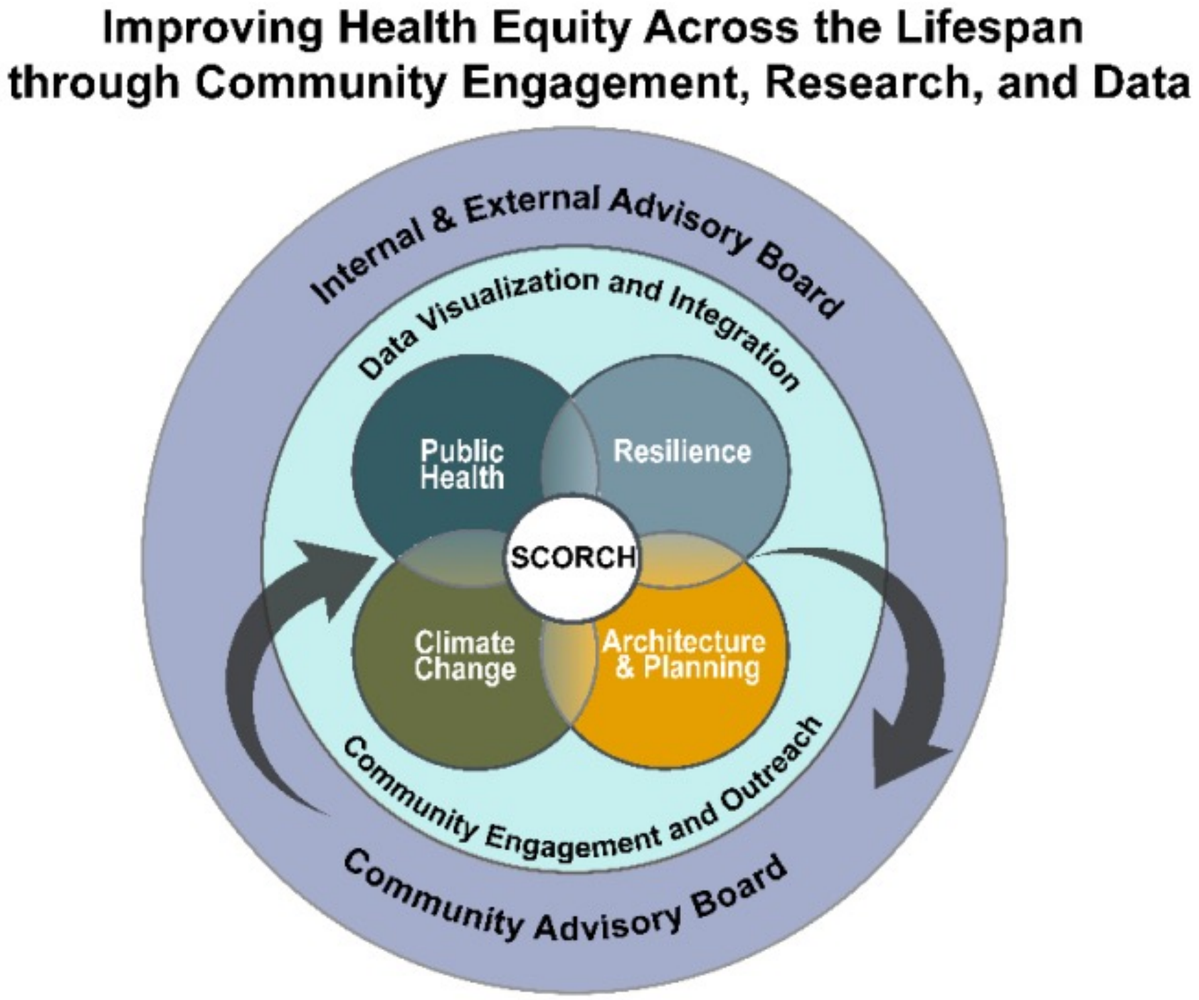


Figure 2. Integrated disciplinary structure of SCORCH engages with communities to promote health equity

- **Administrative Core:** Ernst
- **Community Engagement Core:** Arora
- **Integrated Data Visualization Core:** Hoover
- **Heat and Reproductive Health:** Furlong
- **Trade-offs in Greenspace Designs for Health:** Li

SCORCH focuses on health in arid lands

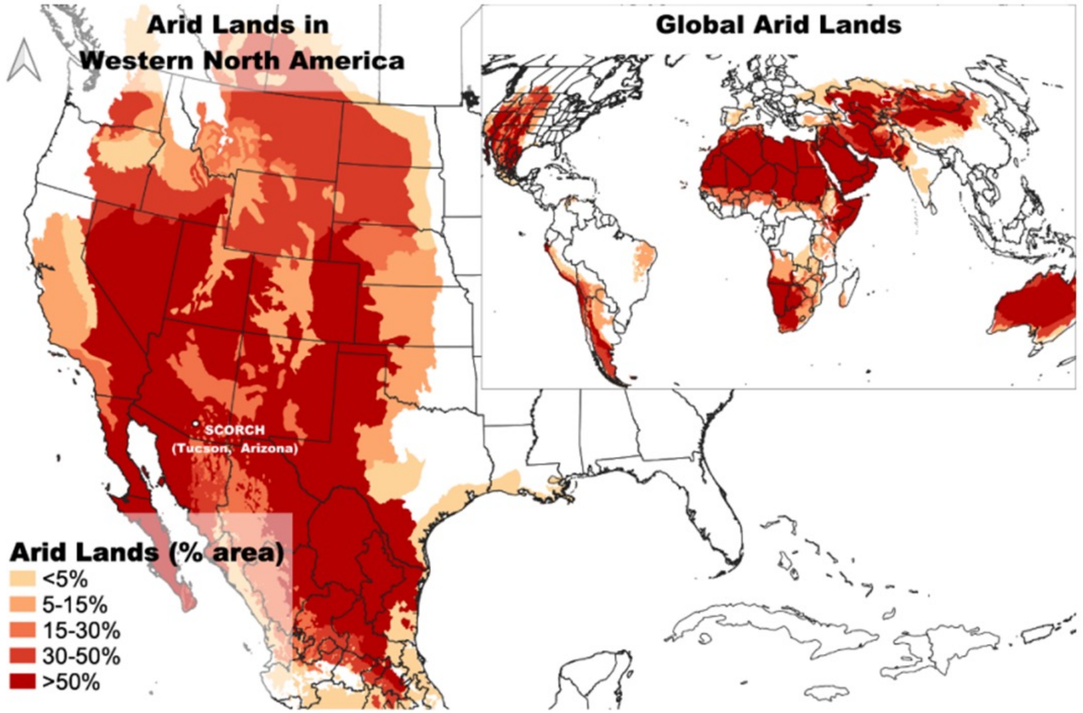
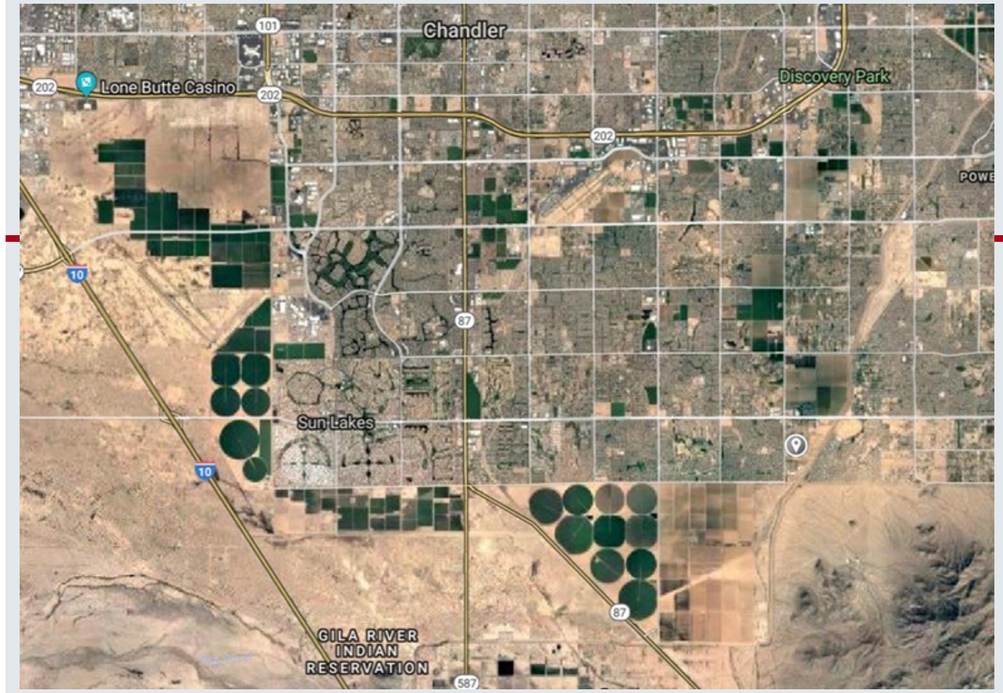


Figure 1. Global extent of arid lands and focus on Southwestern United States



Desertification is increasing - 47% of global populations live in arid lands

University of Arizona global leader in Arid Lands Research and Education

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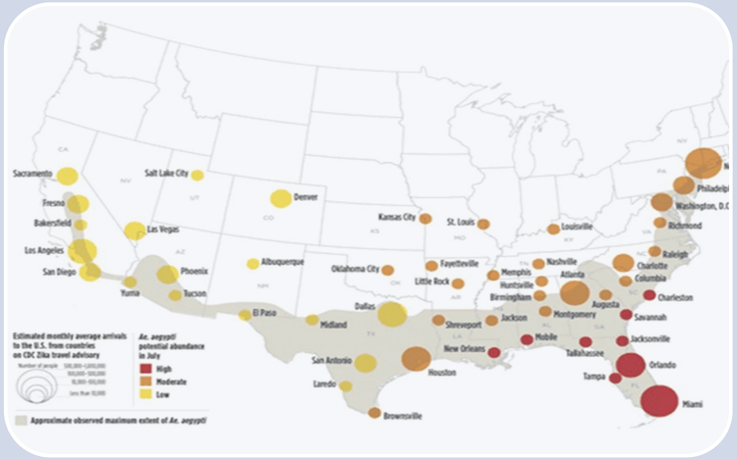

Impact of extreme weather events on long-term health outcomes.

Project 2: Impact of exposure to heat waves during pregnancy and subsequent neurological development of the child.

Development and Implementation of forecasting and early warning systems

Initiative: Collaboration with National Weather Service, Arizona Department of Health and We Health Corp. to develop mobile platform for dissemination of actionable messaging.

Adapting the outdoor built environment to enhance resilience in communities.

Project 1: Using a community-engaged framework to understand trade-offs in design choices on health impacts.

System Science

How are extreme weather events influencing long-term health?

Build flexible and integrated data core

Cross-disciplinary and cross-institution science

Address the complex questions

Health Equity

How do we engage with community partners to address current and future inequities?

Understand priorities

Community connections and partnerships

Community science

Build local and global partners – learn from other arid regions

Science to solutions

How do we build nimble and responsive systems that minimize impacts on productivity?

Early warning and long-term forecasts

Academic-private partnerships to scale solutions

Policymaker engagement to develop effective action plans

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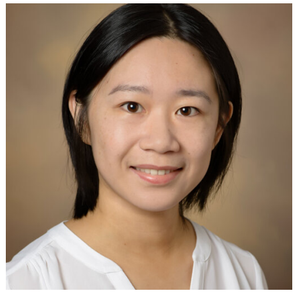
Kacey Ernst – Epidemiology

Griselda Ruiz-Braun
Program Development and Coordination



Yiwen Liu– Biostatistics

Cristian Roman-Palacios
Information and Data Science

Dean Billheimer - Biostatistics

Mona Arora - Geography

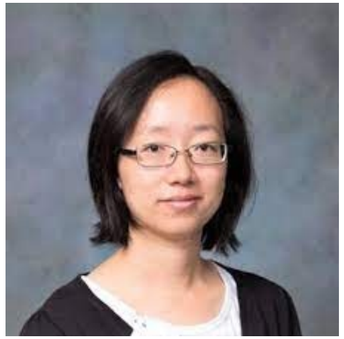
Melissa Furlong – Environmental Epidemiology

Ladd Keith– Policy and Planning

Chris Lim – Environmental Epidemiology

Paloma Beamber – Environmental Engineering

Joe Hoover- Environmental Science



Shujuan Li – Architecture and Planning

Mackenzie Waller – Landscape Architecture

Huanqing Wang – Environmental Planning

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Thank you

Kacey Ernst kernst@arizona.edu
520-626-7374

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Understanding the SCORCH Community Engagement Vision

- Recognizes local ways of living, understanding, and problem-solving
- Designing solutions, advancing climate and health equity on credible science and informed in collaboration with community input.
- Enhance collaboration among communities and research projects to protect health and well being.
- How do we?

Innovate **Co-create** **Educate** **Inspire** **Empower**

Collaboratively & Equitably

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Achieving the SCORCH Community Engagement Vision

Implement equitable, iterative processes for community engagement.

Foster connections between communities and among technical experts.

Ensure Multi-directional communication between SCORCH researchers and community.

Build a network and community of practice to address climate change challenges in our communities.

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Community Advisory Board

- Arizona Advisory Council on Indian Health Care
- Arizona Community Health Workers Association, Inc (AZCHOW)
- Arizona Department of Environment Quality
- Arizona Department of Health Services
- Arizona Developmental Disabilities Planning Council
- Arizona Library Association
- City of Tucson
- National Weather Service
- Pima County Department of Environment Quality
- Pima County Health Department
- Regional Center for Border Health, Inc.
- Tohono O'odham Nation - Department of Health and Human Service

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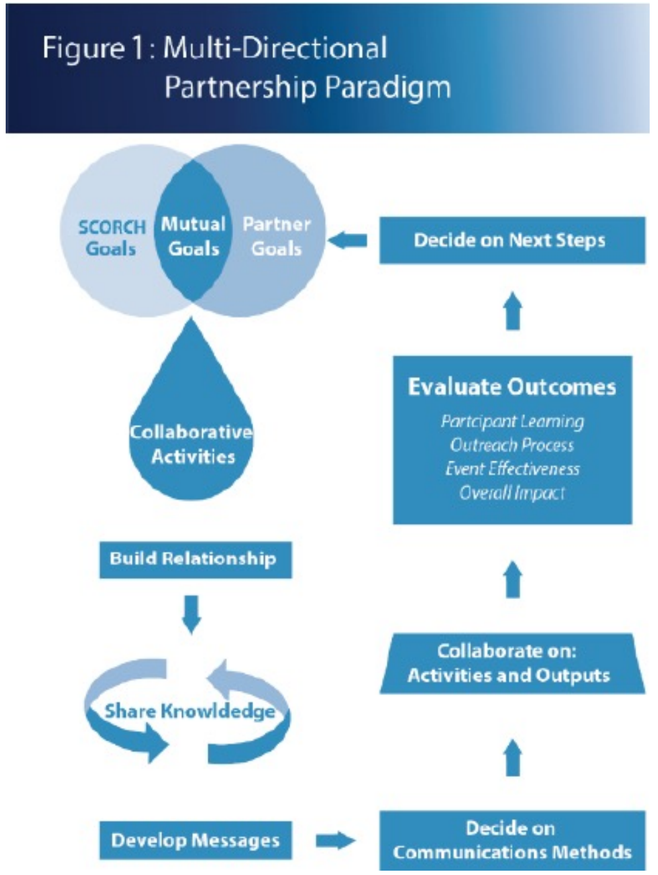
Community Advisory Board

- Conduct needs assessment to understand community concerns
- Inform research and pilot projects
- Technical assistance and community education
- Building workforce capacity
- Align with existing initiatives, frameworks, and priorities
- Connect communities and researchers, and science with action



What are shared priorities that we can work on together?

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CEC Team

Mona Arora
CEC Director

Paloma Beamer
CEC Co-Director

Maia Ingram
Evaluation Lead

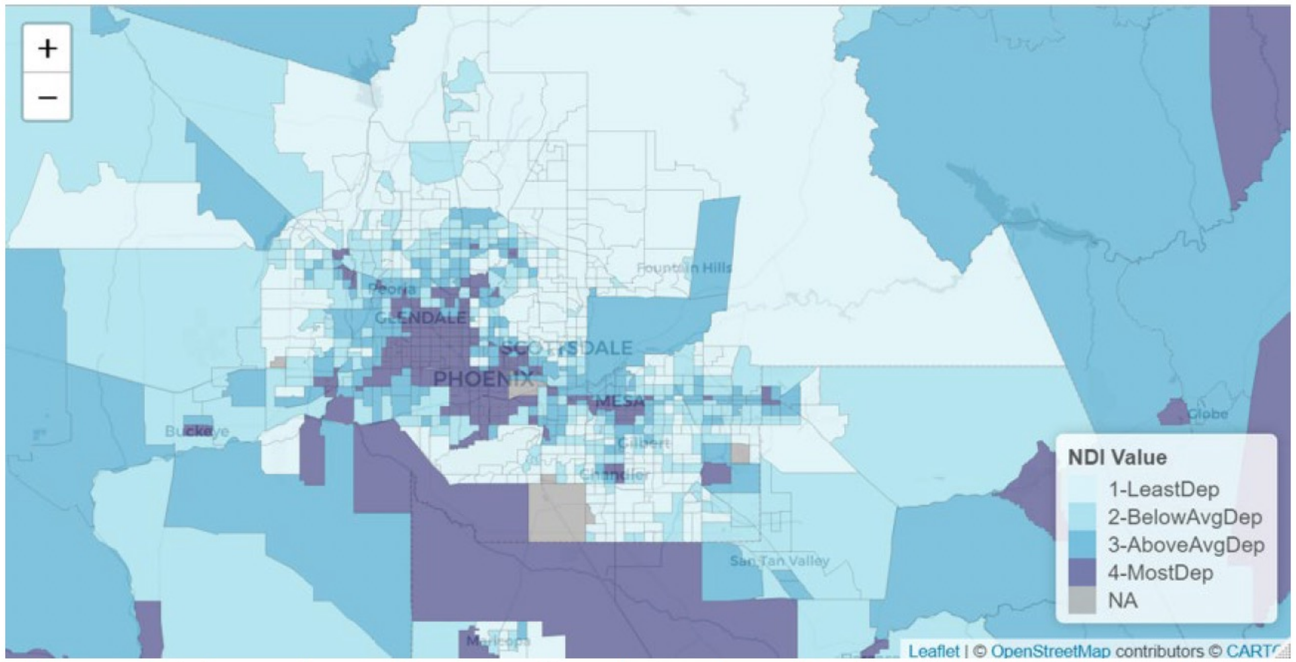
Kathryn Tucker Ortiz Program
Evaluation Co-Lead

Laura Schweers
Program Manager

Ann Garn
Marketing & Promotion

Imran Mithu
Graduate Research Assistant

Meccah Jarrah
Graduate Research Assistant



#	Activity	Name of the activity
3.1	Workshop	Introduction to FAIR and CARE principles
3.2	Workshop	Introduction to data visualization
3.3	Workshop	High-performance computing
3.4	Workshop	Introduction to Data Management
3.5	Workshop and open discussion	Open Science
3.6	Workshop and open discussion	Finding and accessing spatial and aspatial data.
3.8	Drop-in consulting	-

SCORCH *Integrated Data Visualization Core*

02/26/2024
Joseph Hoover, PhD,
jhoover@arizona.edu

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Integrated Data Visualization Core Overview

Objective

- Foster interdisciplinary research and engagement through data science and visualization support

Provide Center investigators with resources and tools to:

1. Support Center and community data visualization needs;
2. Develop training activities and materials; and
3. Manage, integrate, and analyze environmental, health, and sociodemographic data.

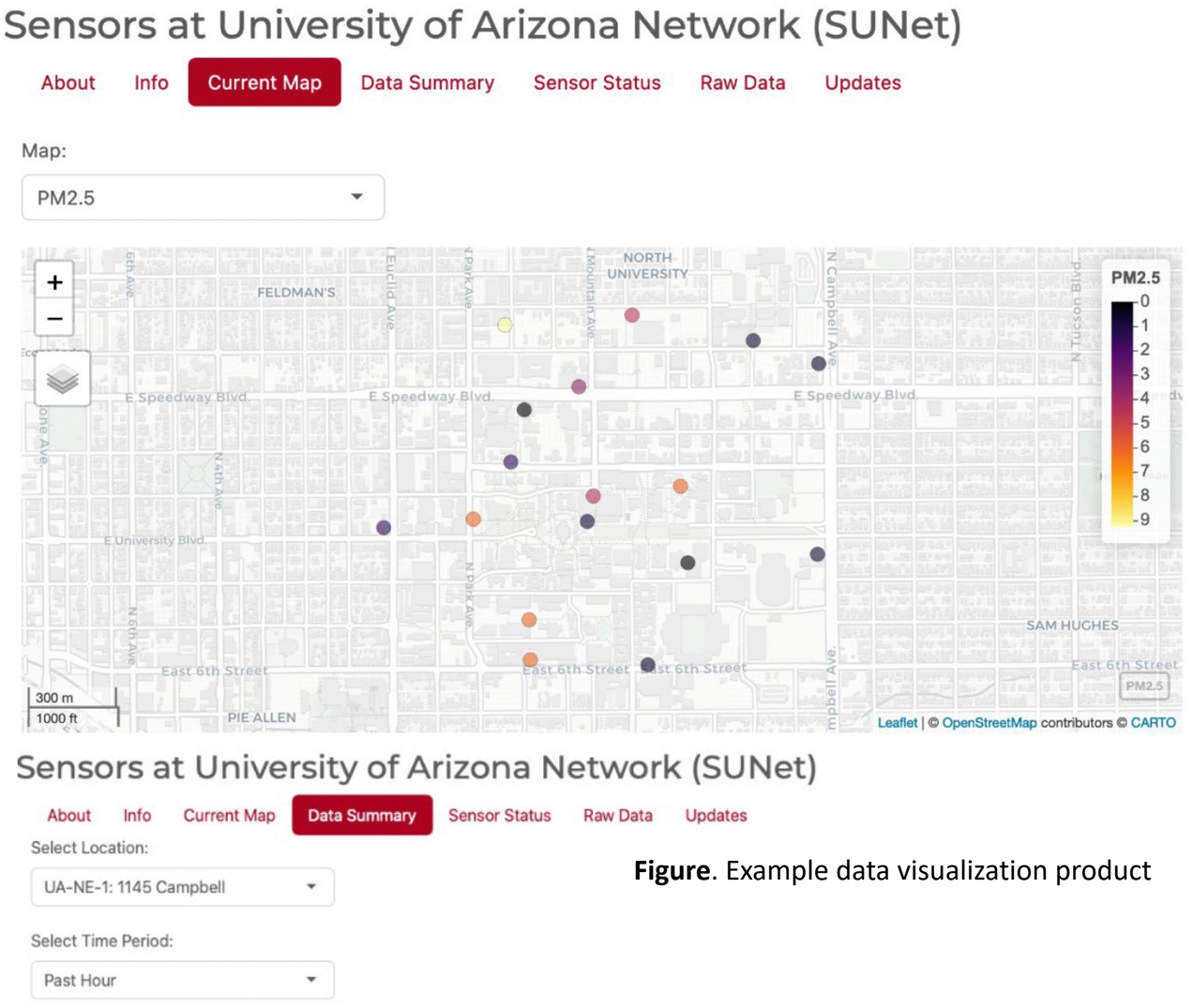

Figure. Example data visualization product

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Three Pillars of the Data Core

Data Management

Tasks

- Data management guidance and support for research projects, cores, and partners
- Data source identification (more on the next slide…)

Data Visualization

Tasks

- Create web-based tools
- Creating infographics and other materials for community engagement
- Support for manuscripts and other scientific products

Data Training

Tasks

- Needs assessment
- Workshops and training
- Evaluation and continuing needs

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Data Management

Short-term goal: Develop and test a data dashboard that supports the integration of socioeconomic, environmental, and public health data;

Long-term goal: Serve as a gateway for climate change and health research in the southwest United States

Started identifying Arizona relevant climate change and health datasets

- Climate, climate change projections, climate adaptation
- Environmental exposures, vector-borne diseases
- Human health
- Natural and built environment, transportation
- Socio-demographic

Questions

1. How might an integrative data dashboard support your community?
2. In this list, what are the preferred data areas?
3. What data areas are not on this list that you'd like to see?

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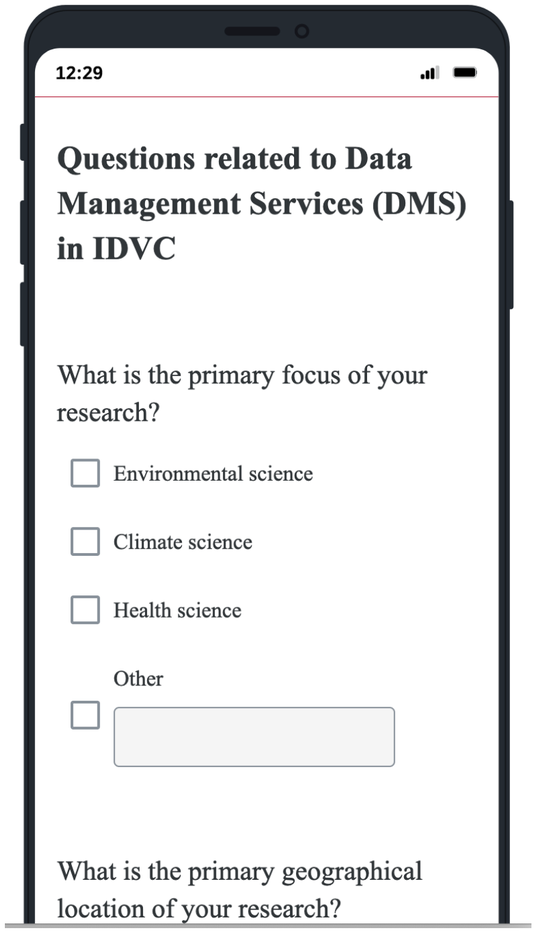
Data Training



Short-term goal: Develop and implement data management and visualization needs assessment for climate change and health

Long-term goal: Create and deliver training materials and activities for university and community-based partners

Survey structure

- Data management
- Data visualization
- Data training needs/asks

- Plan to distribute survey in the near future!

Questions

1. What unmet data management or visualization needs does your community have?

2. Would you be interested in support from the Data core?

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Chris Lim
Environmental Epidemiology

Joseph Hoover
Environmental Science

Dean Billheimer -
Biostatistics

Unnati Palande
Data Science

Cristian Roman Palacios
Information and Data Science

Thank you

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SCORCH Project 1: Greenspace to build resilience to climate change impacts on health: The good, the bad, and the future

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02/26/2024

Shujuan Li, PhD
shujuanli@Arizona.edu

Project 1 Overview
Greenspace, Health, Heat Resiliency

Background:

- Greenspace is associated with various health outcomes through direct and indirect impacts
  - Physical health, mental health, and well-being
  - Lyme disease, allergies, and asthma

- Climate change impacts health and greenspace relationships
  - Increased temperatures
  - More frequent extreme heat

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Project 1 Overview
Greenspace, Health, Heat Resiliency

<u>Aim 1:</u> Evaluate the differential impacts of greenspace on select public health outcomes (2007-2021)

- **Greenspace**
  - Amount, composition, configuration
- **Climate/weather**
  - Surface temperature, air temperature, days of high temperature
- **Social factors**
  - Urbanicity, population, demographics, income, education, etc.
- **Health**
  - Heat-related hospitalization, emergency department visits, and mortality
  - *Ae. aegypti* abundance and infection status, *Cx. Quinquefasciatus* abundance and infection status

Project 1 Overview
Greenspace, Health, Heat Resiliency

<u>Aim 2:</u> Utilize machine learning to develop a tool to predict health effects of community greenspace development plans

- Assess the health outcomes of a greenspace design
- Compare different design plans before the implementation and construction of greenspace projects

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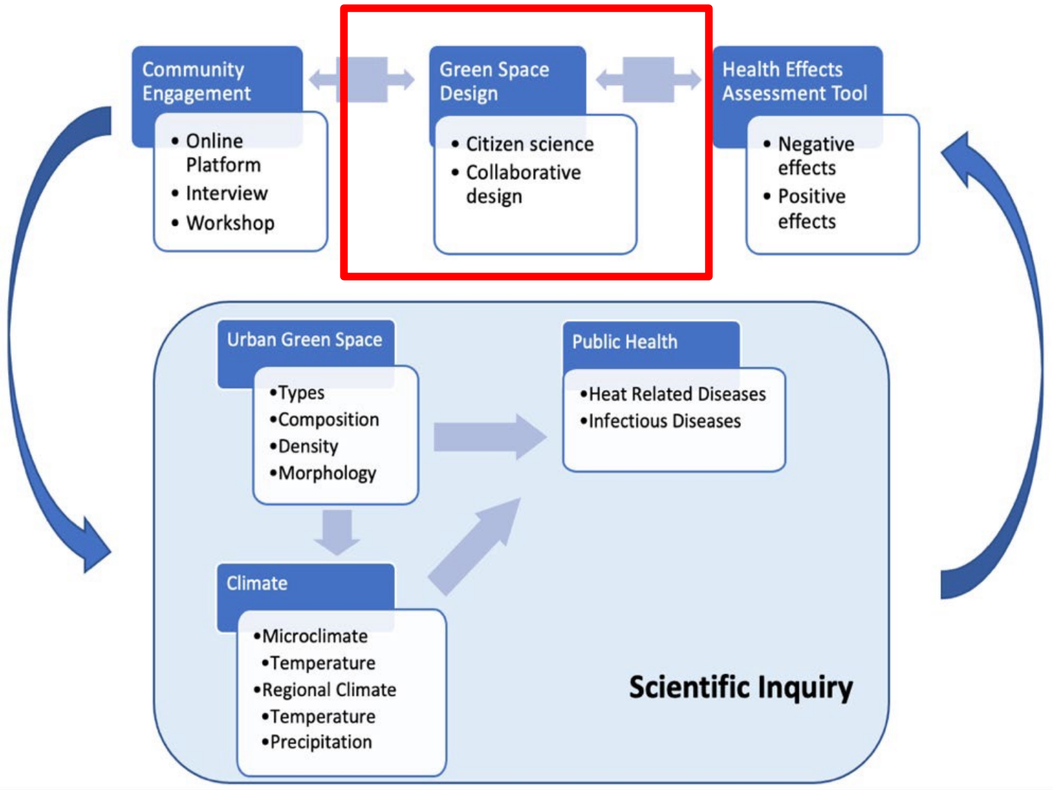
Project 1 Overview
Heat, Greenspace, Resiliency

<u>Aim 3:</u> Linking scientific research and community engagement through greenspace design

- Greenspace Equity Assessment
  - Greenspace, health and other social indicators
- Engaging Communities in Discovery
  - Citizen science system
- Engaging Communities in Planning
  - Community workshops
  - Greenspace planning scenarios
  - Health impact assessment tool



What are your suggestions on data collection through citizen science that would benefit the communities and research?

- Heat
- Greenspace
- Health

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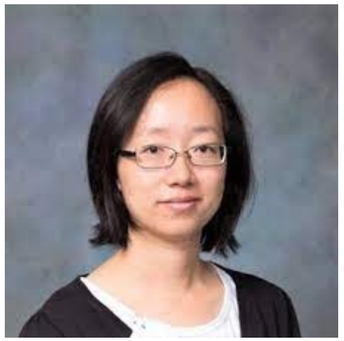
Kacey Ernst – Epidemiology

Joe Hoover- Environmental Science



Shujuan Li – Landscape Architecture and Planning

Mackenzie Waller – Architecture and Landscape Architecture

Huanqing Wang – Environmental Planning

Thank you!

Shujuan Li, PhD
shujuanli@Arizona.edu

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SCORCH Project 2: Heat Waves during Pregnancy, Neurodevelopment, and Resiliency

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02/26/2024
Melissa Furlong, PhD,
mfurlong@Arizona.edu

Project 2 Overview
Heatwaves, Neurodevelopment, Resiliency

Background, Primary Question:

- Growing evidence that heatwaves during pregnancy are associated with several birth outcomes:
  - Preterm birth, low birth weight, birth complications
- Birth complications are predictive of brain development

Are heatwaves during pregnancy associated with brain development in childhood?

Background, Secondary Question:

- Can we lessen the impacts of heat on neurodevelopment?
  - Identify susceptible groups and characteristics
  - Evaluate if policy measures for climate change can reduce impacts

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Are heatwaves during pregnancy associated with brain development in childhood?

Arizona birth certificates, 1992-2020

Temperature models at 1km grid resolution

Arizona Medicaid data, 2008-2016

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Are heatwaves during pregnancy associated with brain development in childhood?

Arizona birth certificates, 1992-2020

- Geocoded birth residence
- Apgar scores
- Important confounders (mom's education, WIC status, race/ethnicity, mom's age, child gender)

NOAA Temperature models at 1km grid resolution

- Daily temperature
- Maximum, minimum
- Humidity measures
- Beginning 1970s

Arizona Medicaid data, 2008-2016

- Electronic medical codes
- Can identify children with and without ADHD

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What other health outcomes in children are the community interested in?

- Consider:
- Chronic diseases (cancer, heart, birth defects, neurological/behavioral)
- Infectious diseases
- Other

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Can we lessen the impact?

Background, Secondary Question:

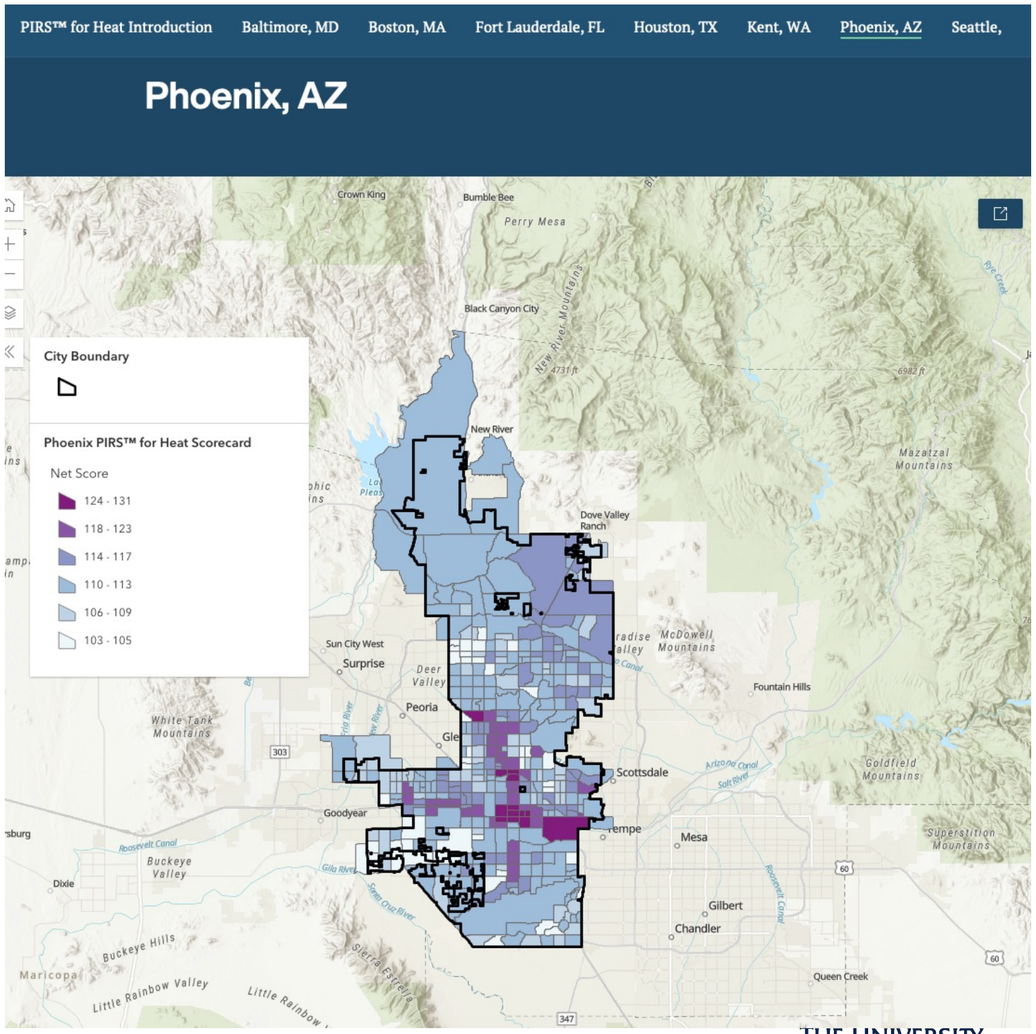
- Can we lessen the impacts of heat on neurodevelopment?
  - Identify susceptible groups and characteristics
    - Housing data (type of house, air conditioning, size, pool)
    - Neighborhood characteristics
      - Tree cover, shade, bus stops, walkability, cooling centers
    - Infrastructure: power outages
    - Would love feedback or input on other important factors
  - Evaluate if policy measures for climate change can reduce impacts

Can we lessen the impact?

Background, Secondary Question:

- Can we lessen the impacts of heat on neurodevelopment?
  - Evaluate if policy measures for climate change can reduce impacts
- Plan Integration for Resiliency Scorecard
  - Measures municipal policies to reduce heat
  - To be released for more Arizona cities
  - Co-I Ladd Keith

- Are there other measures that are relevant for the community?



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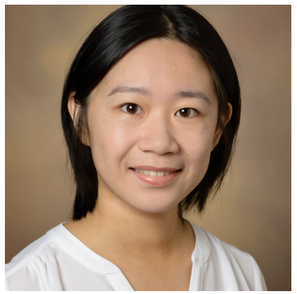
Thank you

Melissa Furlong – Environmental Epidemiology

Chris Lim – Environmental Epidemiology

Ladd Keith– Policy and Planning



Yiwen Liu– Biostatistics

Melissa Furlong
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