Sensing Everywhere!
from ecosystems to human systems

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… in collaboration with faculty, students and staff at CENS

http://urban.cens.ucla.edu

Imagine if….

Pristine ecosystems were infused with **smart cameras** to watch for threats to native biodiversity

Imagine if….

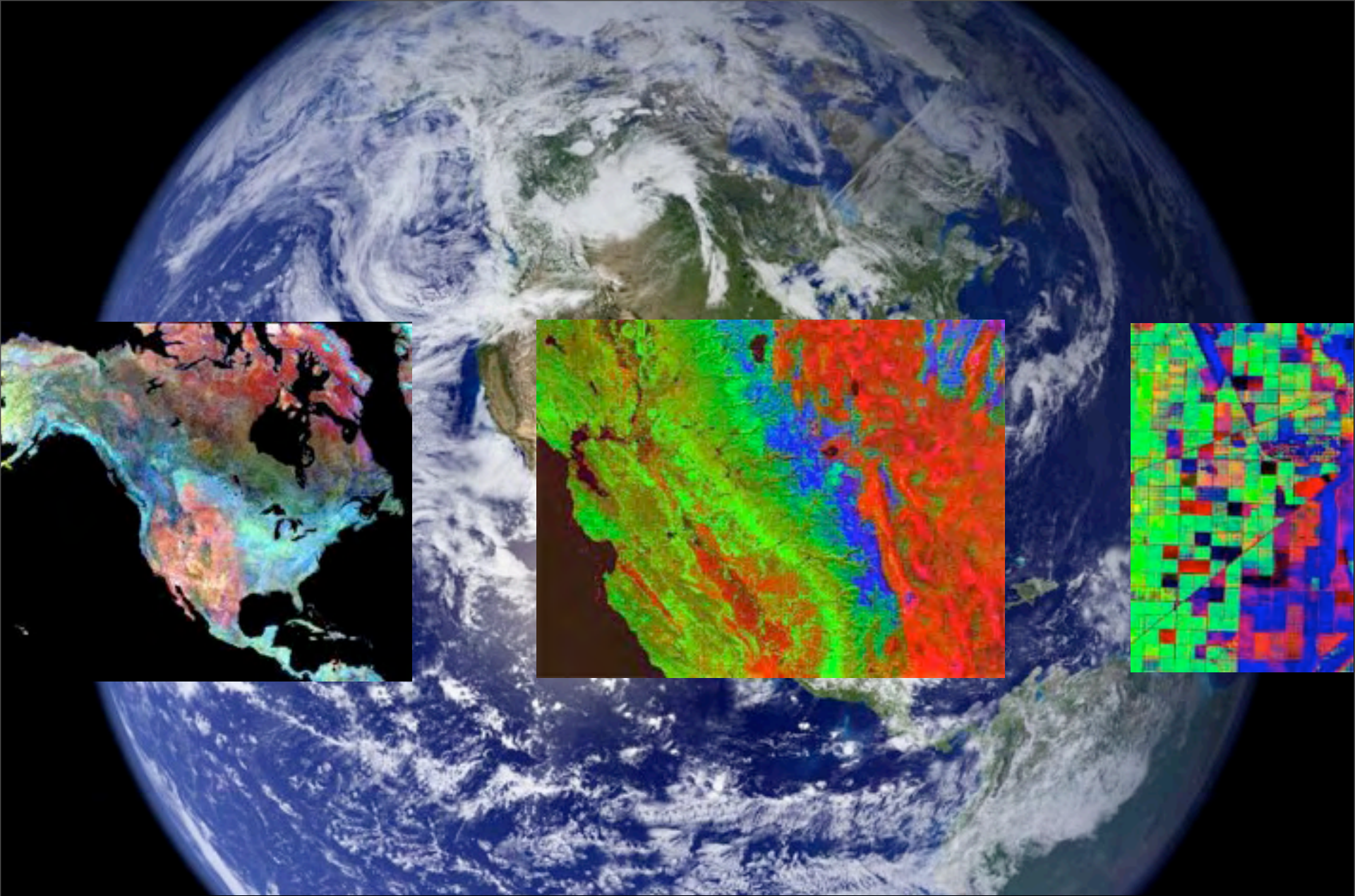Our **everyday cell phones** showed us *how we impact the environment, and how it impacts us.*

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Sensing Everywhere!
The Internet Front-Tier

D. Culler, UCB

San Joaquin River Basin: Red-soil, Green-vegetation, Blue-snow

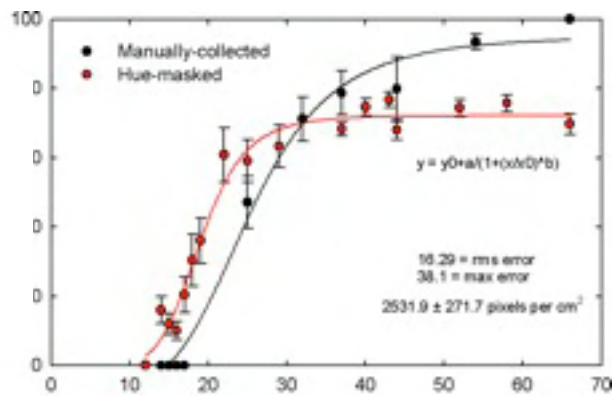S. Ustin, Center for Spatial Technologies and Remote Sensing

Nicolle Rager Fuller, NSF

Percentage leaf area per branch over growing season
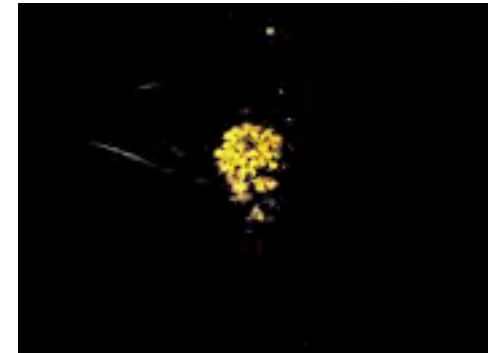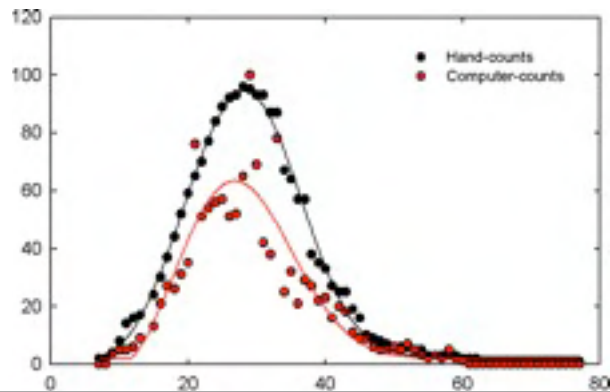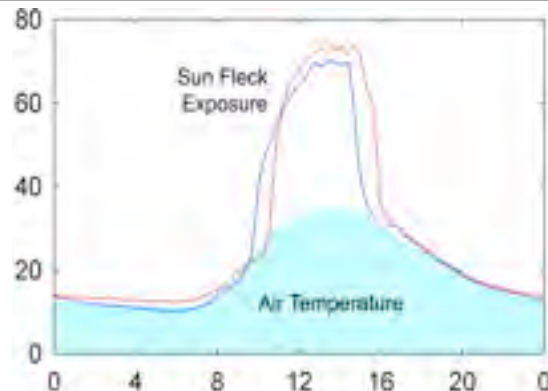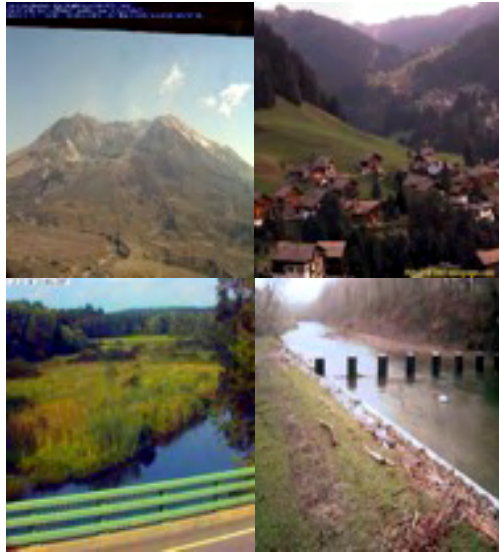

Number of flowers in images per day over growing season

Visible light cameras capture quantitative information in forest understory locations, e.g., to calculate Energy Balance parameters
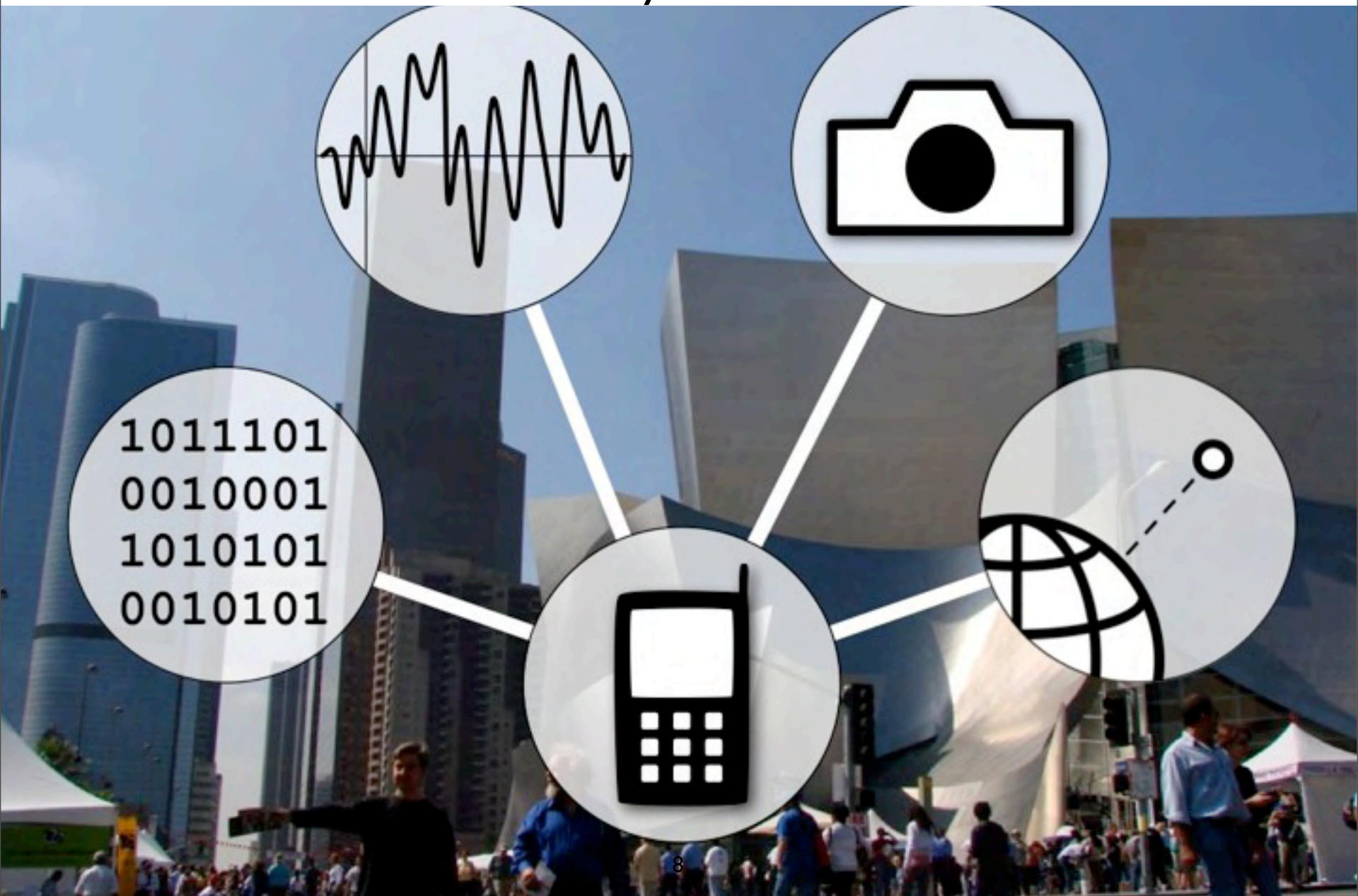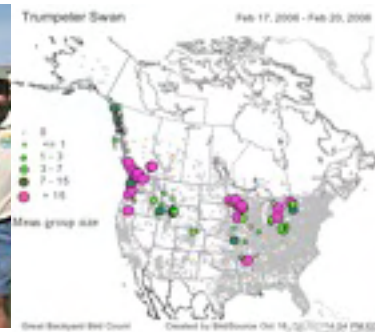
Litter surface temperature during diurnal cycle

Daily images from >1600 webcams captured daily for near estimates of Spring green-up

Graham, et al

# "If you can't go to the field with the sensor you want, go with the sensor you have!"

Enabled by 3 x 10^9 mobile phones with expanding capabilities. Motivated by 6 x 10^9 people on planet earth and their concerns.

Documentation of Climate Change

image,video,audio,text
+
geo-reference,time-stamp
=
evidence of...

Dates of flowering, Dates of fruiting, Species distribution, Human/plant/animal movements, Auditing mitigation activities, Local uses/relevance...
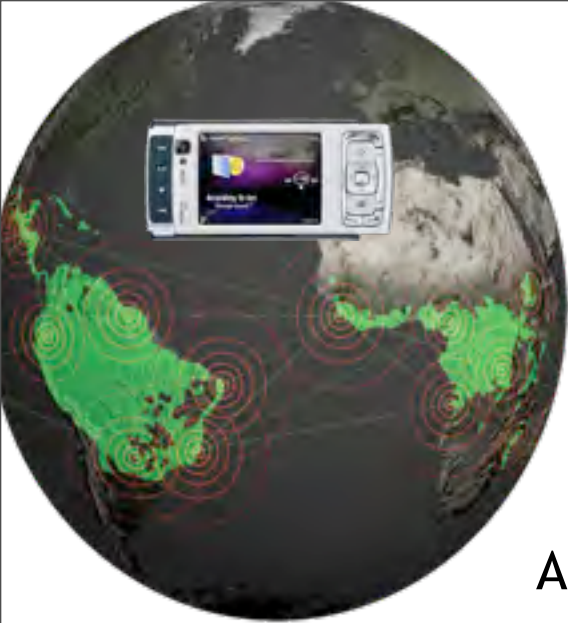
Andelman, et al

Mobile personal sensing for health and wellness

INFERENCE
models, spatial and longitudinal data
Multi-scale
Measurement
to Meaning

↑

PROCESSING
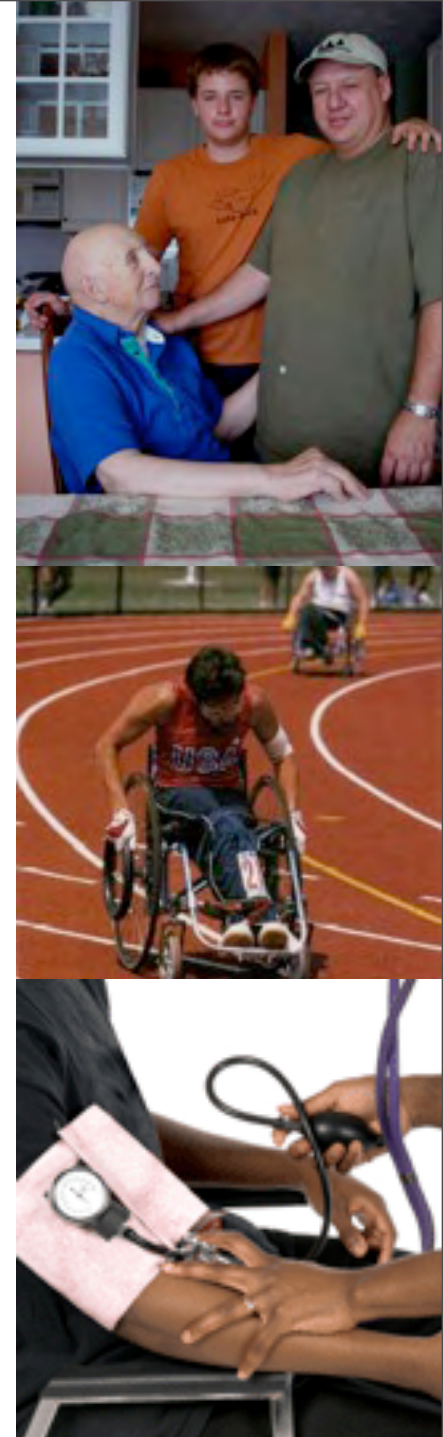**activity classification, data fusion, analysis**
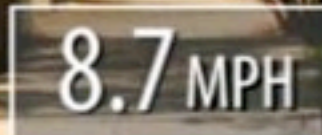**Mobile Device and**
Web Services

+

CAPTURE
personal location/media traces
Mobile Devices
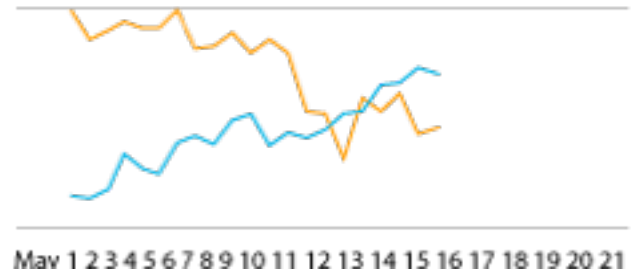
with Mary Jane Rotheram et al, Global Center for Children and Families

2.35 μg/m³

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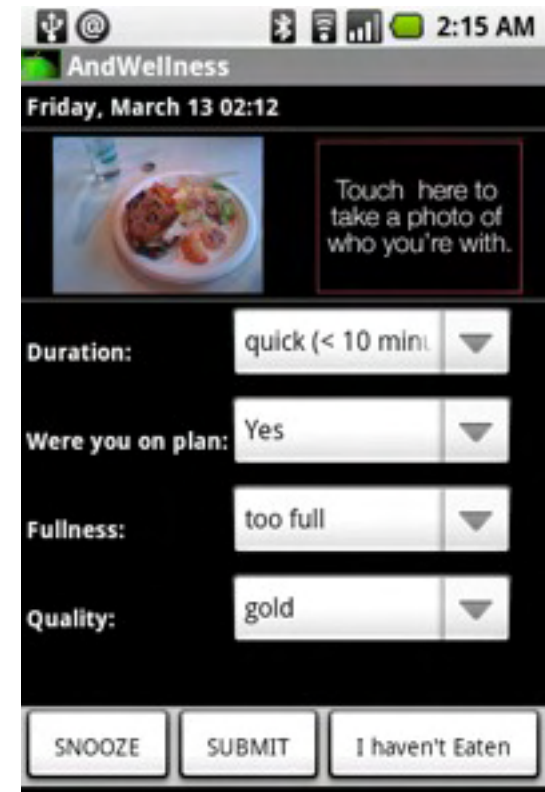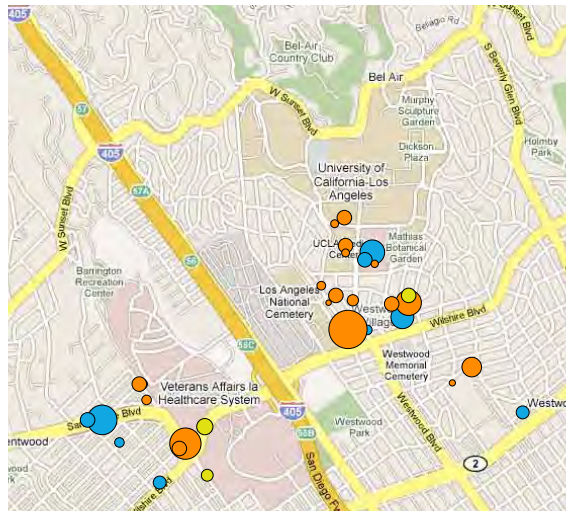
72 BPM

33° 56'N

8.7 MPH

http://urban.cens.ucla.edu/video

When do I eat on and off plan?

Where do I eat on and off plan?

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Cenizal, Estrin, Ramanathan, Samanta, Rotheram, Swendeman, West
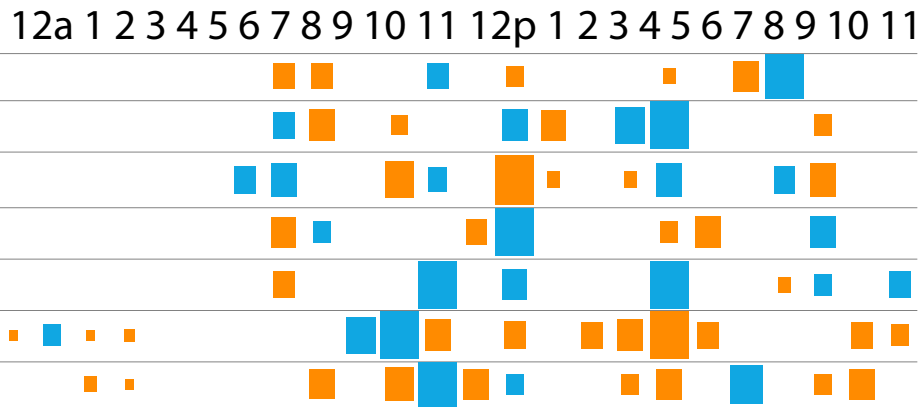
PEIR: Personal Environmental Impact Report
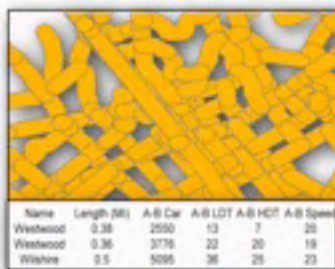## http://peir.cens.ucla.edu

Location Trace Processing

Location Trace + Weather + Activty Classification

Road Buffers

EMFAC

Trip Aggregation

Trip Summary

PEIR UI

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Mun, Yau, Burke, Estrin, Hansen, West, …
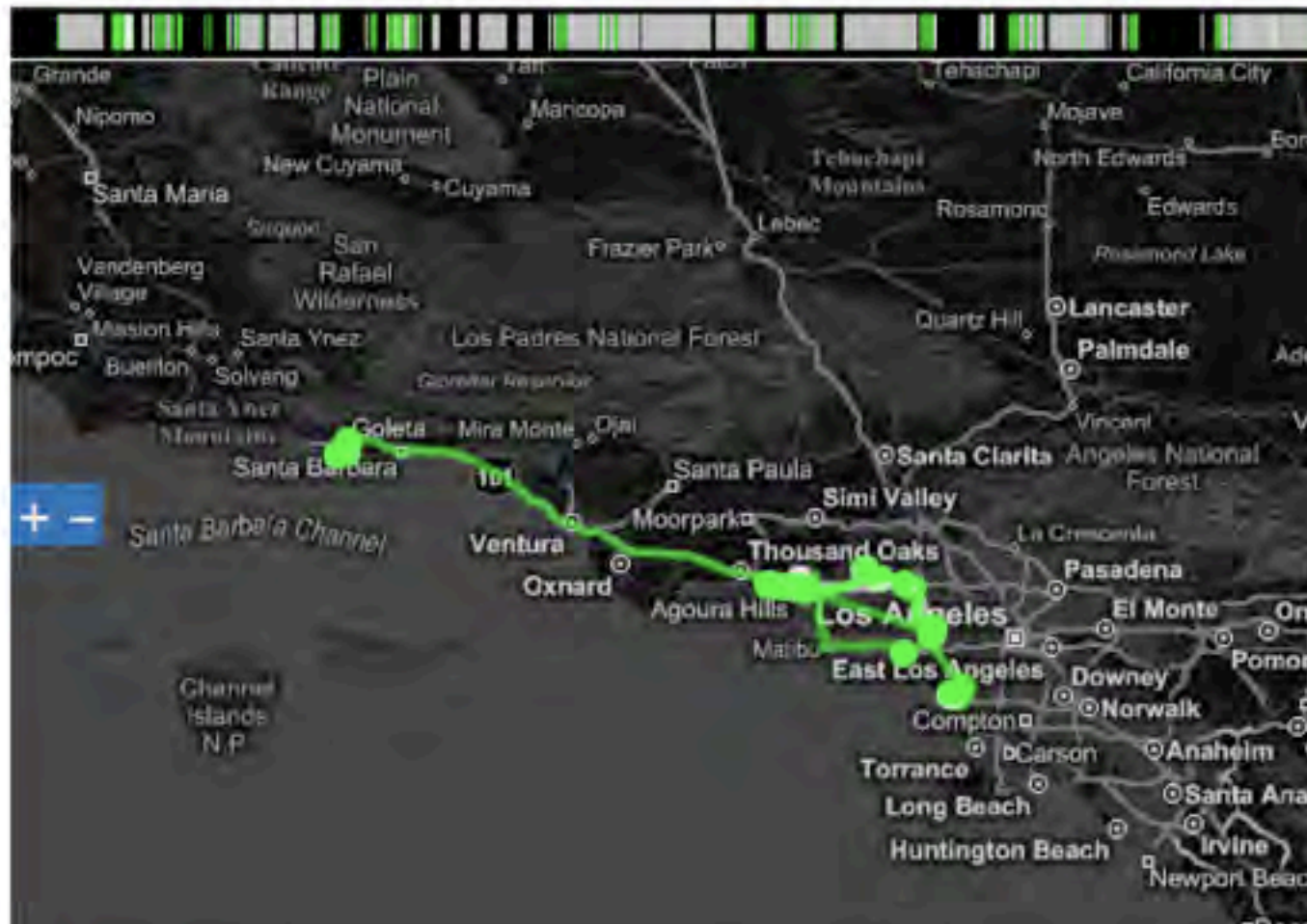
Dashboard
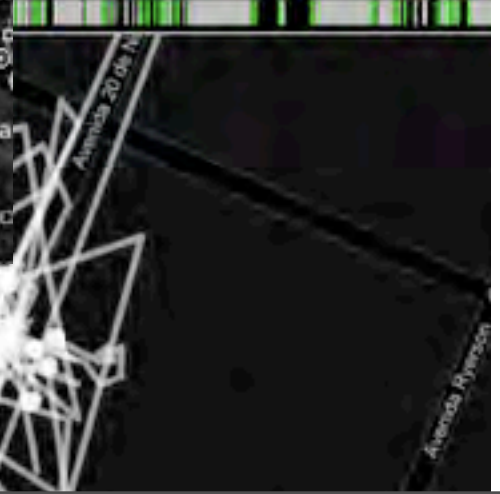
From Incentives to Penalties: How Far Should Employers Go to Reduce Workplace Obesity?

Published: January 09, 2008 in Knowledge@Wharton

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Send a comment

This month, more than half of Americans probably made health-related New Year's resolutions, judging from past data, but few are likely to stick to them. Employees at CFI Westgate Resorts, an Orlando, Fla.-based vacation properties company, might consider themselves lucky: They have an incentive to get healthy. If they join in the company-wide weight-loss contest this month and succeed in reaching their goals, they could win cash prizes or a luxury vacation.

Inspiration for the contest, now in its second year, came from CEO David Siegel, who himself recently lost more than 20 pounds. "He put it on the radar," says Mark Waltrip, chief operating officer at Westgate, adding that in the contest's first year, some employees lost up to 60 pounds.

PROTOTYPE

Predicting Where You'll Go and What You'll Like

Gregory Skibiski, left, and Tony Jebara of Sense Networks, a company that uses location data to make reco... for businesses and consumers.

By MICHAEL FITZGERALD

'TRACK' MAN IS SACKED
GPS NAILS ED. GUY

By DAVID SEIFMAN City Hall Bureau Chief

August 31, 2007

Schools Chancellor Joel Klein yesterday fired a veteran worker whose movements were tracked for five months through the GPS device in his cellphone, leading to charges that he was repeatedly cutting out early.

"This individual was getting paid for not working," said schools spokeswoman Margie Feinberg, explaining Klein's decision to accept an administrative law judge's recommendation to ax John Halpin, a longtime supervisor of carpenters.

Halpin had worked in the

Business Publications   Topic: RSS Feed

AIG Auto Insurance Launches GPS Based Teen Driver Pilot Program

Business Wire , April 9, 2007

EMAIL   PRINT

NEW YORK -- AIG Auto Insurance today announced the AIG Teen GPS Program for auto insurance policyholders with teen drivers. According to the National Highway Safety Administration (www.nhtsa.gov), auto accidents are the leading cause of death for 16 to 20 year-olds, with roughly 6,000 young lives lost annually. The program will initially be piloted in Arizona, Illinois, New Jersey, Pennsylvania, South Carolina and Washington, and uses GPS technology to allow parents of teen drivers to monitor the location of the teen's car and driving.

After installing a small GPS unit, which is easily set up in

Q   Next Previous   Highlight all   Match case

What **you** see

Map Interface

Impact/Exposure Explorer

What you share with **others**

Facebook Widget

Private Data Vault

Raw GPS

Filtered GPS

peir

Vault API

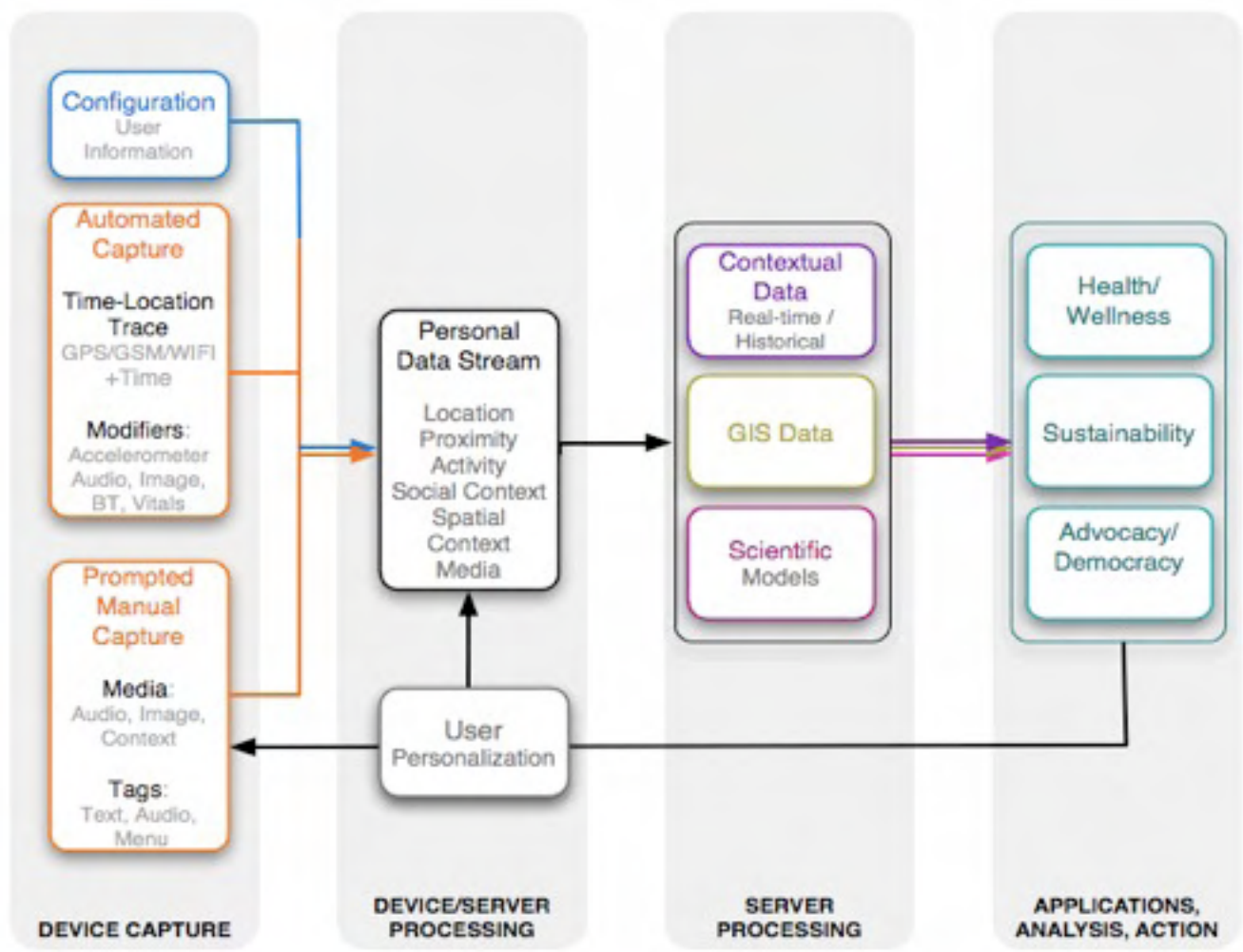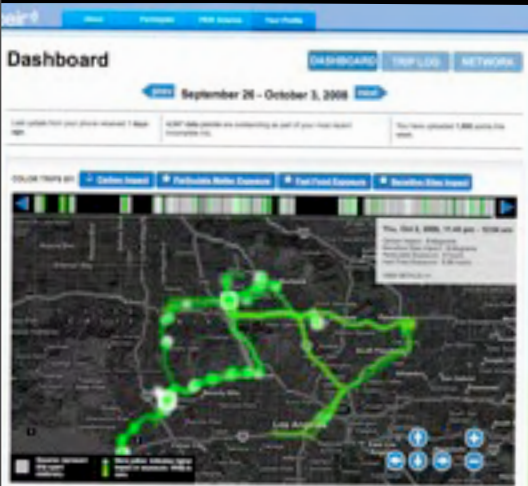**vault + filters = granular, assisted control** over what you send to who, what that data says about you, whether you reveal who you are or share anonymously, ...

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It takes an *ecosystem*...

The center has allowed us to create a vital, innovative, multi-disciplinary research environment at UCLA that nourishes:

Undergrads and Graduate students...
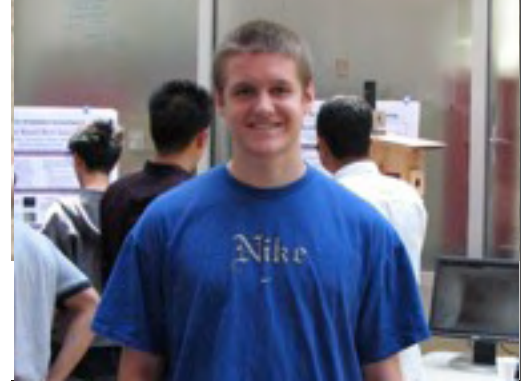
Professors and Post-docs...

Civil Engineers and Ecologists...

Hardware designers and Information theorists..

to come together and innovate...

in matters of great importance...

and in a manner that has real impact.

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Acknowledgments-Sponsors

- NSF: OIA, NETS-FIND Program, CRI Program, CISE, Engineering, Bio

- Nokia, Cisco, Sun, Samsung, Google, Intel, , T-Mobile, MSR, Crossbow

- Participating campuses (UCLA, UCR, UCM, USC, Caltech), UC Micro

- Woodrow Wilson Center, Conservation International

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