

# CENTER FOR EFFECTIVE GLOBAL ACTION

An analytics engine for global development

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Hacking Measurement
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## West Coast network, global presence



40 +

Countries with active trials



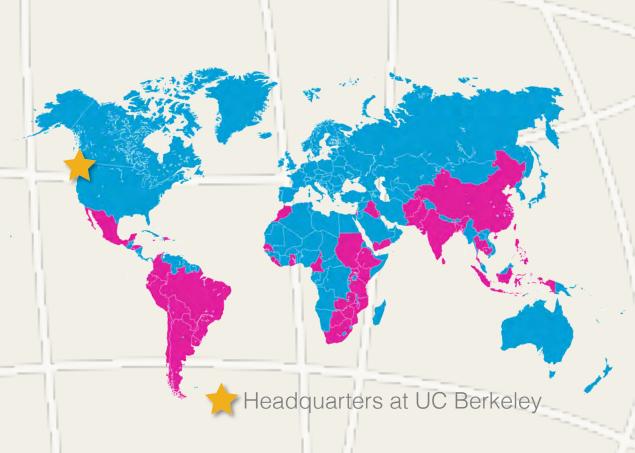
60+

Researchers across 9 universities



70

Investments in 10 different sectors





20

Visiting scholars (talent) brought to the US since 2010



## Data analytics for development...

We build portfolios of rigorous product trials, in different sectors:



Climate & Energy
Education
Institutions
Health
Financial Inclusion

Tech & Infrastructure
Agriculture
Measurement
Transparency
Global Networks



#### Development engineering

Development Engineering is an approach for the design of technologies that advance economic development in very low-resource settings.

The approach links the design of technologies with social or economic interventions that facilitate scale-up and impact. It leverages insights from development economics to address the unique market failures, institutional weaknesses, and behavioral constraints found in developing countries.

Development engineers also use remote sensing, digital data streams, and other advanced measurement techniques to more reliably track the outcomes of development interventions.





#### Journal: Development Engineering



http://www.journals.elsevier.com/development-engineering

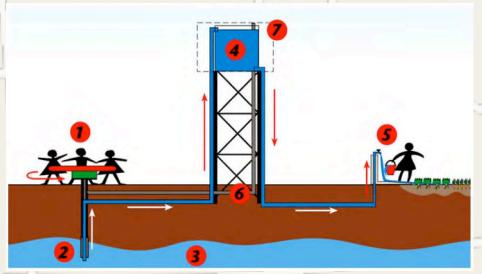


#### Motivation?

Learning from failure...





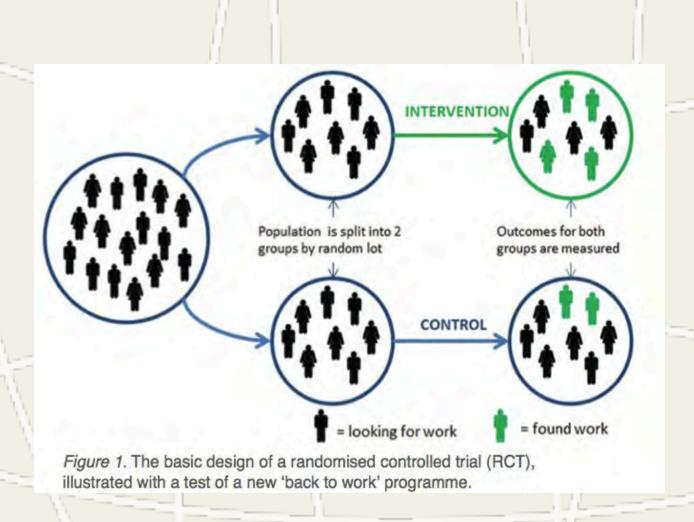




#### Moving away from the status quo



#### 1990s/2000: Randomization





#### Now: Revolutionize measurement



**Fundamental Issues with Traditional Data Collection Methods:** 

Reporting Bias

Human Errors

Costly

Infrequent

#### **Innovation in Data Capture**



**Prospects of Newer Sensing Technologies:** 

Accurate

Unbiased

Cheaper

Frequent

#### The Goldilocks Project

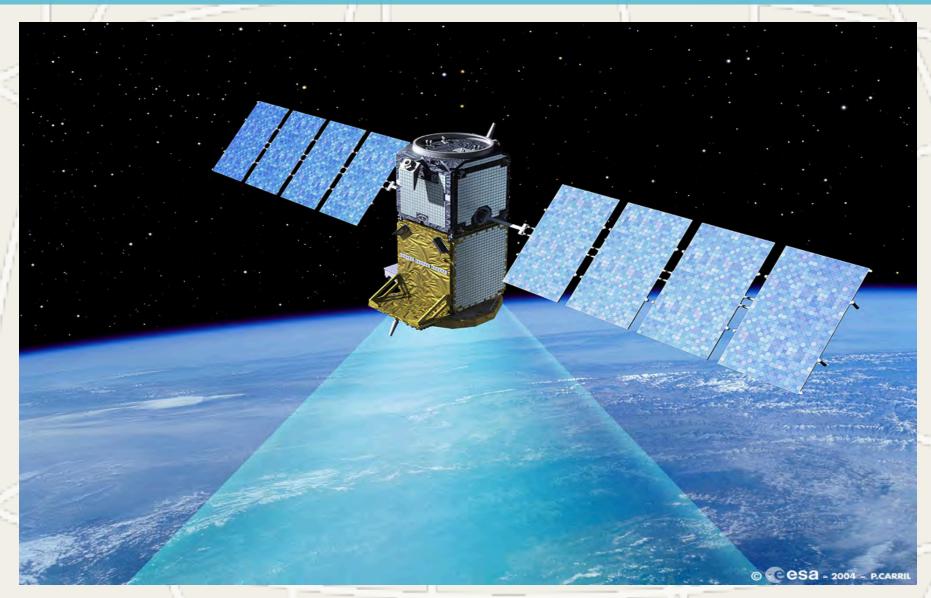
- 3 Case Studies integrating tech into NGOs' M&E architecture
  - Assessing agricultural yields using satellite imagery (One Acre Fund + World Bank + Stanford + Skybox)
  - 2. Monitoring clean cookstove adoption with environmental sensors (Potential Energy + UC Berkeley)
  - 3. Monitoring food staples prices via camera-enabled smartphones (World Food Programme + Univ Washington + Premise)







# Case Study 1: Satellites

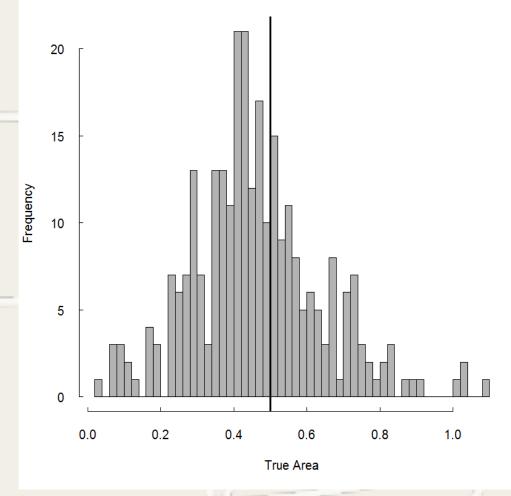




# Case Study 1: Estimating Agricultural Yields

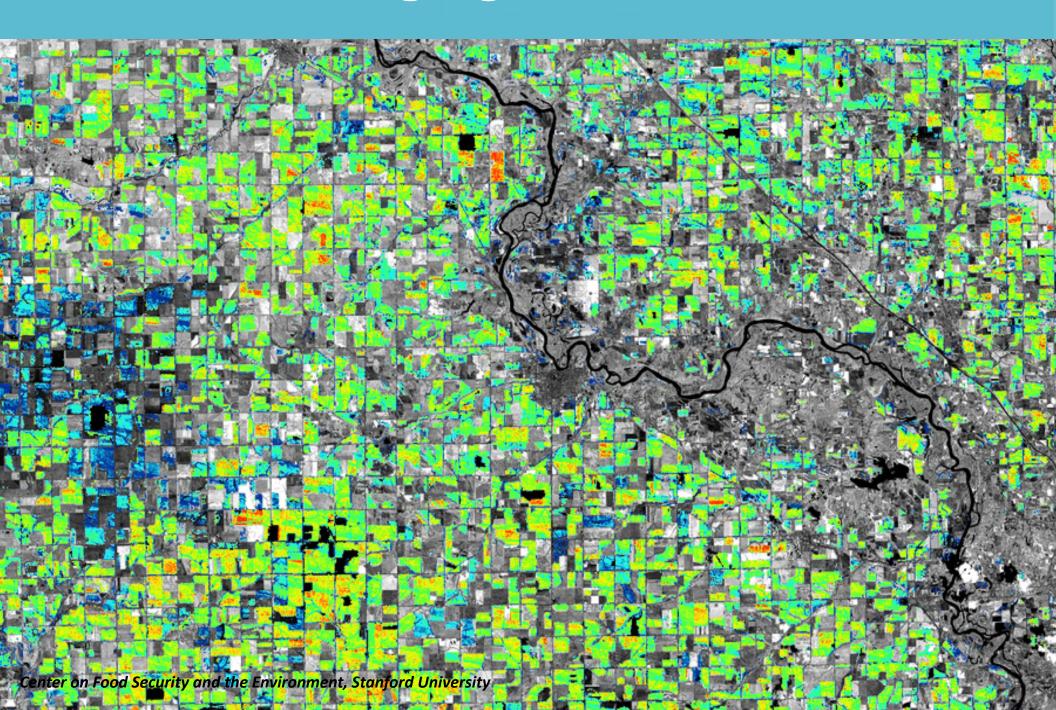


#### Measured plot area for fields with reported area = 0.5 Acres





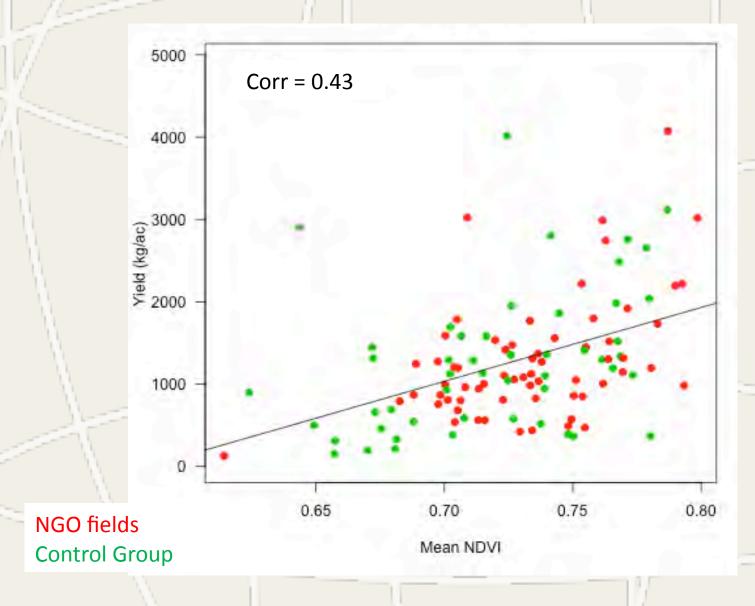
# **Estimating Agricultural Yields**



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# Case Study 1: Estimating Agricultural Yields





#### **Partners**

- CEGA (David Lobell & Marshall Burke)
- Skybox
- World Bank (Living Standards Measurement Survey team)
- Ministry of Agriculture in Uganda
- One Acre Fund in Kenya



### Case Study 2: Sensors































































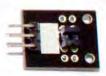






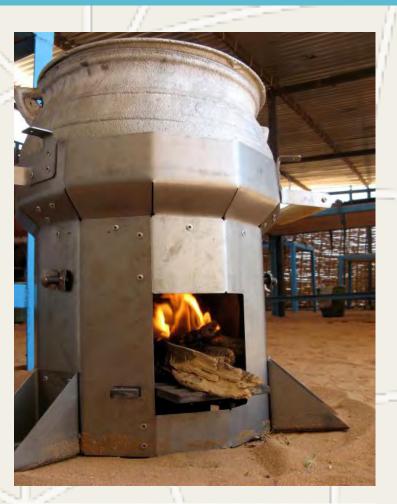


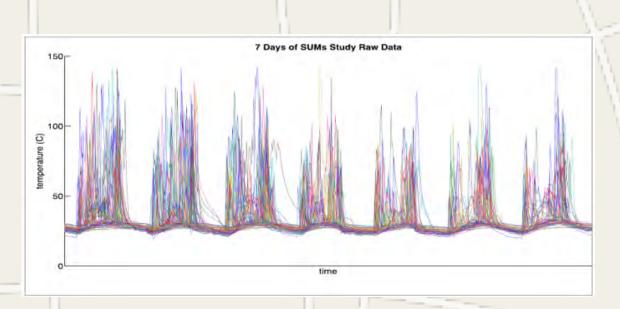






# Do people use Cookstoves?

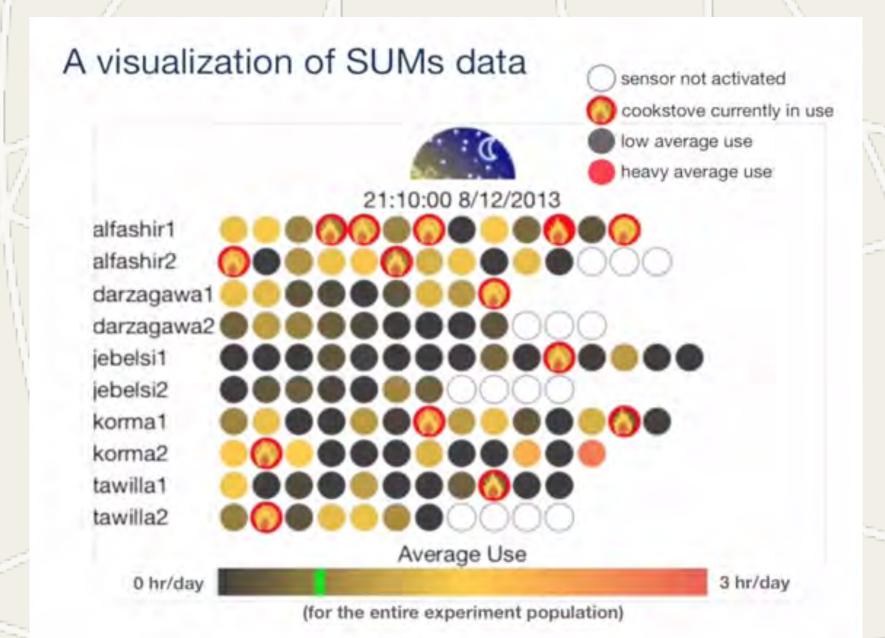














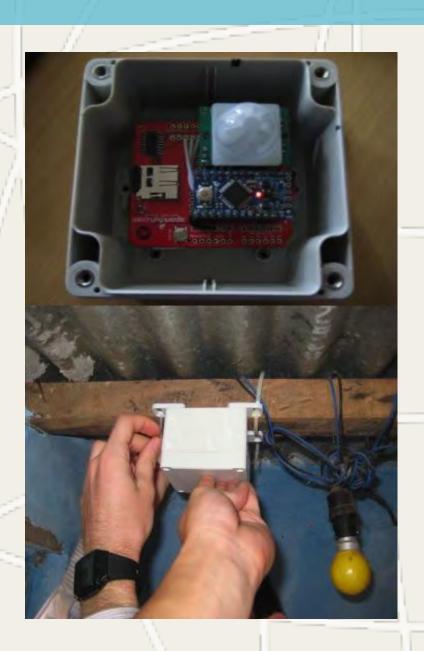
### **Survey Data**



- Survey participants
   overestimated
   cooking time by
   72min a day and
   cooking events by 1.3
   meals a day...
- Twice as much as sensor-measured values



## Filters, Latrines and Power (Oh My!)







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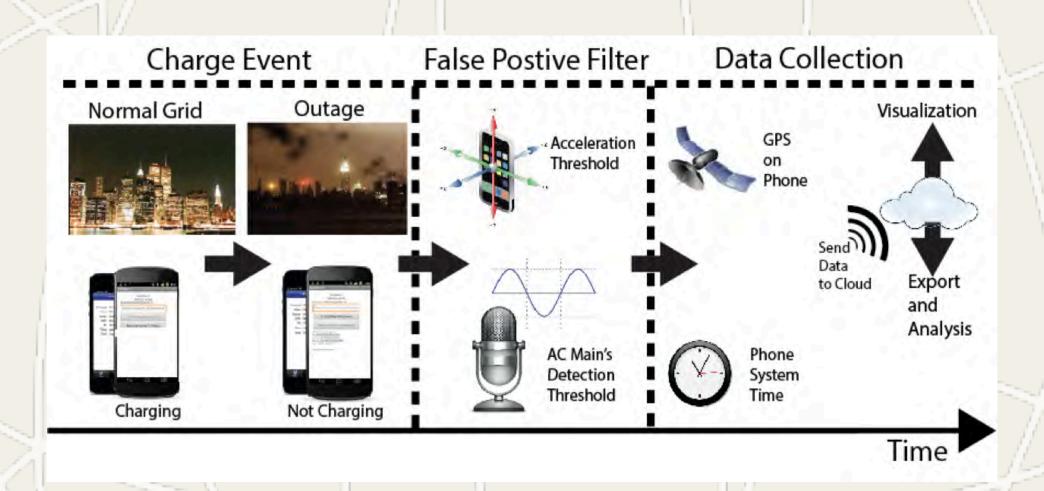
## Case Study 3: Smartphones







#### Passive Measurement: GridWatch





#### Moving toward intervention...

- How to harness IoT to improve the lives of the poor?
  - Low-cost sensors for "precision agriculture"



#### Are we having an impact?

- Policy makers want to design and implement "interventions" that drive social outcomes
- Need better measurement technologies to track progress against objectives: remote sensing
- 3. Next Stage: Unique opportunities to use IoT as interventions to drive poverty reduction



