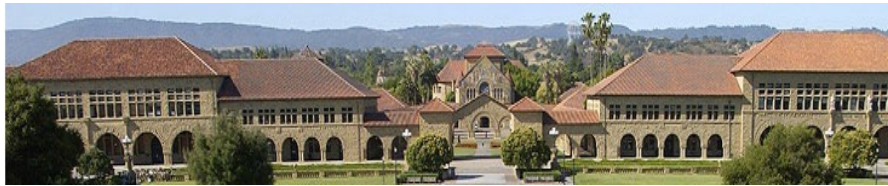




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# Leveraging Digital Tools & Citizen Science Methods to Advance Health Equity for Cancer Prevention

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# The *CHALLENGE*

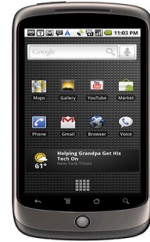
- **Technology** = major “driver” of many of society’s comforts, conveniences & advances
- ***But*** has engineered regular movement/activity & other positive health behaviors out of our daily lives
- How can we harness technology for “***good***” in the *cancer prevention area*?



# Technology offers *Solutions*

## *Including:*

- *Real-time* information capture & delivery
- Delivery of *personalized, contextually relevant* messages & information, timed for maximal impact
- Can automatically “*learn*” over time what works best for whom (“whiches conundrum”)
- *Population/global reach* (& impact)





This *potential* of **digital interventions** occurs across several domains, including:

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- **Me** (personal level)



- **We** (community)



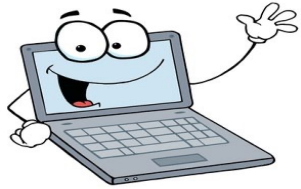
Especially in promoting *health equity*

# Personal (“me”) domain: **The Good News**

- Accelerating evidence for *theory-based*, digitally delivered behavioral health interventions in diverse groups

Examples from ***physical activity promotion*** field:

## Tele-health



(interactive voice response)

## Mobile apps



## Personal “coaches”



Some as effective as *human-delivered* programs!

# The Not so Good News . . .

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- Many digital programs don't take advantage of ***substantial behavioral evidence base/knowledge***
- Many evidence-based programs *don't get* ***implemented/ disseminated across the population***
- Those that are available often ***don't reach under-resourced communities*** that could especially benefit
- Those that reach those communities often ***do not adequately tailor or customize*** to their needs/preferences

## *One potential solution . . .*



**Directly engage members** from diverse communities & backgrounds in the scientific process, which can:

- demystify science

- make it more accessible & inclusive

- & advance **health equity**

# A possibility:

## *Community-Engaged 'Citizen Science'*

that brings together:



Researchers



Organizations



Residents

to harness potential of informational technologies/mobile devices to help solve the **cancer prevention challenge**





## One Example: *The “OUR VOICE” Citizen Science Research Initiative*

Empowers residents to *assess & activate environmental changes* for healthier neighborhoods & communities  
(in partnership with local decision-makers)

***Local Facilitators*** learn how to support residents throughout the process



Buman M, et al. *Translat Behav Med*, 2012; *AJPM*, 2013; Winter S, et al., *Translat Behav Med*, 2014; King AC, et al., *TJACSM*, 2016; Rosas GR, et al., *J Urban Health*, 2016; Sheats J, et al., *J Urban Health*, 2017; Hinckson E, et al., *IJBNPA*, 2017; King AC, et al., *Prev Med*, 2019

# How does the *Our Voice* Citizen Science Method work?

Facilitated **4-step process** to engage residents in:



**Discovery**



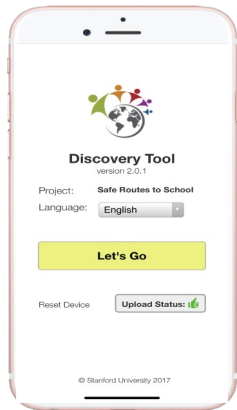
**Discuss & Prioritize**



**Share, Activate**



**Change**



**13+  
languages**

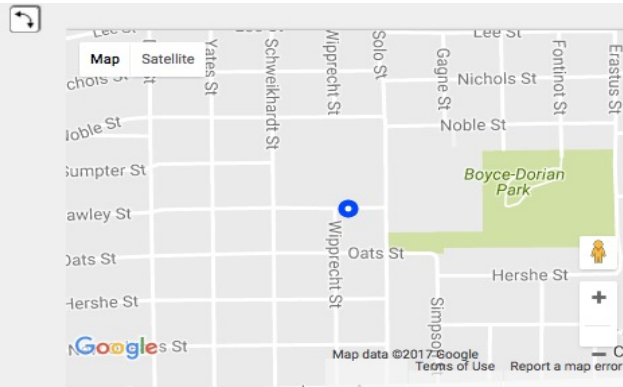
**Users aged  
9-95+**



**Walking  
maps**

**Geo-tagged photos &  
narratives, simple ratings**

# Discovery Tool's multi-dimensional data are accessible & meaningful to residents, decision makers & researchers alike



Good or Bad for the community



Rating

"I took the photo because as you can see from the left of the picture, there is a sidewalk, and then we have a crosswalk going across the street, **but it leads to a ditch**. So that needs to be fixed. There **needs to be an extension of the crosswalk to the sidewalk** on the side there to the right".

Save Transcriptions



Can use  
**grouped data**  
to identify  
community  
“Hot Spots”

- **Green** = positive features
- **Red** = negative features
- **Orange** = mixed positive & negative features

(grey=no  
rating  
provided)

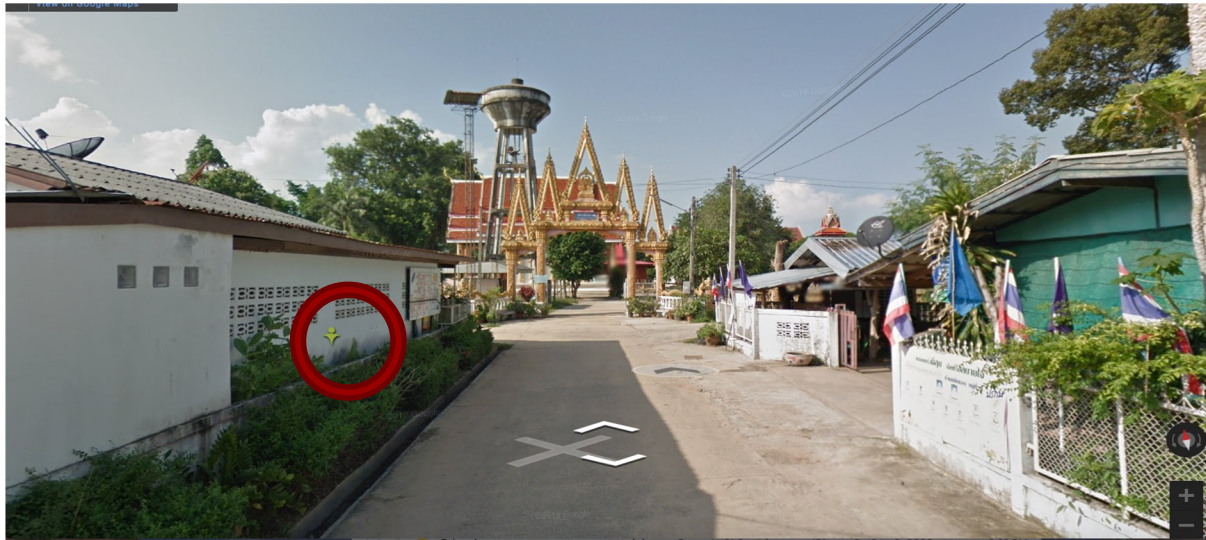


# Exploring other data visualizations

(Google Earth)



e.g., **Street View**  
Feature on  
Google Maps

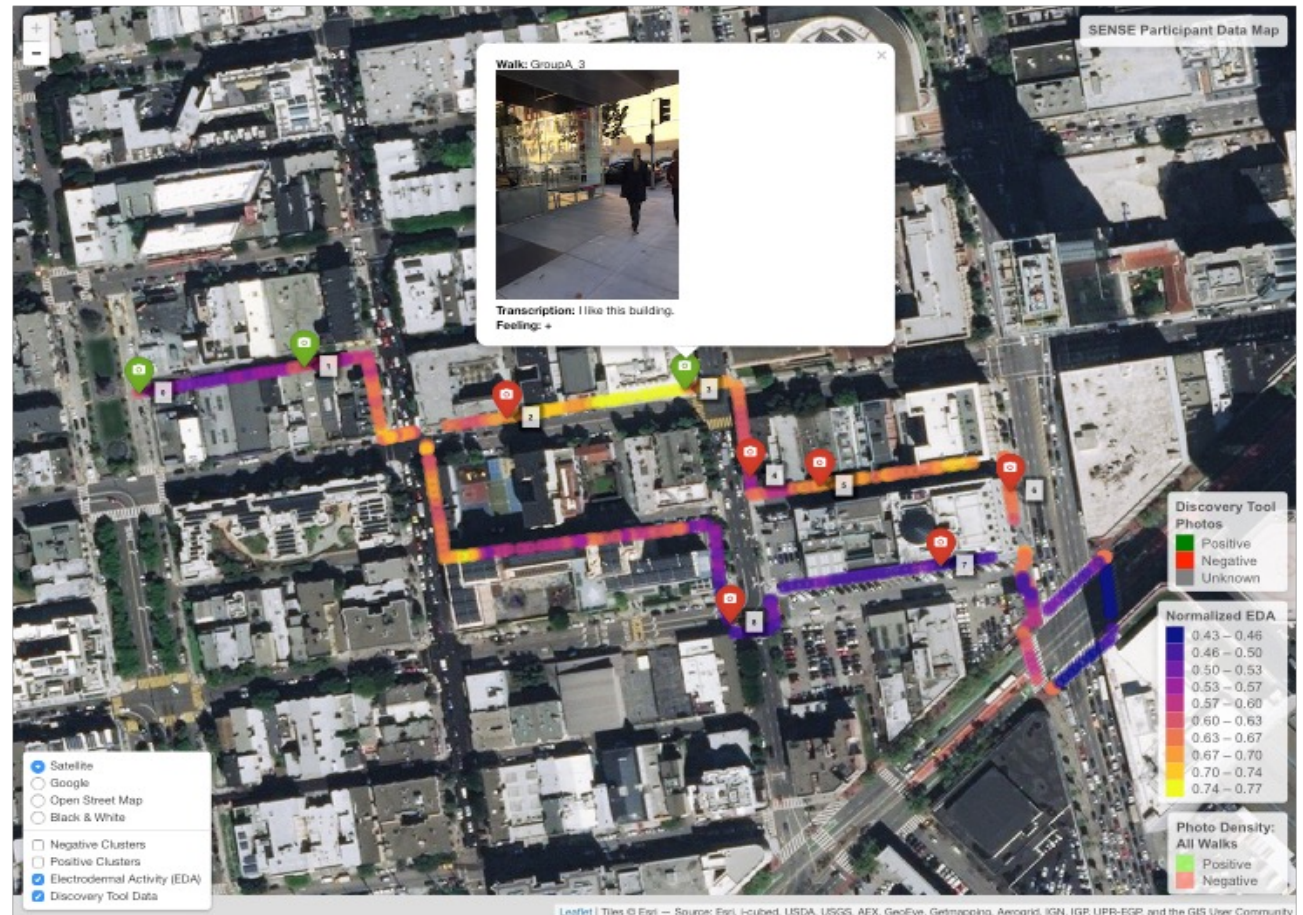


Praveena Fernes,  
Thailand project



## Combining DT with Mobile Sensing Devices:

- Wrist-worn sensor of electro-dermal & heart rate activity
- **Identifies locations linked with increased arousal/stress**



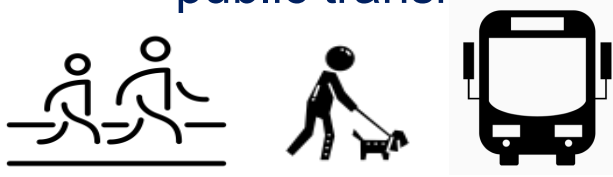
Chrisinger Ben & AC King (International J Health Geography, 2018). Stress Experiences in Neighborhood and Social Environments (SENSE). (with Place Labs, SF [Empatica])



- [illegible]

# Demonstrated **Successes** of *Our Voice* in diverse, often under-resourced communities include:

*Infrastructure repair/additions  
supporting local walkability,  
public transit*



*More age-friendly  
community events, groups*



*More  
greenery/gardens*



*Increased access  
to healthy foods*



*Safer indoor  
environs. in rehab.  
center*



*Healthier school  
environments & safer  
routes to schools*



*Safer activity-supportive  
parks & rec. spaces*



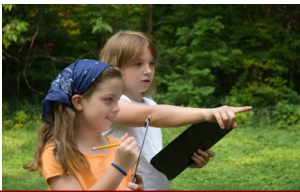
*Increases in agency,  
efficacy, connectedness*



## Successes creating Accelerating demand!

- 80+ projects
- 18 U.S. states
- >20 countries
- >30 universities  
partnering with  
community  
organizations



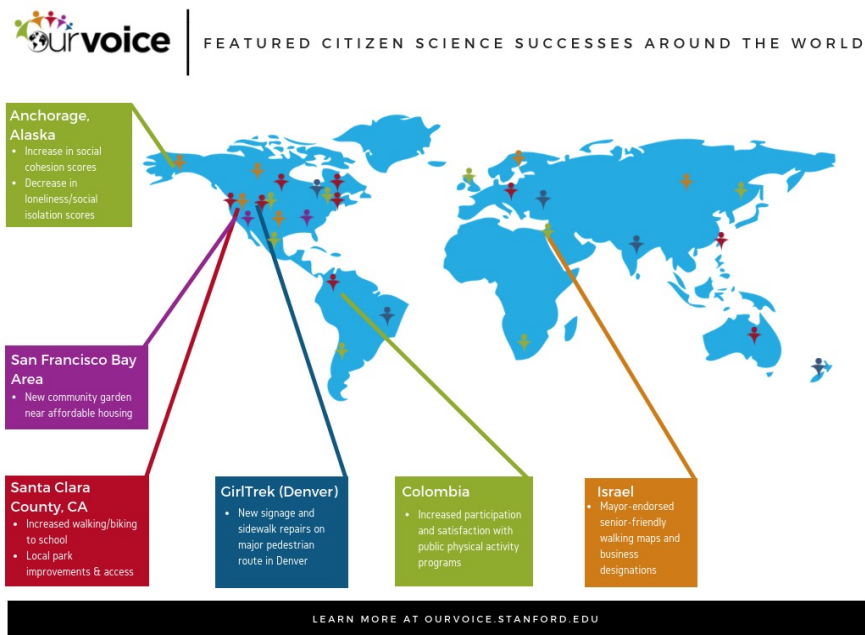


# Goals include . . .



- Build an ***online, interactive world map*** of citizen science data & results for all to use
- Link ***with other data platforms*** to add contextually relevant “lived experience” information

**Ultimate Vision:** Inspire a *global citizen science movement* to build healthy communities & planet



Finally, for the **Digital Health Field** more generally:

## Some “Calls To Action” for . . .

### Science agencies:

- **Shorten** grant submission-to-funding cycle
- Build further funding bridges to **dissemination/scale-up**

### National & community organizations:

- Apprise **grantees/constituents** about evidence-based programs
- **Partner further with universities** to accelerate *research-to-action*

### Private sector:

- Seek academic partnerships to **heighten product quality/effectiveness**

### Community members:

- Look for ways to get involved in science so that we can **discover & implement solutions together!**





***In Summary:***

**Residents' lived experiences**

of local conditions can enrich &  
contextualize digital approaches to  
*advance cancer prevention*

***Thank you!*** <http://ourvoice.stanford.edu>