

Sensing Everywhere! from ecosystems to human systems

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... in collaboration with faculty, students and staff at CENS

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<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.*

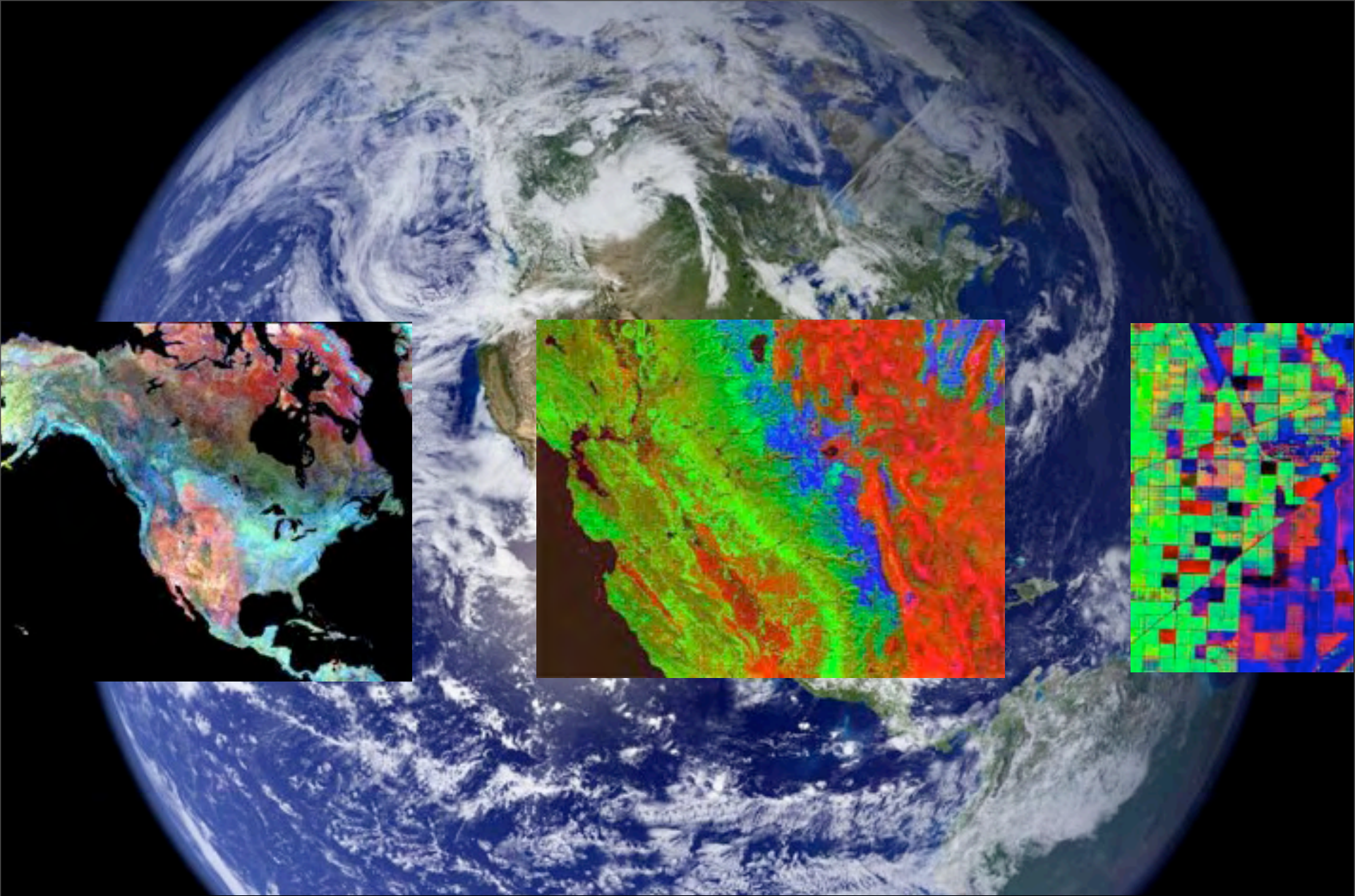


Sensing Everywhere!

The Internet Front-Tier



Baruch/Oleswick map of the internet showing the major ISPs. Data collected 26 June 1999



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

S. Ustin, Center for Spatial Technologies and Remote Sensing

National Ecological Observatory Network

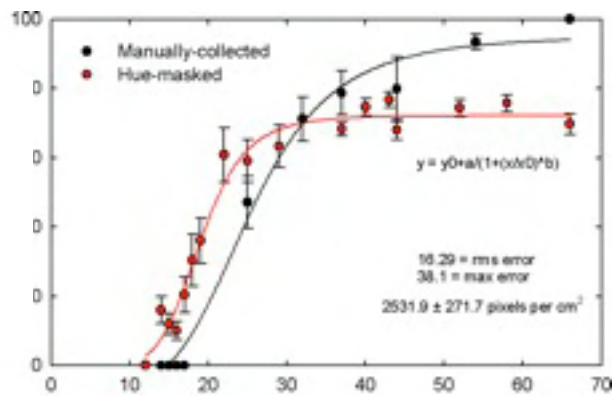


Nicolle Rager Fuller, NSF

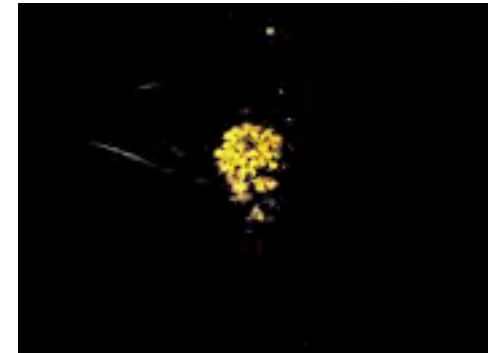
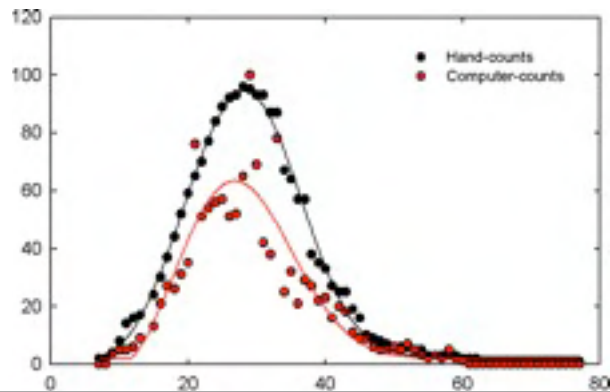
5

Tuesday, March 24, 2009

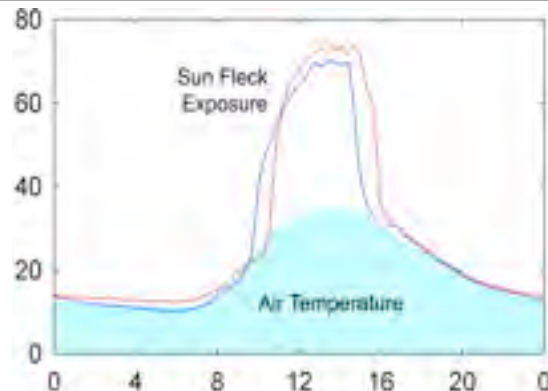
5



Percentage leaf area per branch over growing season

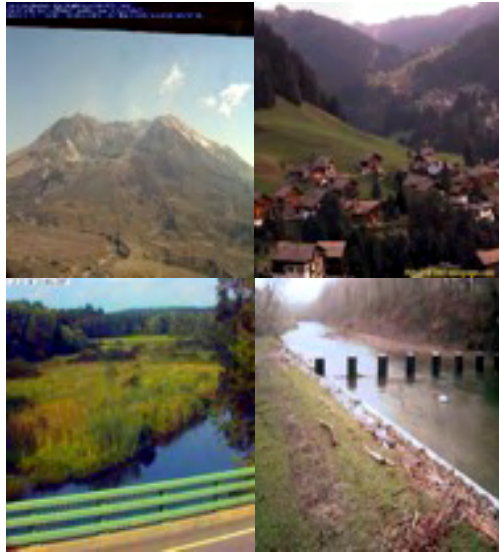


Number of flowers in images per day over growing season



Visible light cameras capture quantitative information in forest understory locations, e.g., to calculate Energy Balance parameters

Litter surface temperature during diurnal cycle

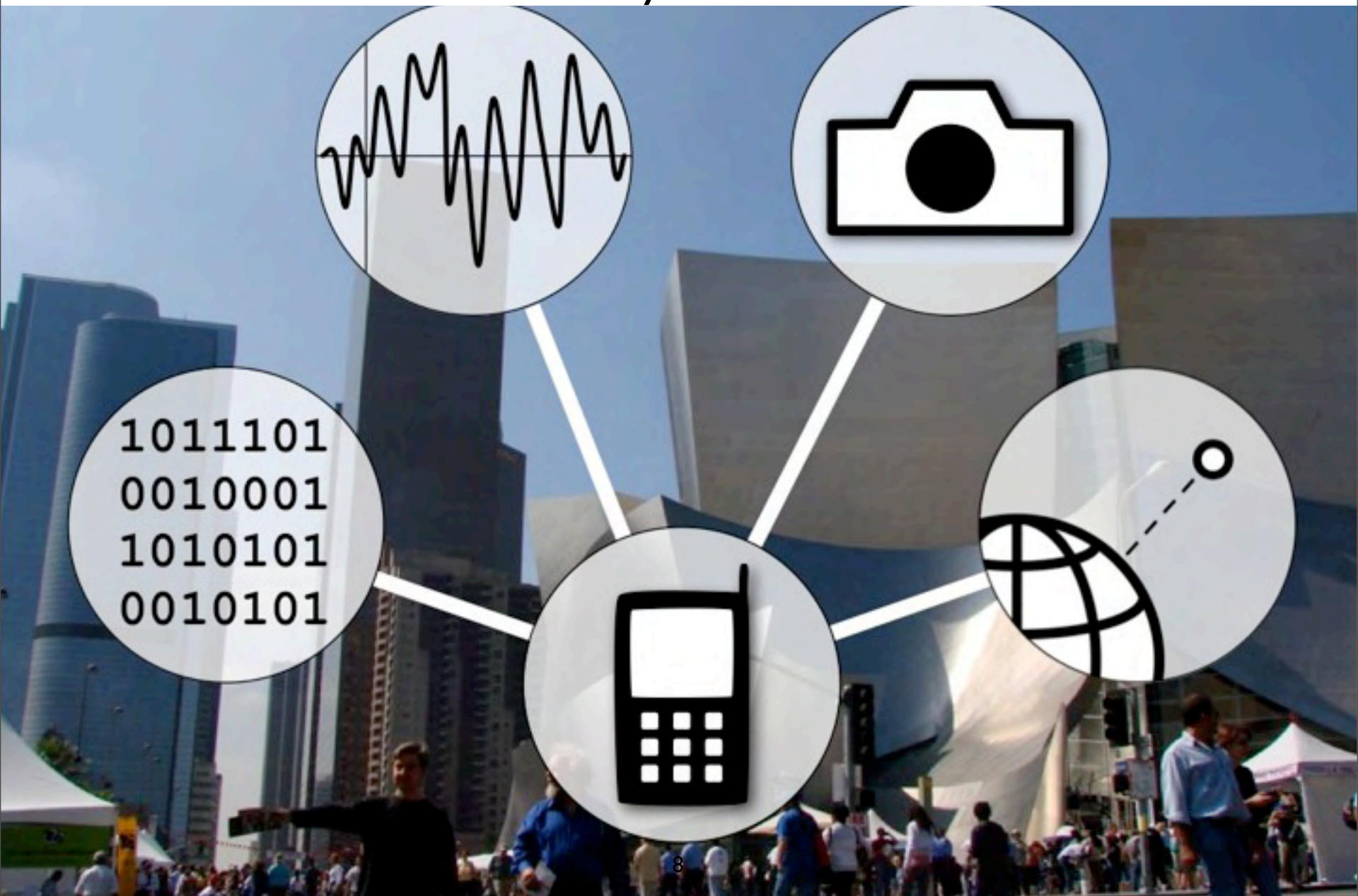


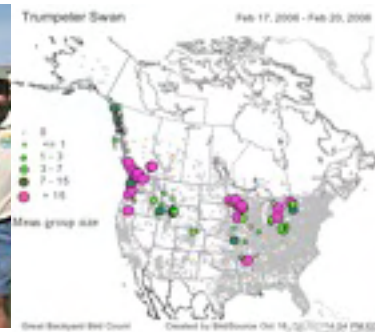
Daily images from
>1600 webcams
captured daily for
near estimates of
Spring green-up



Graham, et al

“If you can’t go to the field with the sensor you want, go with the sensor you have!”



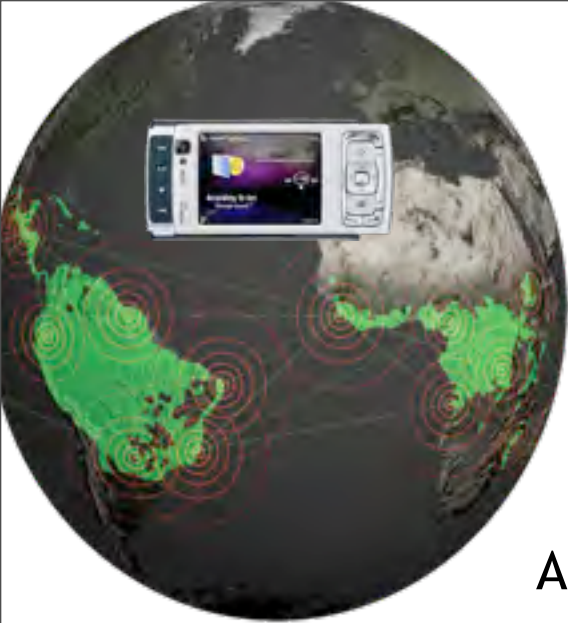


Enabled by 3×10^9 mobile phones with expanding capabilities.
Motivated by 6×10^9 people on planet earth and their concerns.

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

Tuesday, March 24, 2009

Mobile personal sensing for health and wellness

INFERENCE

models, spatial and longitudinal data

Multi-scale

Measurement
to Meaning



PROCESSING

activity classification, data fusion, analysis

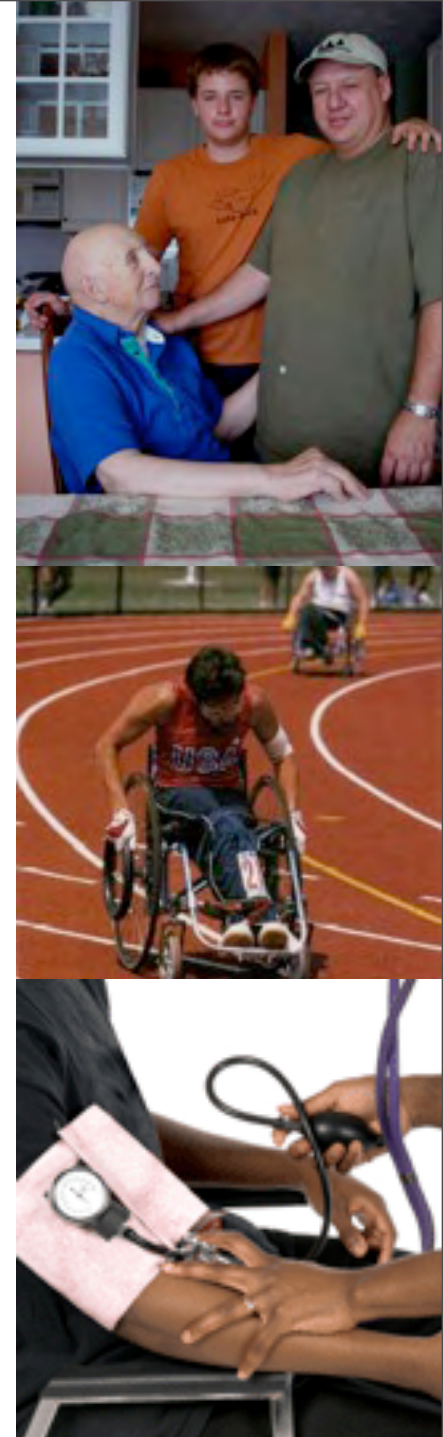
Mobile Device and
Web Services



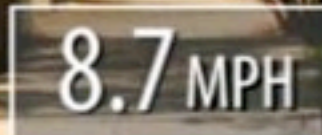
CAPTURE

personal location/media traces

Mobile Devices

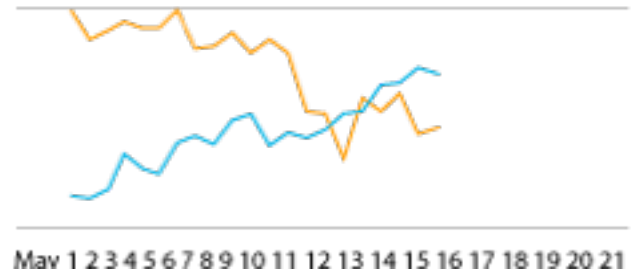
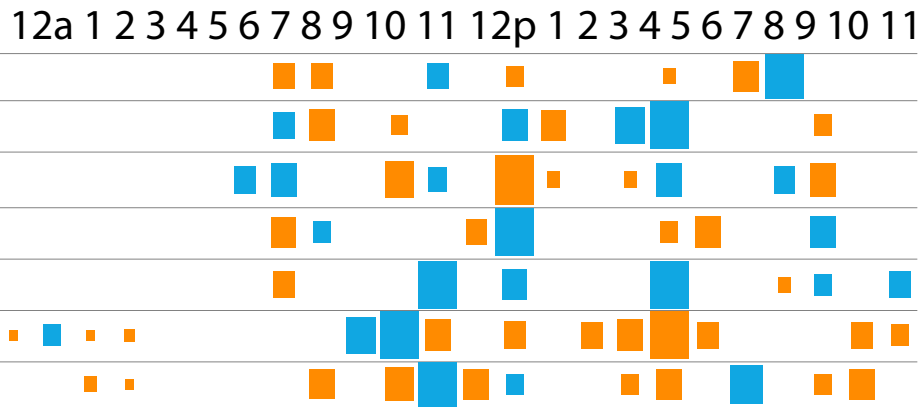


with Mary Jane Rotheram et al, Global Center for Children and Families

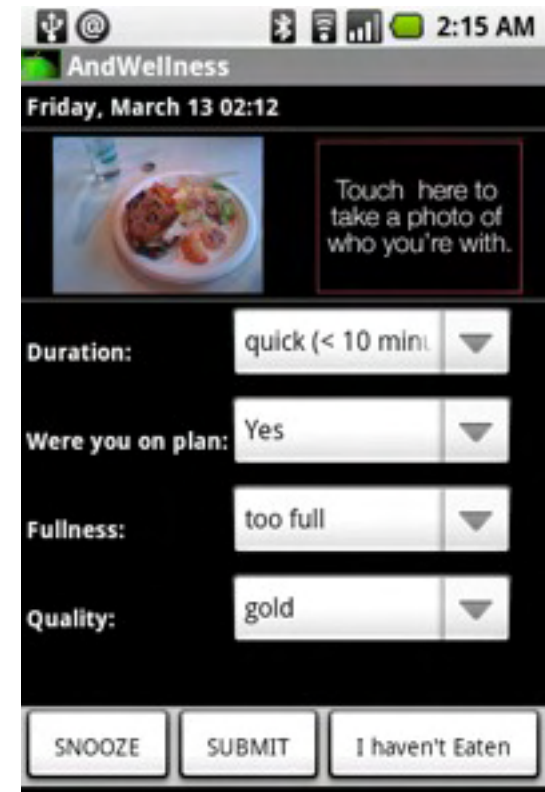
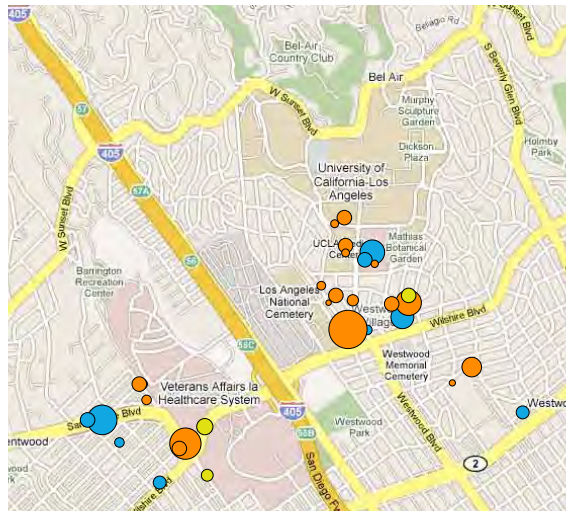


<http://urban.cens.ucla.edu/video>

When do I eat on and off plan?



Where do I eat on and off plan?



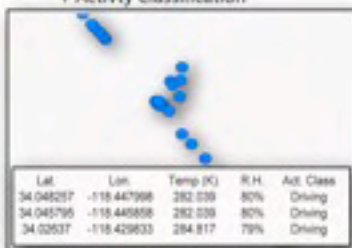
PEIR: Personal Environmental Impact Report

<http://peir.cens.ucla.edu>

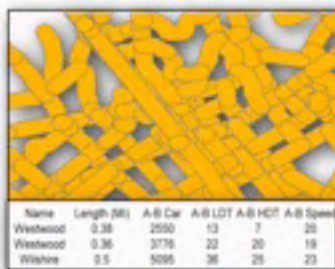


Location Trace Processing

Location Trace + Weather
+ Activity Classification

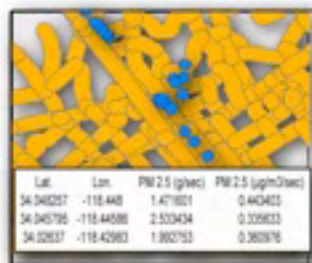


Road Buffers



EMFAC

Trip Aggregation



Trip Summary

Trip	Avg. PM 2.5 Exposure	time spent over 0.112716 (hours)
2432	0.470002	0.15
2423	0.235333	0.27
2410	0.210576	0.04

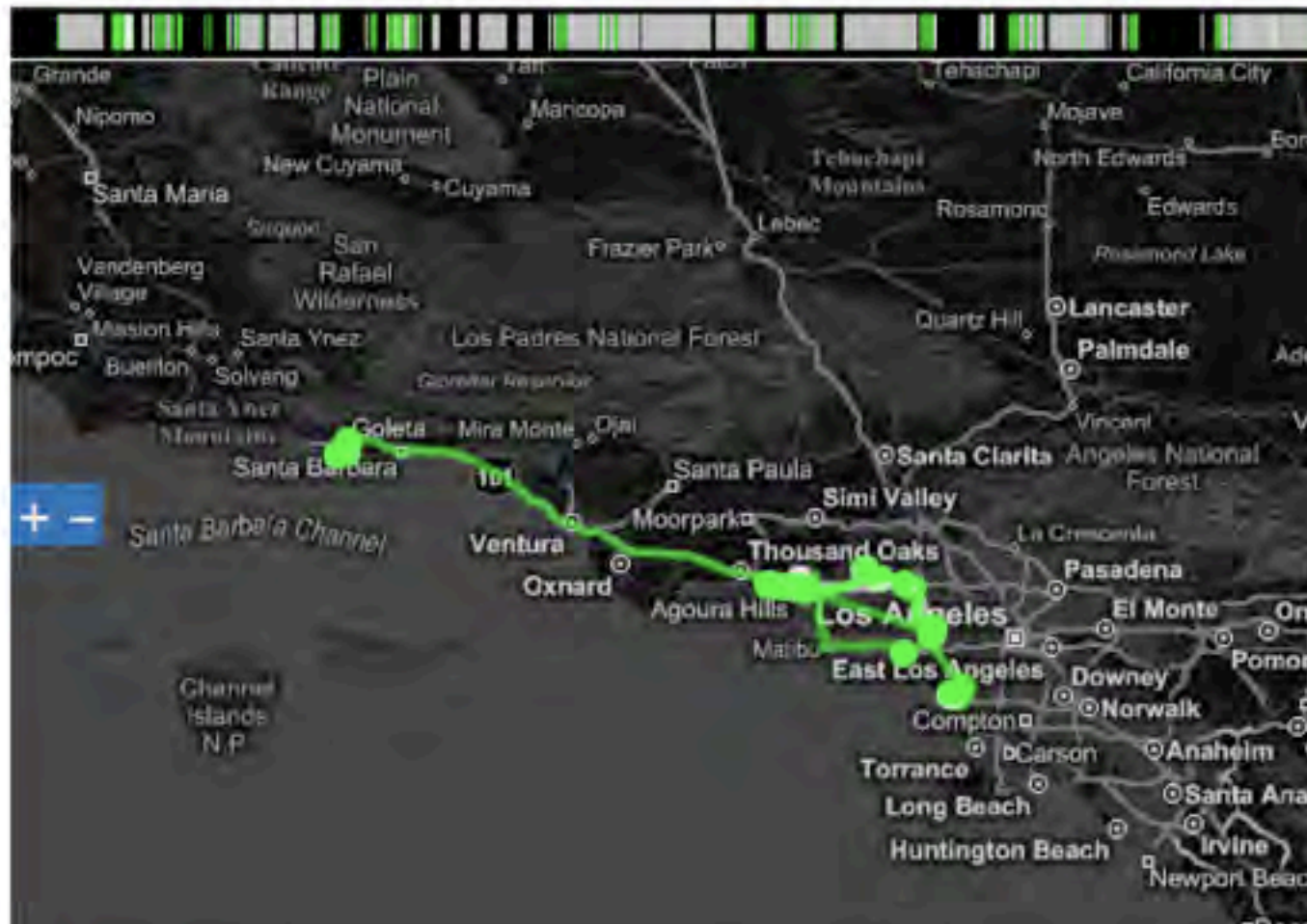
PEIR UI

The screenshot shows the PEIR web interface. At the top, there's a navigation bar with 'About', 'Participate', 'PEIR Science', 'FAQ', and 'Your Profile'. The main area is a map of Los Angeles with several green and yellow lines representing trip traces. A sidebar on the right contains the 'peir' logo, the text 'personal environmental impact report', and the question 'How have you interacted with the environment lately?'. Below this are 'UPLOAD' and 'SHARE' buttons. At the bottom, there's a section titled 'YOUR GO GREEN RANKING' with a progress bar and a 'SHARE' button.

Dashboard

Tell us what you think! Send feedback to peir-info@cens.ucla.edu.

COLOR TRIPS BY: Particulate Exposure



Dashboard

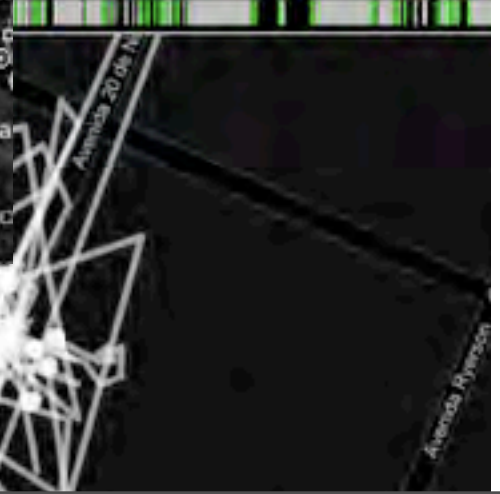
[s.ucla.edu/protected/private/](#)

News Science/AAAS Gizmodo Engadget

Lincoln Cent. Earthquake

PEIR Science Your Profile

edu.



From Incentives to Penalties: How Far Should Employers Go to Reduce Workplace Obesity?

Published: January 09, 2008 in Knowledge@Wharton

[DOWNLOAD AUDIO](#) | [PLAY AUDIO](#)



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.

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'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



Tom Weirich

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



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

By MICHAEL FITZGERALD

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

What you see

peir3 | About | Participate | PEIR Science | Your Profile

Dashboard | February 28 - March 7, 2009

Tell us what you think! Send feedback to peir-info@cehrs.us

COLOR TRIPS BY: Carbon Impact

Map Interface

STATUS

Last update from your phone received +125 seconds ago.

7,379 data points uploaded this week.

74 data points are outstanding as part of your most recent incomplete trip.

Impact/Exposure Explorer

Impact and Exposure for the past 7 days (starting today)
Values are updated nightly

Metric	Sat	Sun	Mon	Tue	Wed	Thu	Fri
Carbon Impact (kilograms)	0	12	13	24	34	12	12
Particulate Matter Exposure (hours) (%)	0.1	0.2	0.3	0.4	0.5	0.6	0.7
Fast Food Exposure (hours) (%)	14.6	13.7					
Sensitive Sites Impact (kilograms) (%)							

What you share with others

Facebook Widget

GoGreen Foundation

YOUR GO GREEN RANKINGS

Your rankings are displayed below for each group you're in:
(shorter bars are better)

Group	Rank	My Impact	Group Average
ASDF?!	rank 3 of 3	0.00 lbs CO2 0% of 112 hrs	9.85 lbs CO2 49% of 112 hrs
GoGreen Testing Group	rank 3 of 3	0.00 lbs CO2 0% of 112 hrs	239.64 lbs CO2 49% of 112 hrs

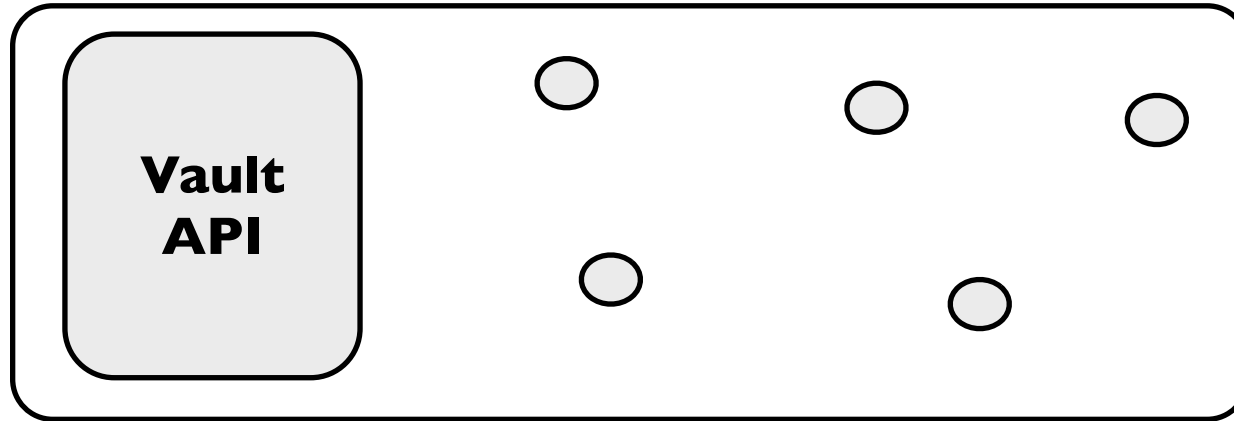
participation capped at 16 hrs/day (112 hrs/week)
statistics calculated over the last 7 days
last updated at 12:45:03 PM, 03/12/2009



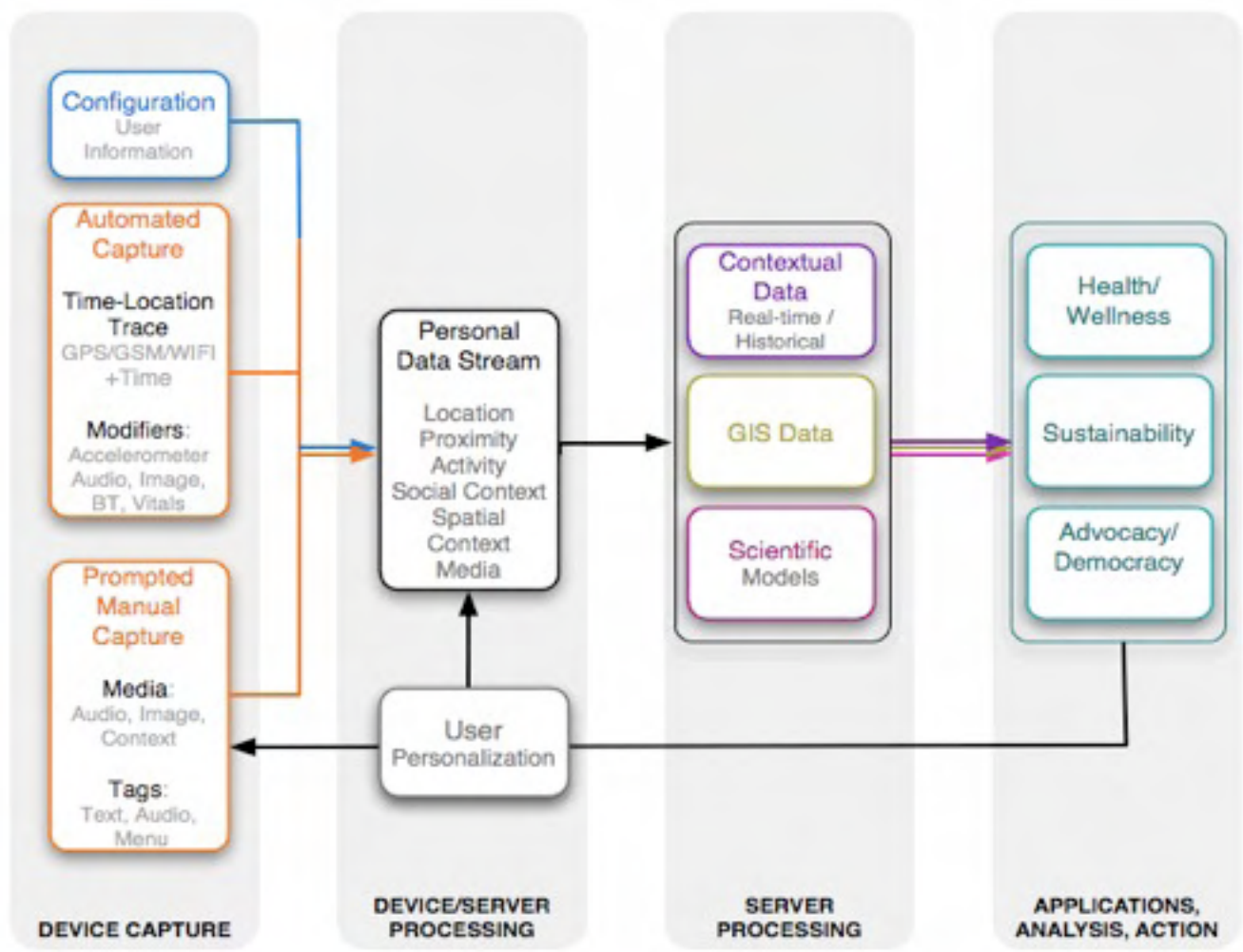
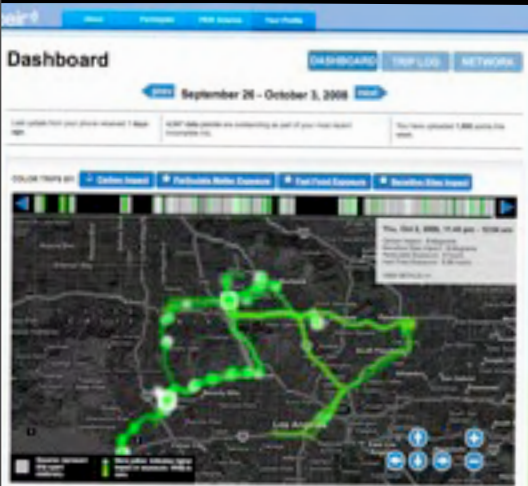
Raw
GPS

Private Data Vault

Filtered
GPS



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, ...



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...

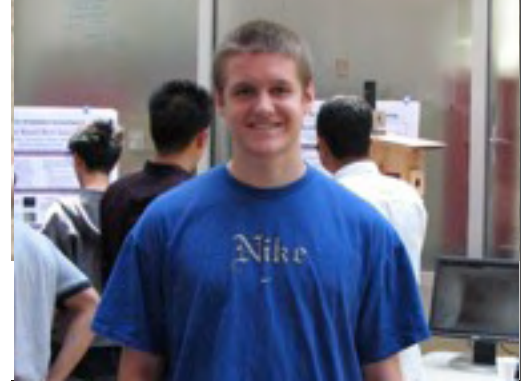
Civil Engineers and Ecologists...

Hardware designers and Information theorists..

to come together and innovate...

in matters of great importance...

and in a manner that has real impact.



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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