Engaging Communities in Environmental Research: The Power of Citizen Science

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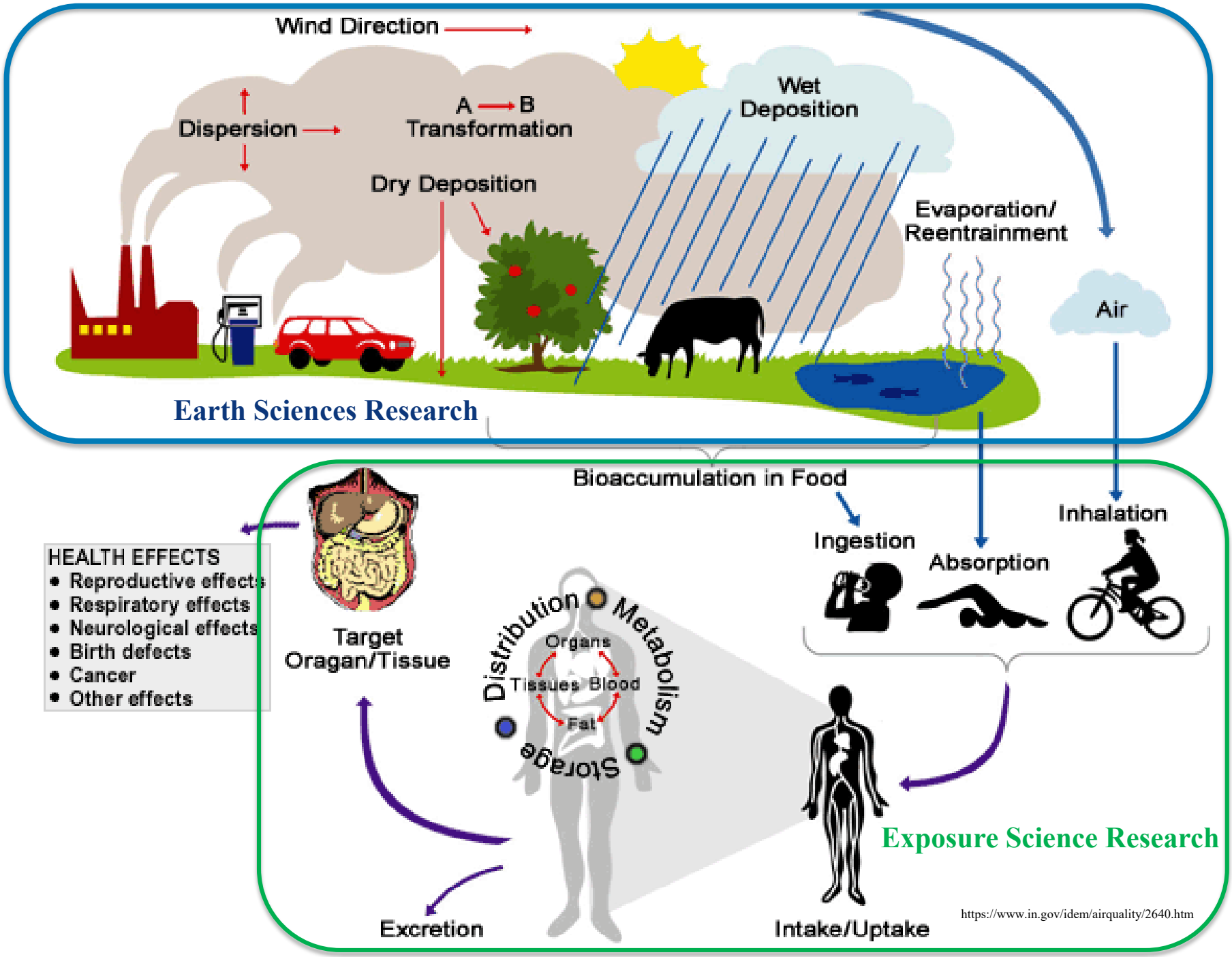
Kentucky Geological Survey 58th Annual Seminar

May 17, 2019


Wind Direction
Dispersion
A → B
Transformation
Dry Deposition
Wet
Deposition
Evaporation/
Reentrainment
Air
Earth Sciences Research
Bioaccumulation in Food
Ingestion
Absorption
Inhalation
HEALTH EFFECTS
• Reproductive effects
• Respiratory effects
• Neurological effects
• Birth defects
• Cancer
• Other effects
Target
Oragan/Tissue
Distribution
Metabolism
Storage
Organs
Tissues
Blood
Fat
Excretion
Intake/Uptake
Exposure Science Research
https://www.in.gov/idem/airquality/2640.htm

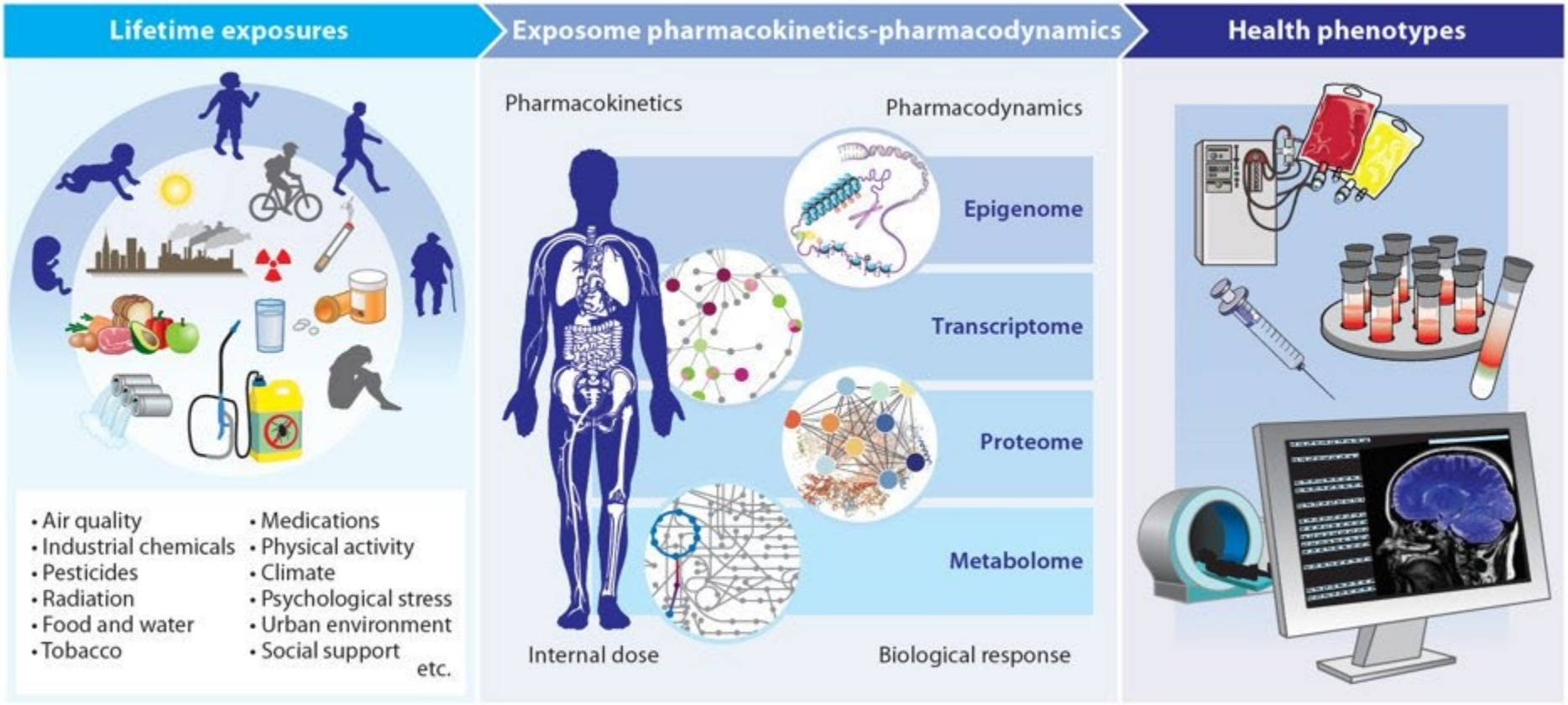
Environmental Epidemiology

Exposure

Biomarkers of Exposure

Health

Exposome

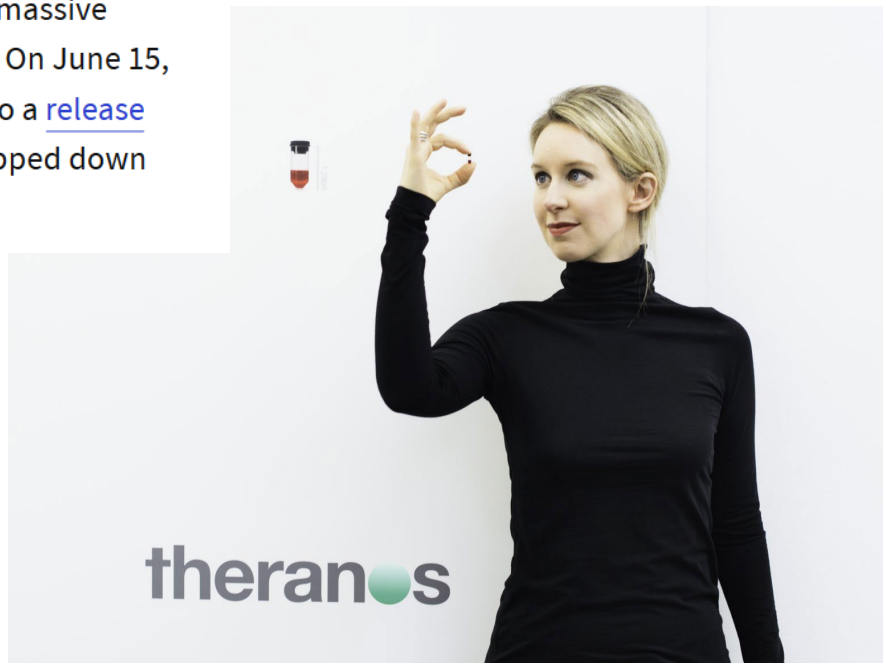


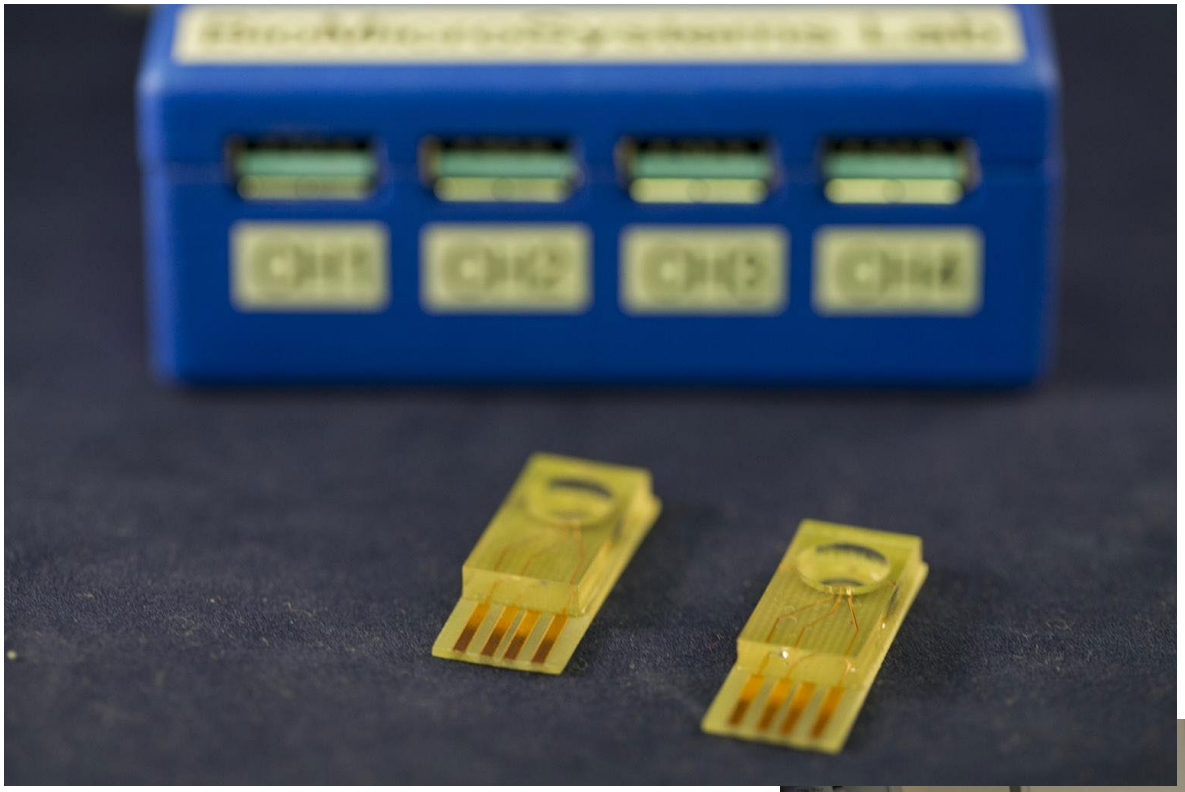
https://twitter.com/exposome/status/1044588169600094208/photo/1 and humanexposomeproject.com

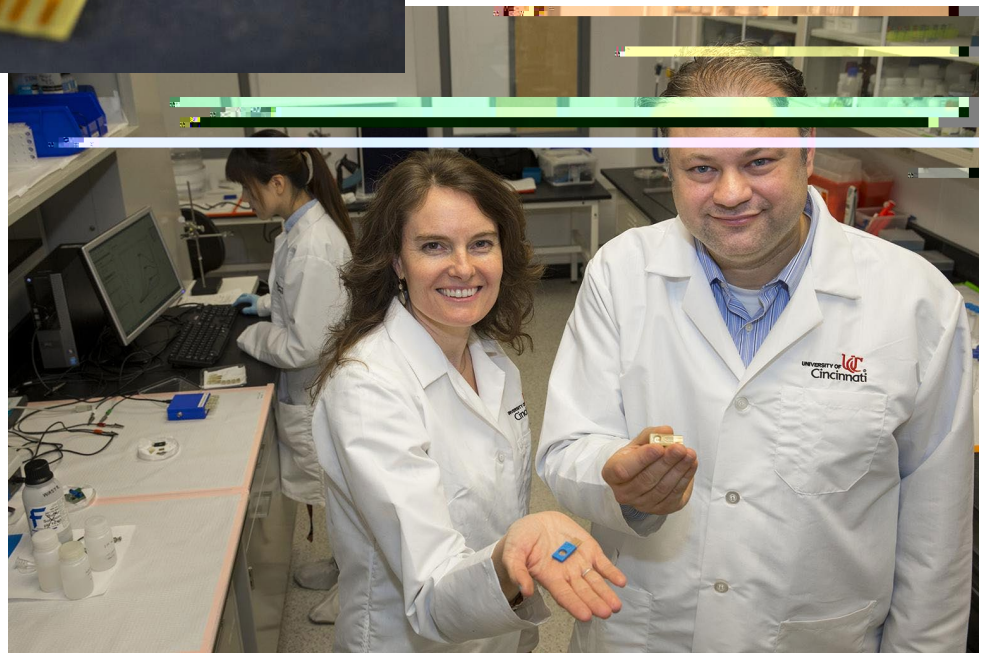
Theranos: A Fallen Unicorn

BY ZAW THIHA TUN | Updated May 15, 2019

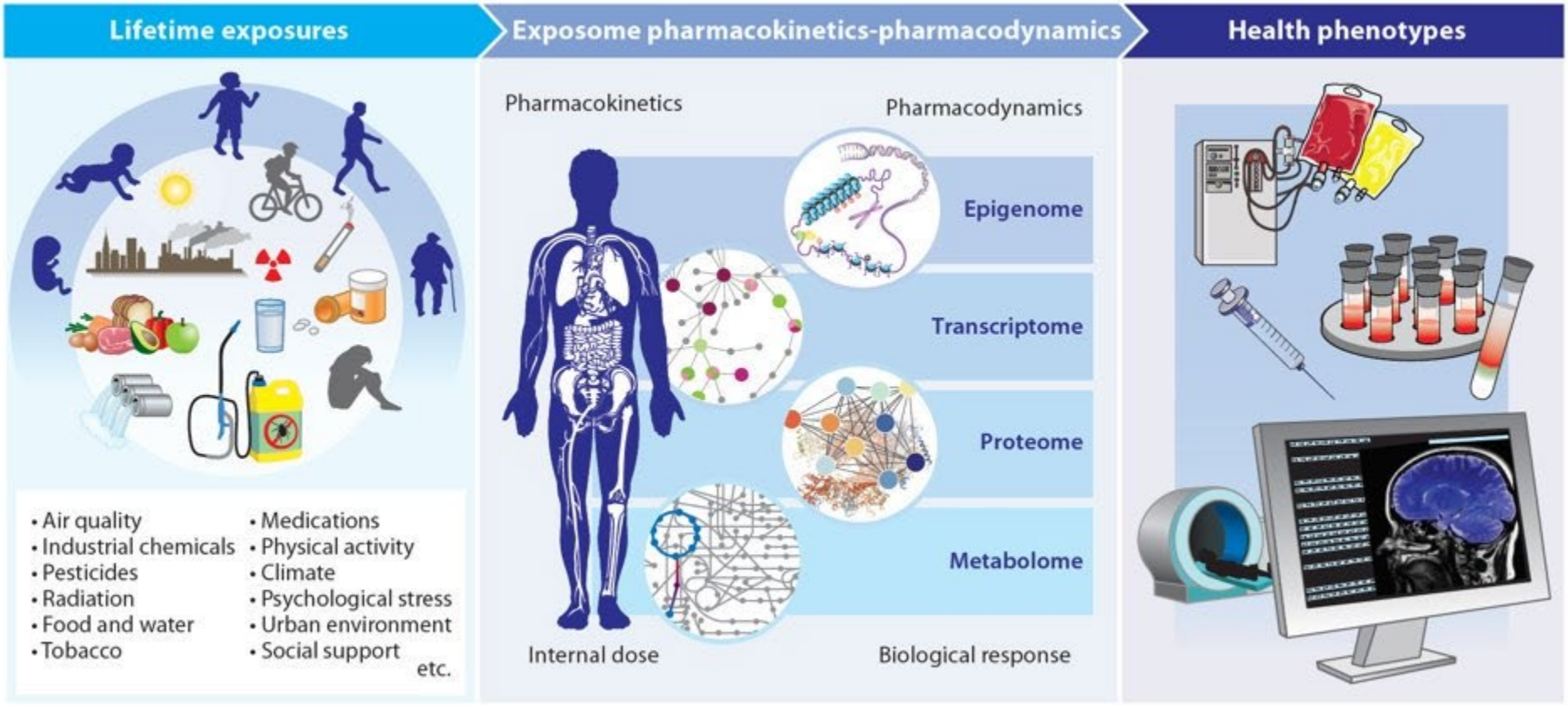
Theranos Inc., a consumer healthcare technology startup, was once valued at $10 billion, and its leadership claimed it would revolutionize the blood testing industry. However, the technological breakthrough that CEO Elizabeth Holmes and former company president Ramesh Balwani touted was never demonstrated, and the assertions of Holmes and Balwani amounted to outright deceit. Holmes and Balwani were ultimately charged by the SEC for massive fraud. The two executives agreed to settle subject to court approval. On June 15, 2018, Holmes and Balwani were charged with wire fraud according to a release by the U.S. Attorney's Office, North District of California. Holmes stepped down as the CEO of the company on the same day.






UNIVERSITY OF
Cincinnati

Exposome



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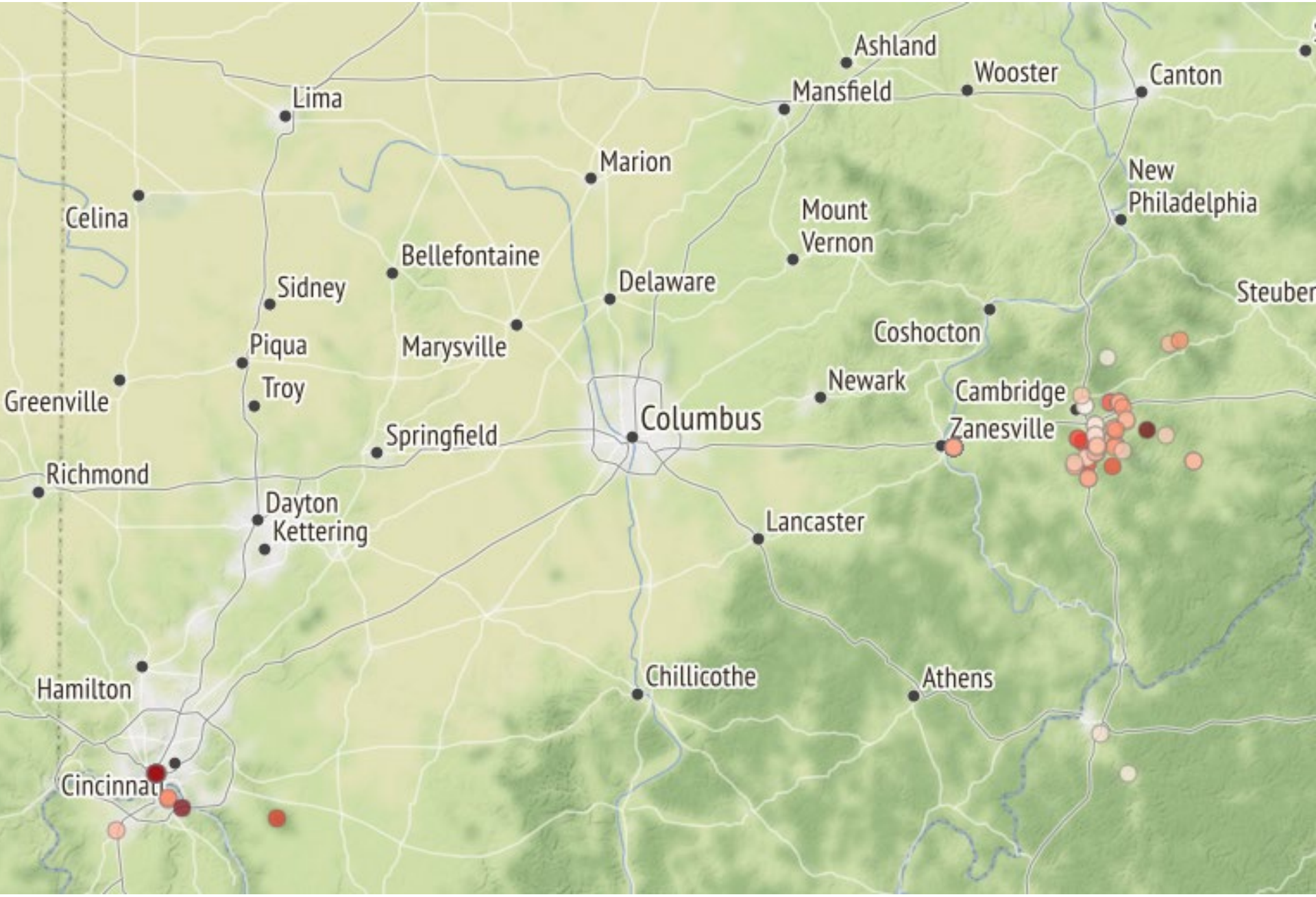
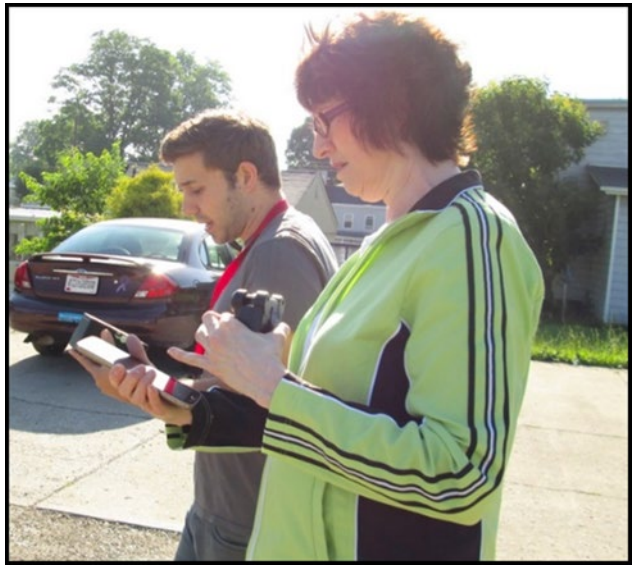
Public Participation in Water Quality Assessment


Ashland
Wooster
Canton
Mansfield
Lima
Marion
New
Philadelphia
Celina
Mount
Vernon
Bellefontaine
Sidney
Delaware
Steuben
Coshocton
Piqua
Marysville
Newark
Cambridge
Troy
Greenville
Columbus
Zanesville
Springfield
Richmond
Dayton
Kettering
Lancaster
Hamilton
Chillicothe
Athens
Cincinnati

Public Participation in Air Quality Research



Citizen science is the public involvement in inquiry and discovery of new scientific knowledge.

1) Participants use the same protocol
2) Data are useful for scientific research
3) Collaborative between scientists and volunteers
4) Data are accessible

over 1K

Projects

over 1M

Volunteers

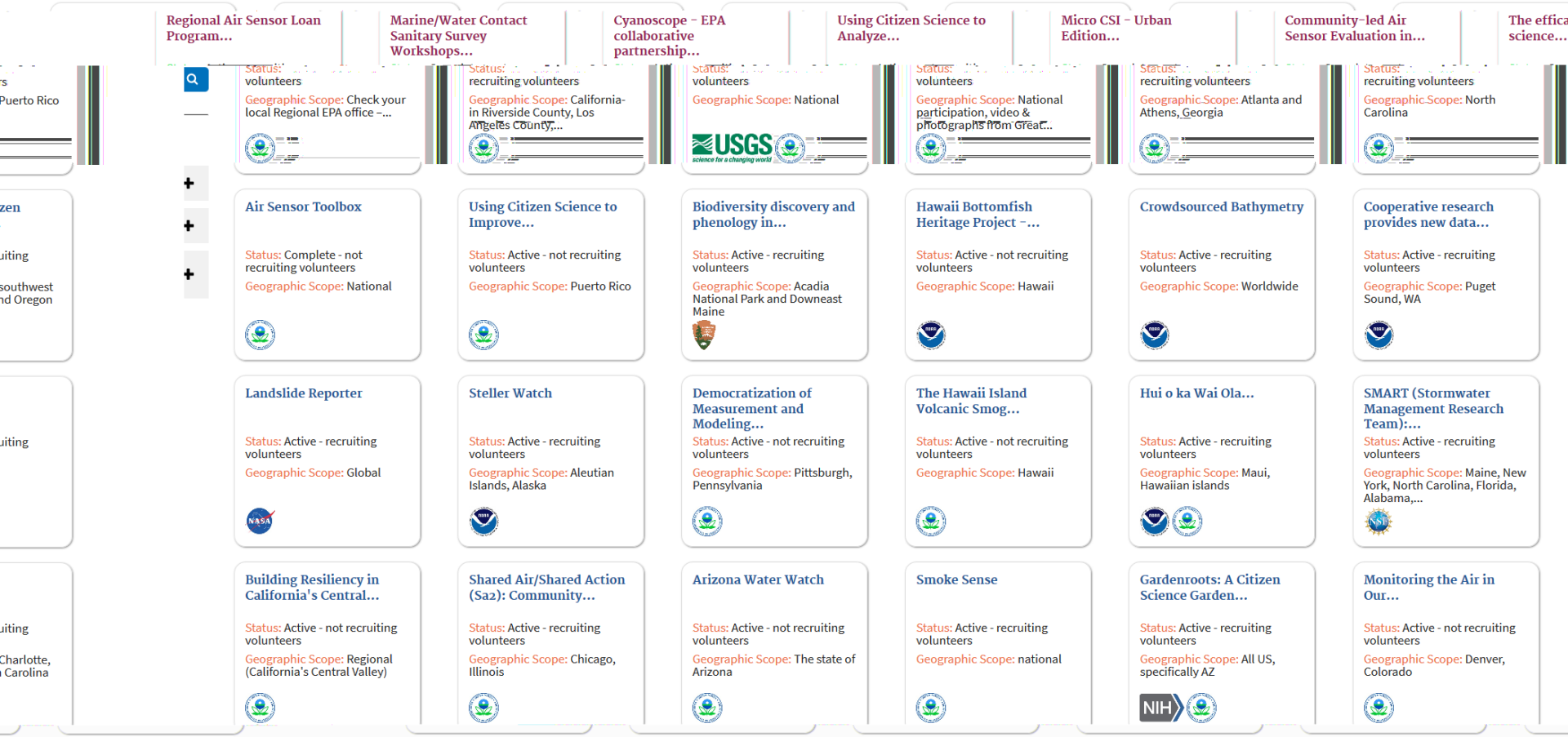
over 5K

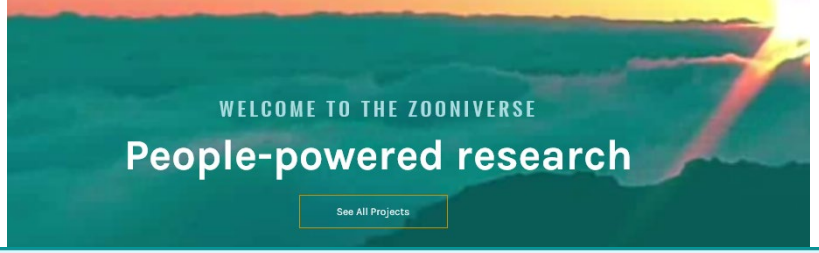
Members

citizenscience.gov

Federal Crowdsourcing and Citizen Science Catalog

Number of Projects: 439





ALL DISCIPLINES | ARTS | BIOLOGY | CLIMATE | HISTORY | LANGUAGE | LITERATURE | MEDICINE | NAT

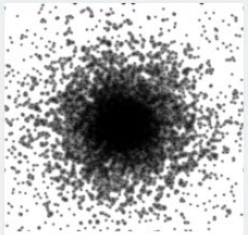
Most Recently Launched

Showing 1-18 of 18 projects found.

Name:

MUON HUNTERS 2.0

COSMIC

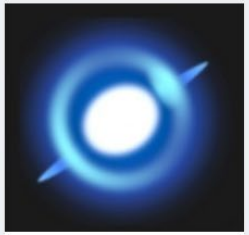


LOCAL GROUP CLUSTER SEARCH

PLANET HUNTERS TESS

SUPERWASP VARIABLE STARS

VARIABLE STAR ZOO



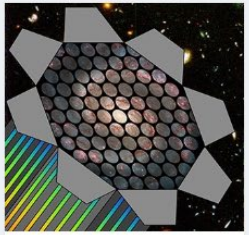
SPACE WARPS - HSC

GALAXY ZOO

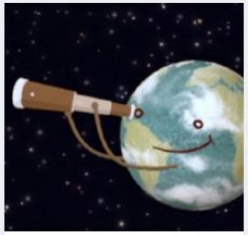
SOLAR STORMWATCH II

EXOPLANET EXPLORERS

ASTRONOMY REWIND

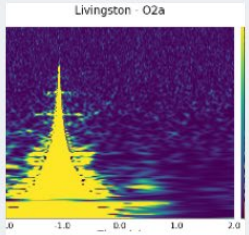


GALAXY ZOO: 3D



BACKYARD WORLDS: PLANET 9

PLANET FOUR: RIDGES



GRAVITY SPY

FREE
The Appalachian VOICE
Dec. 2018 / Jan. 2019
ENERGY Democracy
Part Two of a two-part series looks at how everyday people are taking charge of their electricity systems and prioritizing clean energy, affordability and choice
Repower REC
Pro member
Pro co-op
Pro democracy
ALSO INSIDE:
Citizen Science
Discover projects underway across the region and how you can get involved

Considerations of Data

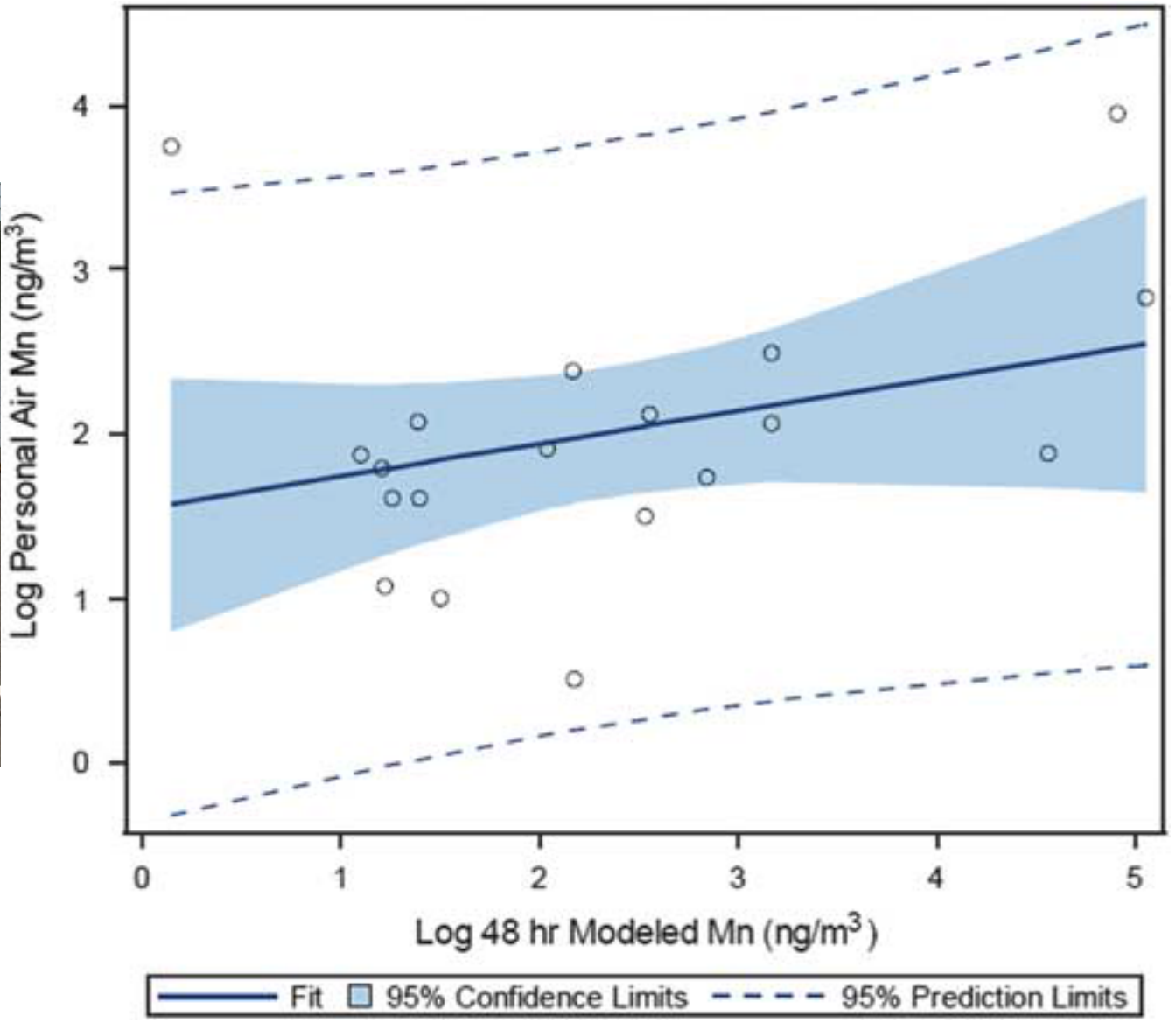
- Valid, reproducible, accurate…high quality
- Accessible
- Devices selected based on fit for purpose
- Mechanisms for checking data quality
- Interpret-able results

- Crowdsourcing can be powerful
- Let’s maximize this valuable data resource
- Increase public participation in science

- Increase STEM in our communities
- Increase environmental exposure research

Thank you!

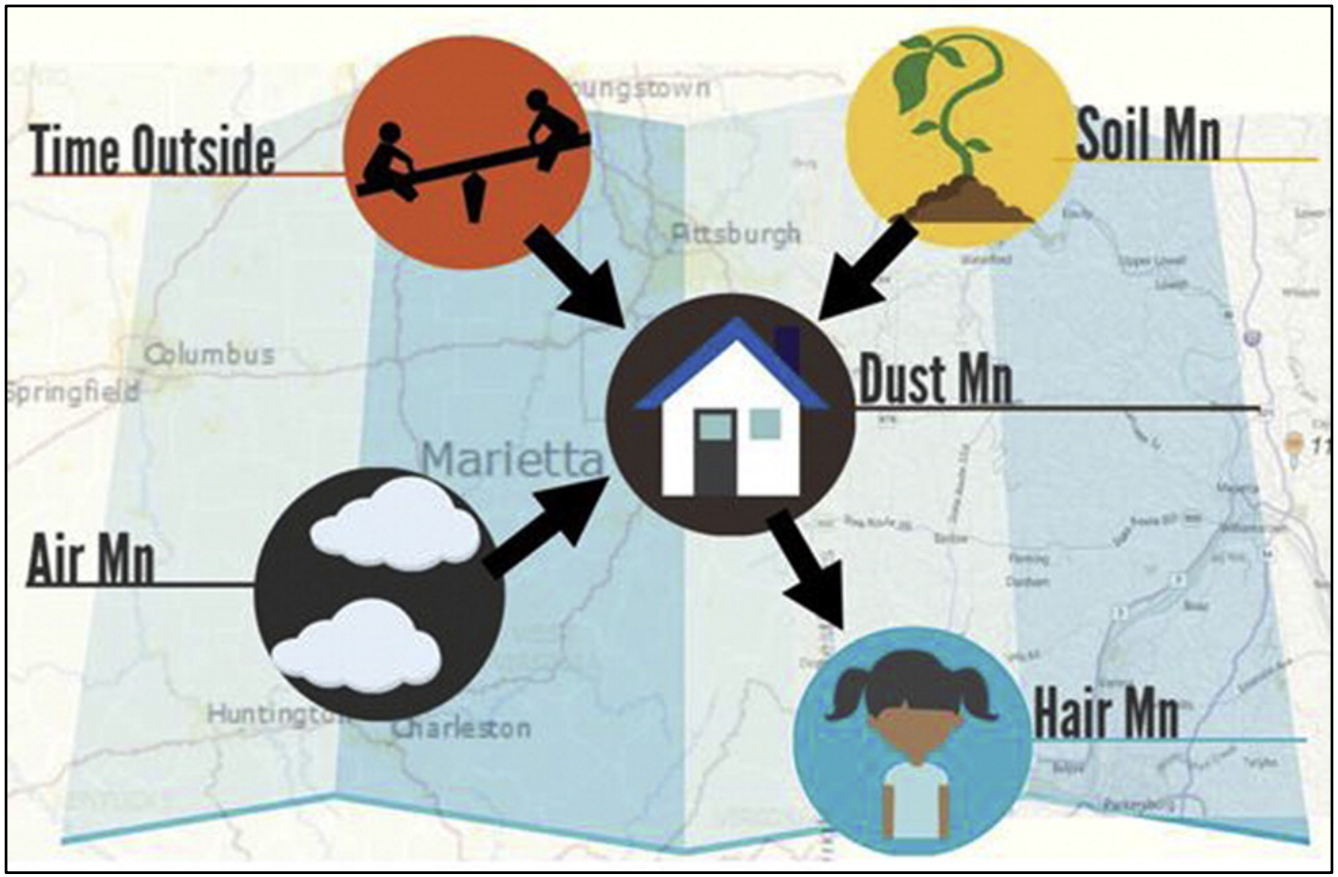
Let’s go collect data!



Regression plot of log personal air Mn with log AERMOD 48 h modeled air (N=19)

Fulk F *et al* JESEE 2016

Pathways of inhalation exposure to manganese in children living near a ferromanganese refinery: A structural equation modeling approach

Florence Fulk [a], Paul Succop [b,†], Timothy J Hilbert [b], Caroline Beidler [c], David Brown [d], Tiina Reponen [b], Erin N Haynes [b,*]

Science of the Total Environment 579 (2017) 768–775