Citizen Cyberscience

François Grey
Tsinghua University, Beijing

CERN
UN Institute for Training and Research
University of Geneva

"All for science, and science for all"
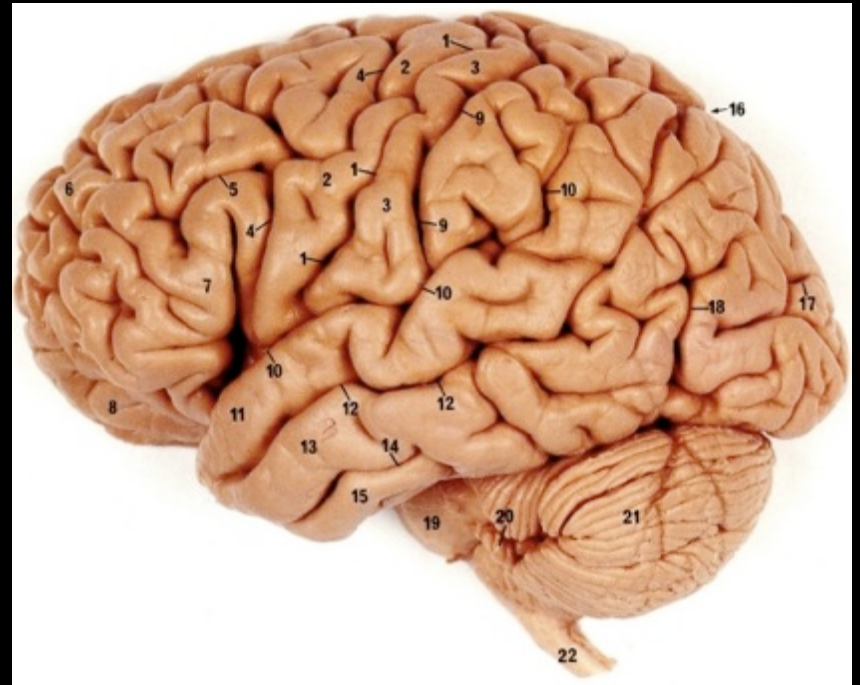
Citizen Cyberscience:
The largest scientific resource on the planet

2bn   5bn   7bn

$V_{internet} > 1\ C/s$

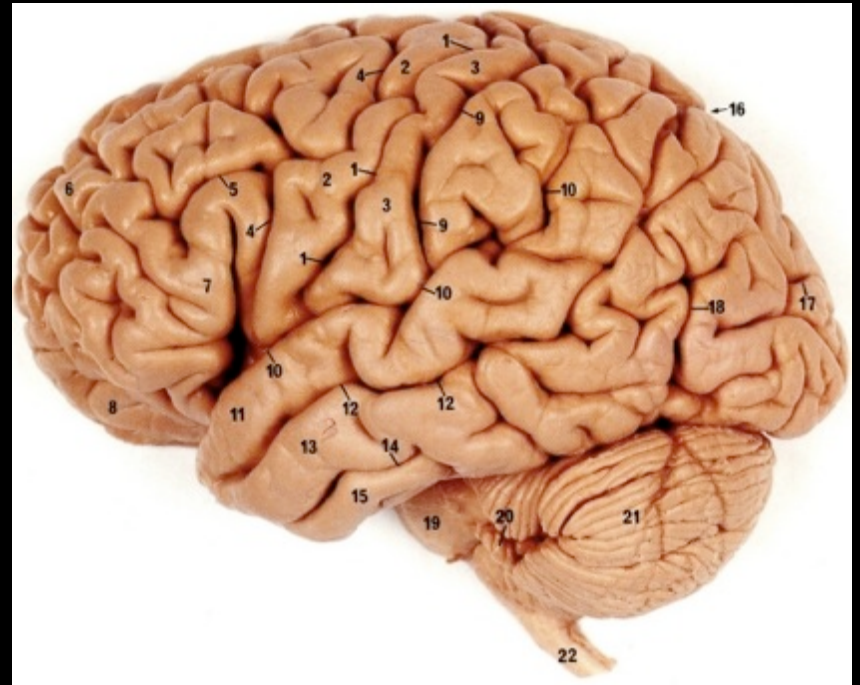# Citizen Cyberscience:
A range of approaches

Volunteer
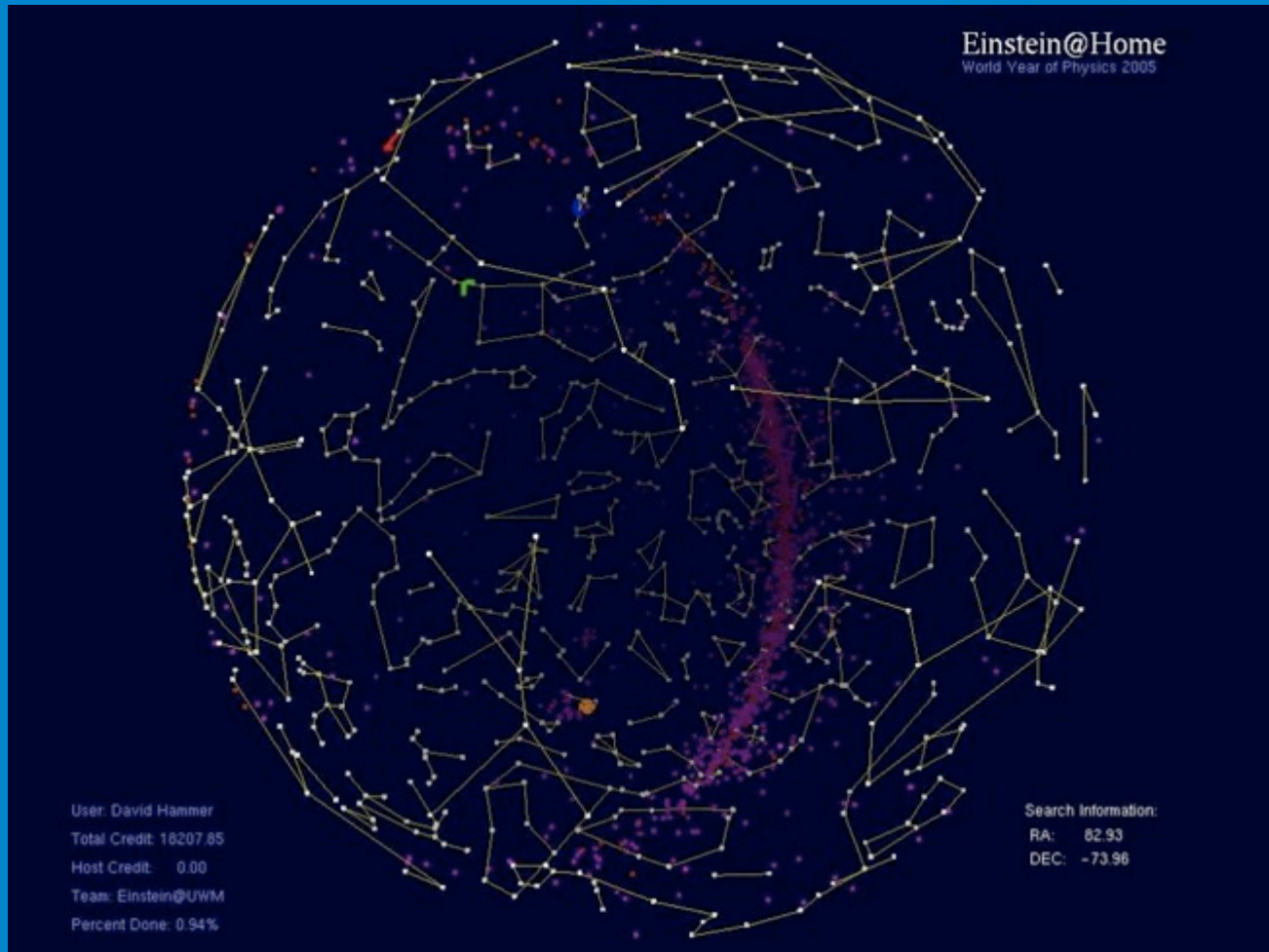Computing

Volunteer
Sensing
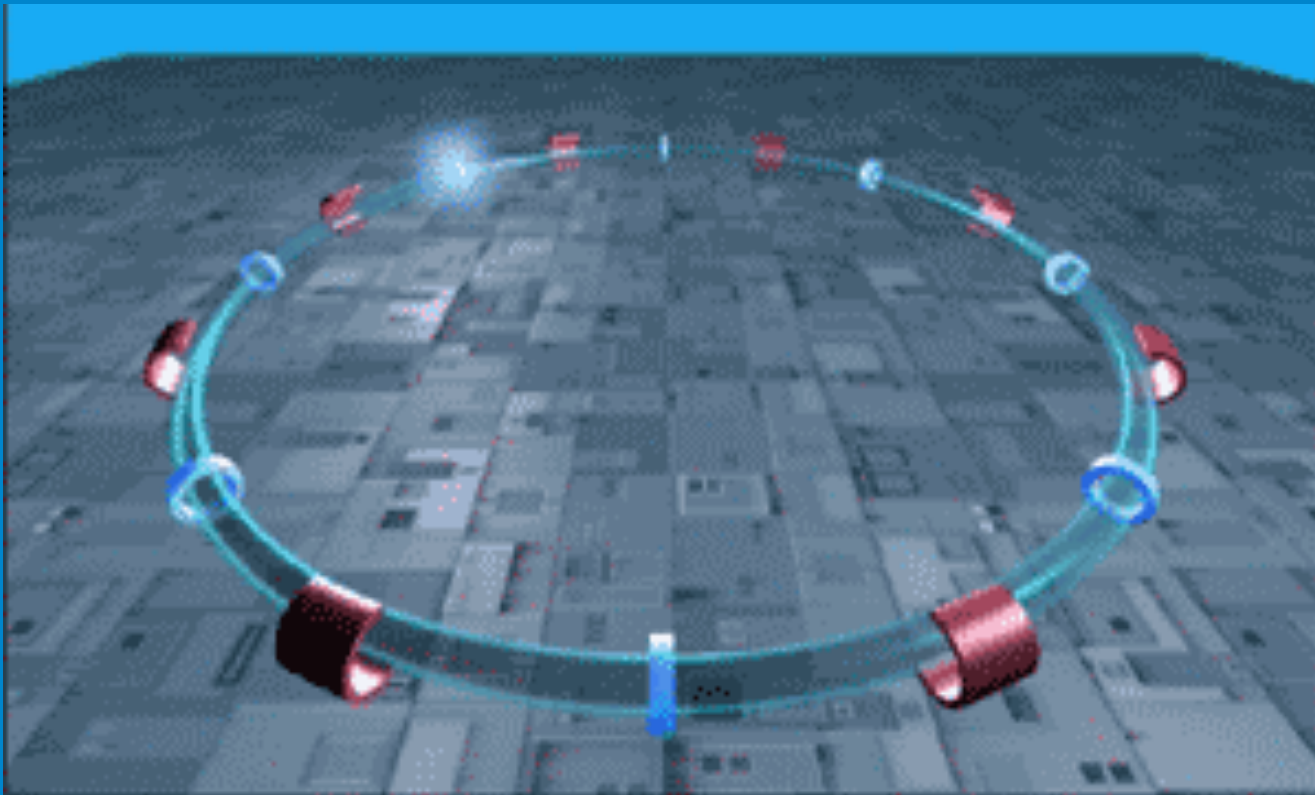
Volunteer
Thinking

Volunteer computing

1999: SETI@home >1M CPU
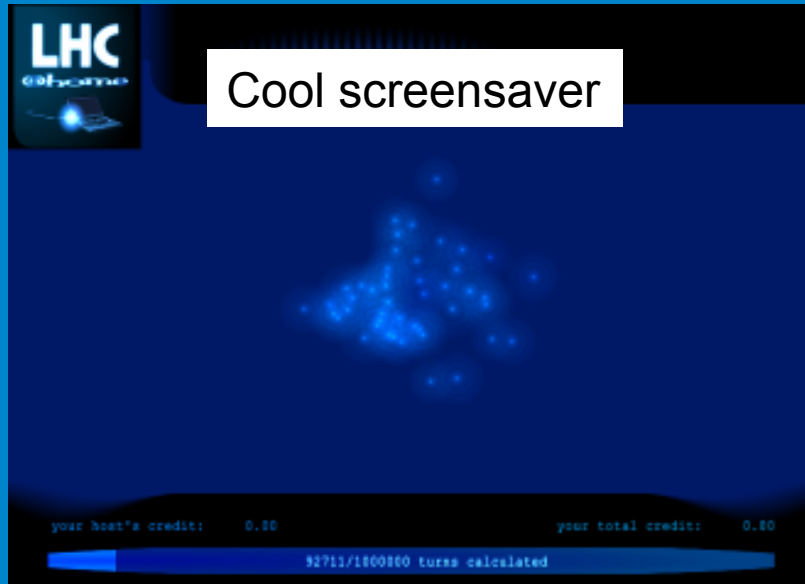
Einstein@home: pulsar discoveries (Science)

LHC@home for accelerator design (2004)
LHC@home for particle physics (2011)

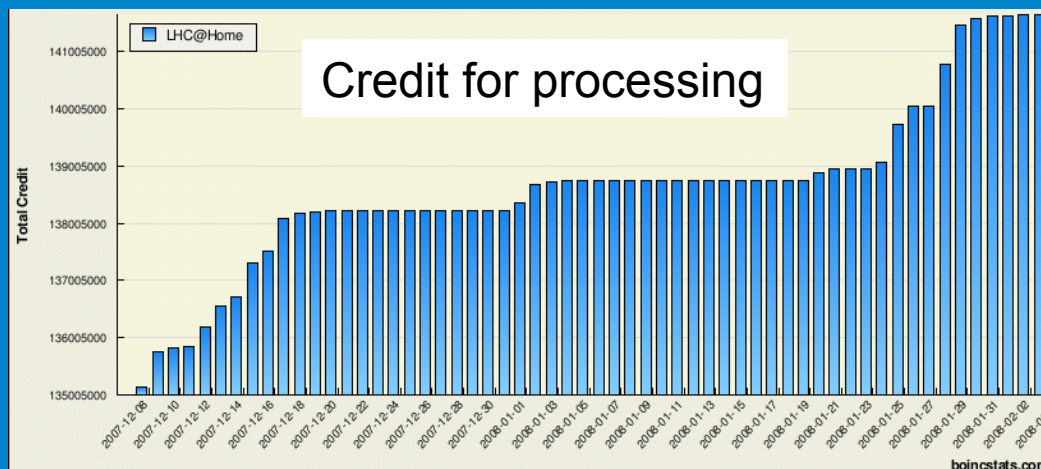# Why do volunteers participate?

Cool screensaver

Message boards

Credit for processing

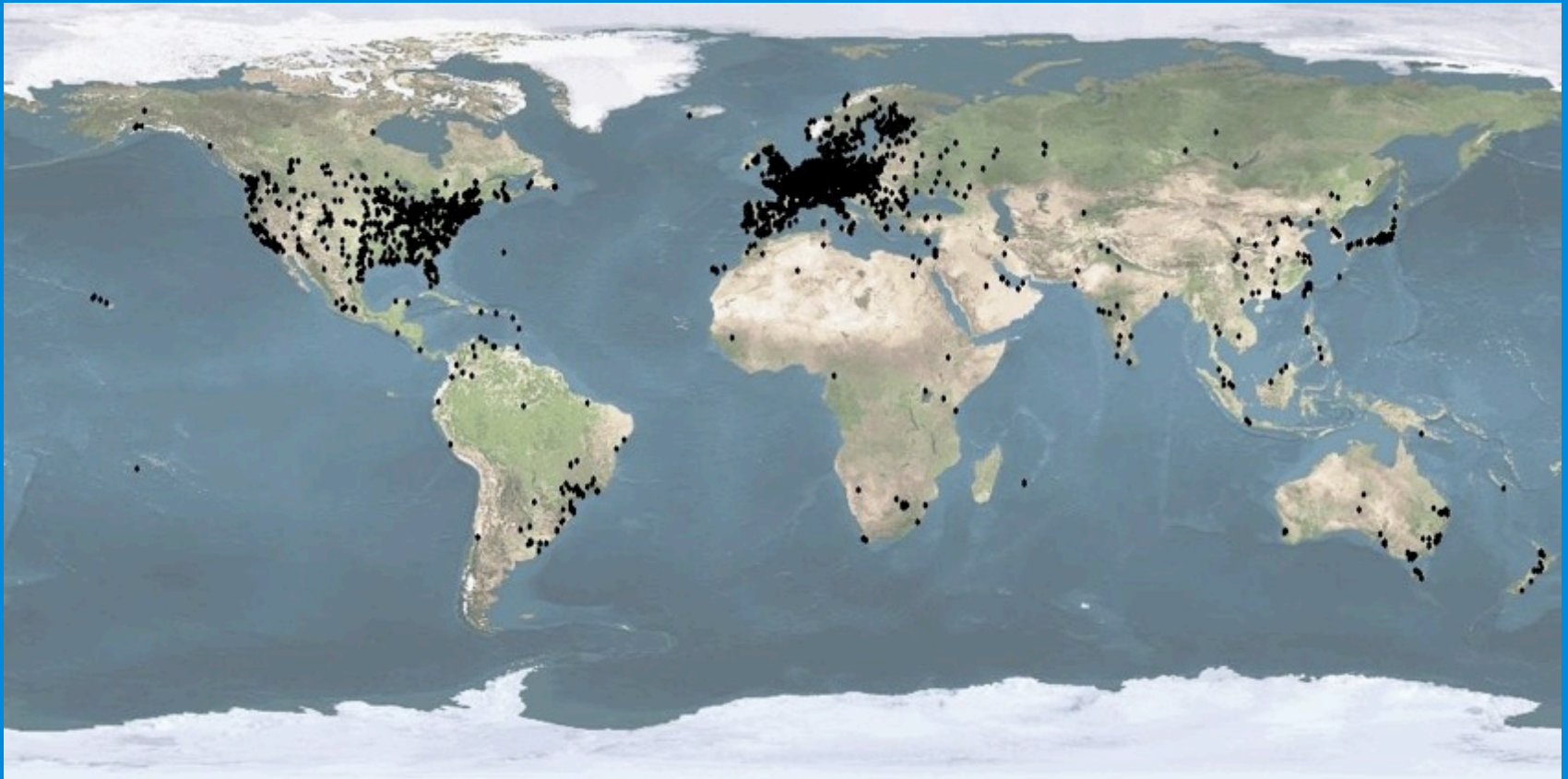# MalariaControl.net: modelling the epidemiology of malaria in Africa
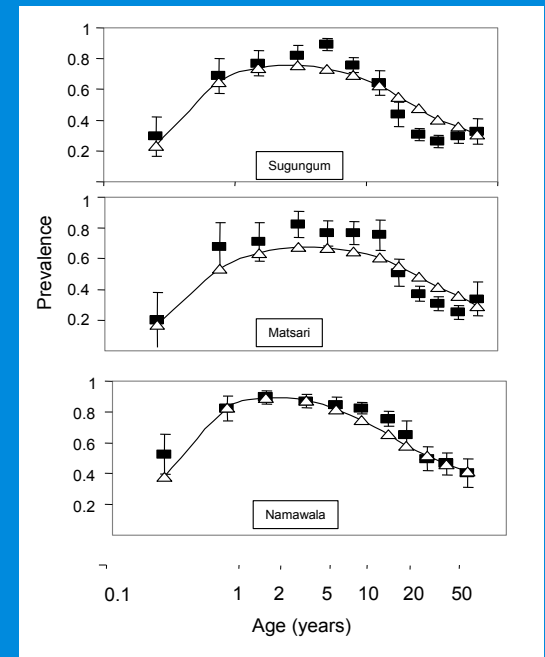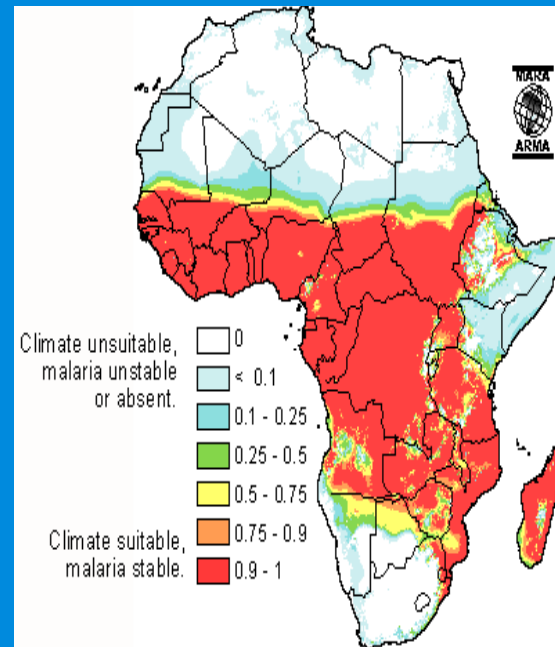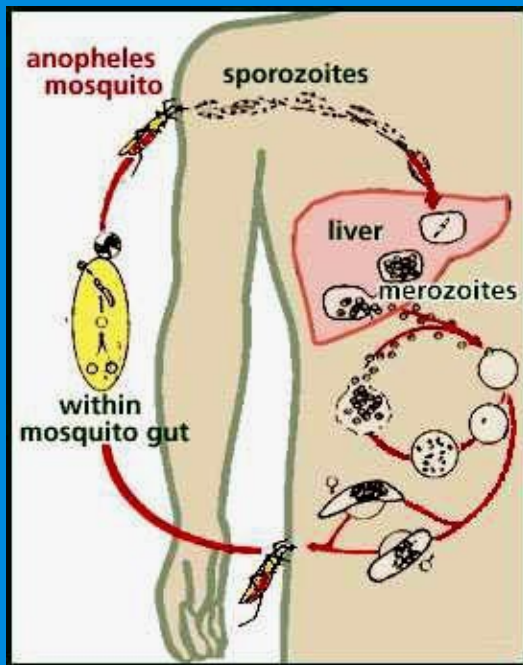
Real impact on investment

STI model predictions of vaccine cost-effectiveness:
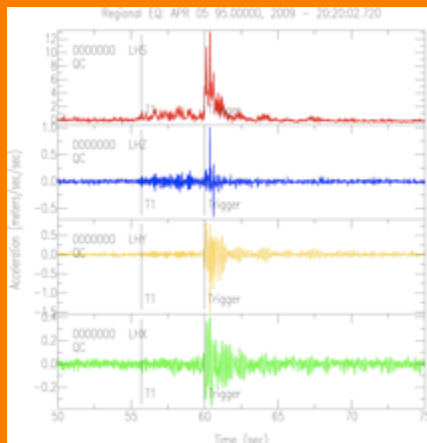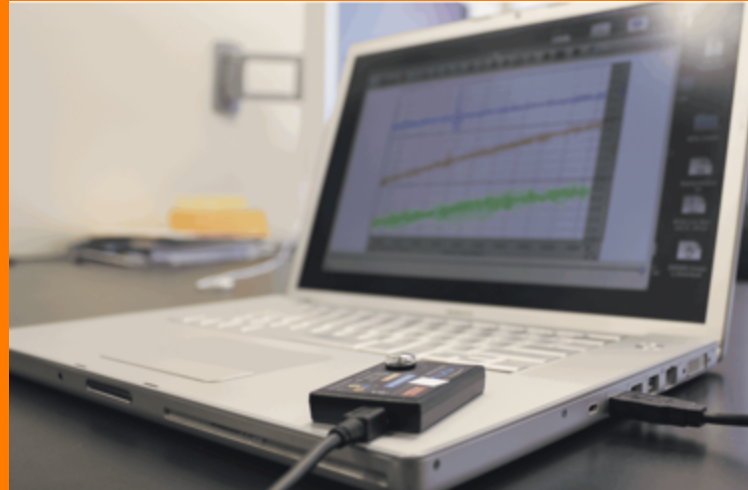**$1 - $10** per dose with 52% efficacy
$4.73 - $34.43 per fully-immunized child
$450 - $3,500 per death averted
$12 - $96 per disability adjusted life year
$2.7M - $19.8M per year for Mozambique

Most volunteers not in Africa

Volunteer sensing

Quake Catcher Network: volunteer seismic detection and science

Epicollect: vets in Kenya survey >100,000 animals with Google Mobile phones

Volunteer thinking

Foldit: compete online to fold proteins ("gamers beat scientists")

Cybermappr: experiments in volunteer damage assessment (Haiti earthquake)

Building Point Classification

- 🟥 ..... Destroyed
- 🟧 ..... Severe Damage
- 🟨 ..... Moderate Damage
- ⬛ ..... No Visible Damage
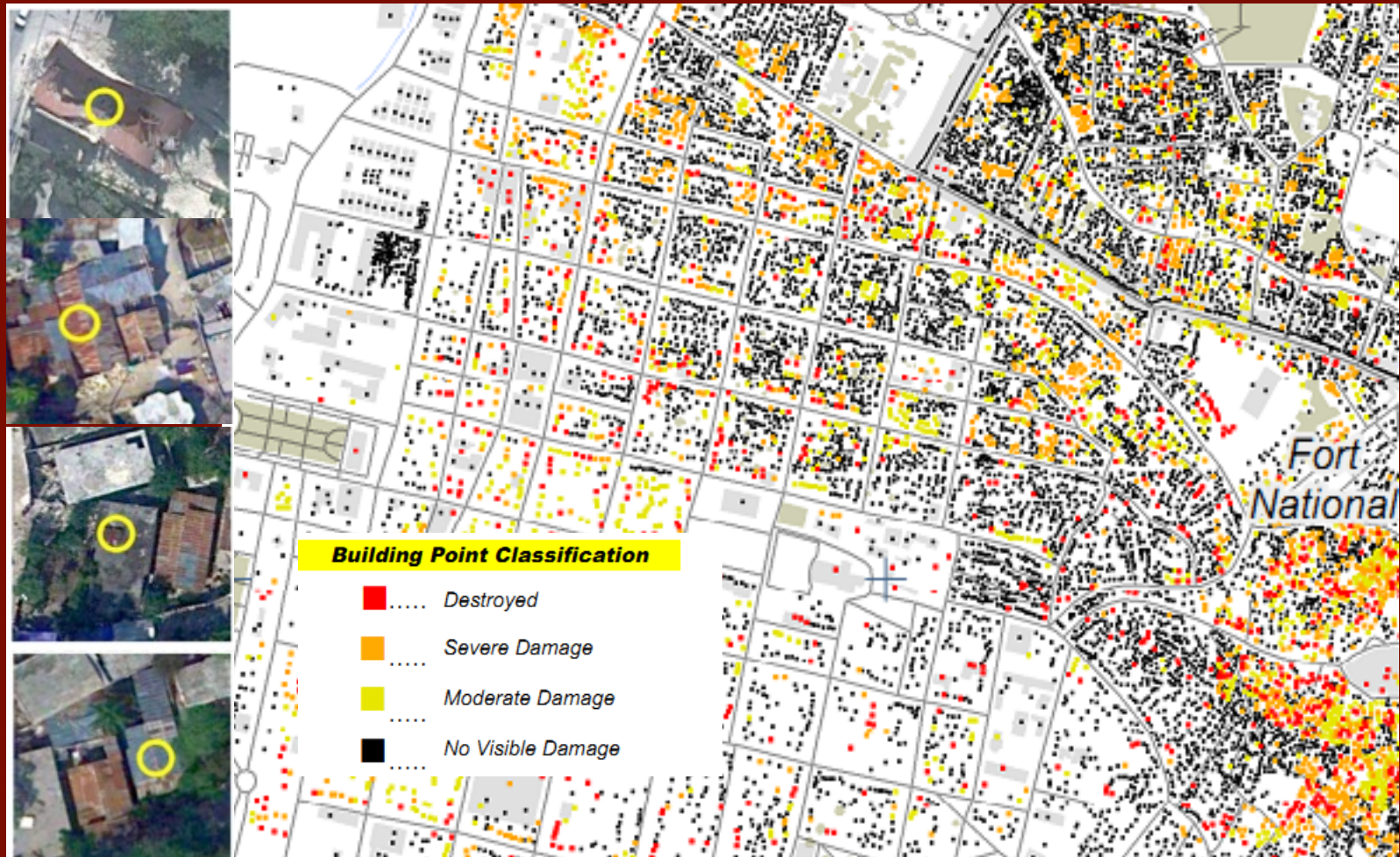
Citizen Cyberscience
For and by the developing world

Computing for Clean Water
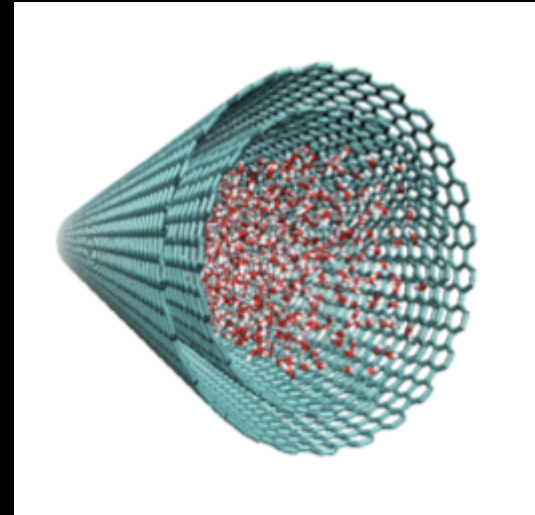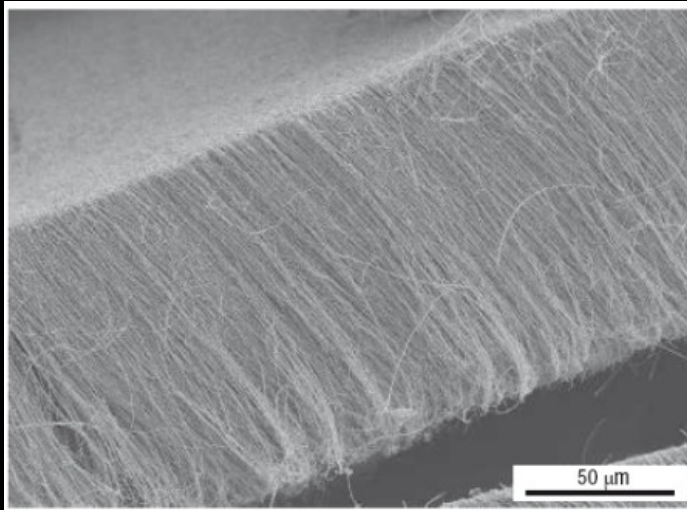
Project with Tsinghua, IBM World Community Grid
1) Simulating enhanced water flow through nanotubes
2) Accuracy at low v needs large samples (~10^5 CPU-years)
3) IBM WCG projects preloaded on Sony Vaio in US

Hackfest in Beijing with Mozilla

2011: Brazil, S. Africa, India & S.E. Asia

The 7 myths of
citizen cyberscience

- It doesn't produce real science
- It won't work for my science
- Nobody will be interested in my science
- You can't trust results from ordinary people
- It is energetically hugely wasteful
- It doesn't really engage people in science
- One day we will run out of volunteers

$V_{internet} > 1\ C/s$