Center for
ecogenetics
& Environmental Heal

Fast Facts about
The Quantified Self:
Sharing your Data for Environmental Health Research

What is the Quantified Self (QS)?

The quantified self is a movement of people who use technology to collect data to learn about themselves. People have long collected data by counting calories and recording baby feeding schedules. But what's new about the QS movement is the use of technology.

Data-collecting devices have become smaller and cheaper and are now in smartphones and tablets, making it easier and cheaper to collect quantitative measurements. Often data are collected automatically using a wearable sensor such as a wristband, video camera or pedometer. Data from many individuals can then be aggregated and analyzed from these sensors.

Many self-tracking applications integrate with other apps or websites, allowing users not only to analyze their own findings but combine them with the findings of others, sharing information to see a bigger picture. You can find examples here: http://quantifiedself.com

What is crowdsourcing?

Crowdsourcing refers to seeking services, ideas, or content from a large group of people, often online. Like community engagement and community-based participatory research (CBPR), crowdsourcing allows community members to discover and provide solutions to complicated problems.

Here are some examples of crowdsourcing for public health:

- Users enter grocery store locations on a map to Identify food deserts
- Reporting injuries on playgrounds and at dangerous intersections
- Conducting a product watch to identify availability of emerging tobacco products
- Identifying available public health resources, such as pandemic flu vaccine
- Collecting local air pollution measures
- Gathering information on the use and condition of parks and bike trails

SCHOOL OF PUBLIC HEALTH
UNIVERSITY *of* WASHINGTON

How is the Quantified Self being used for environmental health research?

After the 2010 BP oil disaster in the Gulf of Mexico, the information local communities were given about the extent and damage from the spill contradicted what they were seeing. Three citizen scientists along with more than 100 local volunteers used helium balloons, kites and digital cameras to collect 100,000 aerial images of the coastline. Volunteers stitched the images into high-resolution maps of the disaster and uploaded them to Google Earth. The New York Times, BBC, PBS, and the Boston Globe featured these community maps of the spill. This media attention allowed residents to speak about what was really going on in the Gulf Coast. The three citizen scientists who started this

project went on to create Public Lab, a wiki for open source tools for environmental investigation. http://publiclab.org/wiki/stories

Imperial County, CA, a low-income, primarily Latino community, has a high asthma rate for school-aged children. But the county has a limited number of air pollution monitors. UW professor Edmund Seto collaborated with Comité Cívico del Valle, a community group that advocates for health and the environment, and the CA Environmental Health Tracking Program, to measure air pollution in the community. Measurements were taken with mobile devices Seto built from low-cost, widely available electronic sensors in cases made using a 3-D printer. The hope is that this new information from the community will help in developing policies and practices to reduce exposure to air pollution.

Seto also used sensors to study the effects of air pollution on black women, in particular the health risk for hypertension and diabetes from being exposed to

air pollution. In Uganda, he used GPS monitors to help protect children from intestinal parasites. In Europe, he used mobile phones to help map walkable neighborhoods. This research has the potential to engage communities and build social cohesion around environmental concerns.

How can I get involved?

Check out this Meetup group in Seattle: http://www.meetup.com/Quantified-Self-Seattle/

Are you concerned about sharing personal data? Should you be?

Self-tracking applications collect information about you and store it in the Cloud. When you use a smart phone, for example, your data is added to data from others to create a bigger picture. This large dataset can be shared with others without asking your permission.
People feel differently about sharing personal information and appear to fall into three groups:

- Information altruists are willing to share anything with anybody to get their data out there and aren't concerned about who sees it or how they use it.
- People with certain boundaries are willing to contribute specific personal information with a known project or person.
- Privacy advocates don't want to share personal information because they worry about how it might be used.

Sharing information is a personal decision. There is no right or wrong position.

Food for Thought

Are you an information altruist, a privacy advocate, or somewhere in between? What assurances would you want before you share your personal information that was collected on a handheld device or your smartphone?

Where to learn more:

Public Lab: A do-it-yourself (DIY) environmental science community who investigates environmental concerns with inexpensive DIY techniques. Resources include local chapters, tools and techniques, and an open data archive for environmental data http://publiclab.org

Oregon State University's silicone pollution detection wristbands have a porous surface that acts like a biological cell, absorbing chemicals people are exposed to through their environment. The wristbands collect 1,200 chemicals that researchers can screen for. http://oregonstate.edu/ua/ncs/archives/2014/mar/rubber-wristbands-show-pollution-air-water-and-food

Some examples of OSU's research:
- 30 volunteers wore the bracelets for a month. The bracelets soaked up 50 chemical compounds, including fragrances, personal care products, flame-retardants, pesticides, caffeine and nicotine.
- Roofers who wore the wristbands showed exposure to polycyclic aromatic hydrocarbons (PAHs), 12 of which are on the EPA's list of priority pollutants.
- OSU researchers are recruiting citizen scientists to join a network for environmental exposure monitoring in their communities. Citizens will develop a profile, perform online training, request a wristband, suggest a sampling site, and join local events https://citizen.science.oregonstate.edu.

Husky SciVal Experts
This research expertise portal is designed to facilitate faculty research and collaboration by searching for scientific and technical publications indexed in the Scopus Database, provide data to assist with strategic development, and funded grant information publicly available through research funding databases. http://www.experts.scival.com/uwashington/

Harvard World Map
Open source software that allows users to build and publish their own mapping portals. Anyone can view the maps: http://worldmap.harvard.edu

Quantified Self TED Talk by Gary Wolf, Journalist and contributing editor at Wired Magazine www.ted.com/talks/gary_wolf_the_quantified_self

Crowdsourcing Applications for Public Health, Am Journal of Preventive Medicine, Feb 2014 http://www.sciencedirect.com/science/article/pii/S0749379713005898#