

# CITRIS and its impact on the California economy

CITRIS was created to  
“shorten the pipeline”  
between world-class  
laboratory research and the  
creation of start-ups,  
larger companies, and  
whole industries



UC Berkeley



UC Santa Cruz



UC Davis



UC Merced

# CITRIS: The Center for Information Technology Research in the interests of Society: in short, “Technology for Societal Impact”

*In 2001, the State of California began four unique “California Institutes of Science and Innovation” ... One of which is CITRIS*



***\$100 million from the State of California**  
**>\$ 780 million raised in research dollars at CITRIS since its formation***



# CITRIS Headquarters: A Multi-disciplinary Building with Rotating Projects

- *Technology for Societal Impact means:*
- *Not “technology-push”*
- *Professors from the Business School, Law School, Public Policy, Political Science, and the Lawrence Berkeley Laboratory also have offices in our Headquarters building*



# CITRIS Nano Lab and impact on California Start-up Companies

- Old “Micro Lab” moving to new “Nano Lab” during 2009
- From Nanoscale Research to Gigascale Integration
- *Micro Lab achievements in the decade of CITRIS include:*
- 500 active users from 100 faculty PIs
- Enabled \$320M research funding since 2000 (~ \$40M/year)
- Trained work force for CA: > 2,000 MS/PhD/Postdocs and > 1,300 BS
- **Provided critical technology support for 86 companies (76 start-ups)**
- **Created 1,000 jobs in those start-ups**



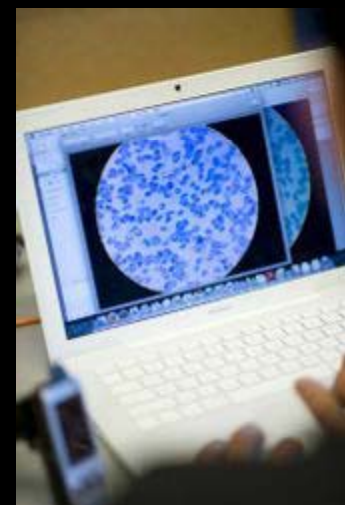
# 1. Health Care @ CITRIS: California Telehealth Network Extending the Reach of CA's Best Medical Care

- Increases access to care for over 3 million rural and urban Californians
- Performed >20,000 real-time video consultations
- Over \$35 million in funding (\$22.6 M FCC)
- Test bed for future research in wireless and new medical devices



# CellScope: Fast, Simple Diagnosis in the Field

- Phone + microscope = potent distance diagnostic device
- Malaria, TB, sickle cell
- 2,725 cases of TB in CA in 2007
- **Started with CITRIS seed grant**
- Microsoft Support: \$100,000
- Heading toward commercial manufacture/licensing
- *Popular Science's* "Best of What's New" for 2008



## 2. Energy Urgency: Demand Response Redistributing Energy

- CITRIS has enjoyed strong partnership with and support from the California Energy Commission for more than 9 years.
- Projects have profound effects on CA business, energy supply, and GHG emissions.
- Employs CITRIS-developed sensor tech, policy, economics, and law to flatten peak loads
- CO<sub>2</sub> Reductions: **9 million tons**
- Californians Save: **\$10 Billion**
- Eliminates need for **5 new power plants**



# Demand Response: Tech + Policy = Progress

- CA Energy Commission's rules for new buildings will require programmable thermostats



# Predicting Solar Irradiance: A Missing Link in the Clean-Energy Chain

- Electric carbon output in CA: 45 Million MTCE (metric tons of carbon equivalent)
- With realistic investment over the next 15 years, solar could reduce emissions by 8 - 10 million MTCE (15 - 20 % of the electric carbon output)
- Predicting solar irradiance is key
- UC Merced network of GPS research stations



# 3. Intelligent Infrastructures: Steering Clear of Congestion

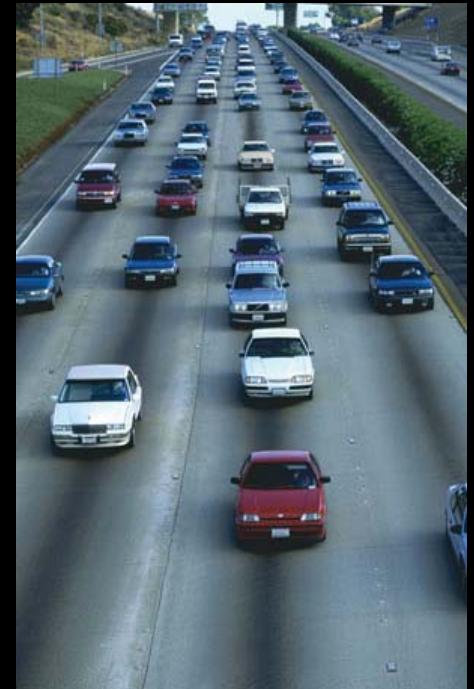
- Average Bay Area commuter wastes 60 hours and 47 gallons of fuel / year in traffic
- Bay Area congestion produces extra **975,092.5** tons of CO<sub>2</sub> / year
- Total Bay Area congestion cost: **\$1.6 B** per year
- Cost of dedicated infrastructure-style traffic monitoring for 8,300 miles of cat 1-4 roads: between **\$332 M** and \$1 B (not including maintenance and operation)
- Mobil Millennium Project: a decentralized, networked approach
- Partnership between UC Berkeley, Nokia, Navteq, US DOT, and California DOT
- Launched November 10, 2008, from CITRIS



# Mobile Millennium

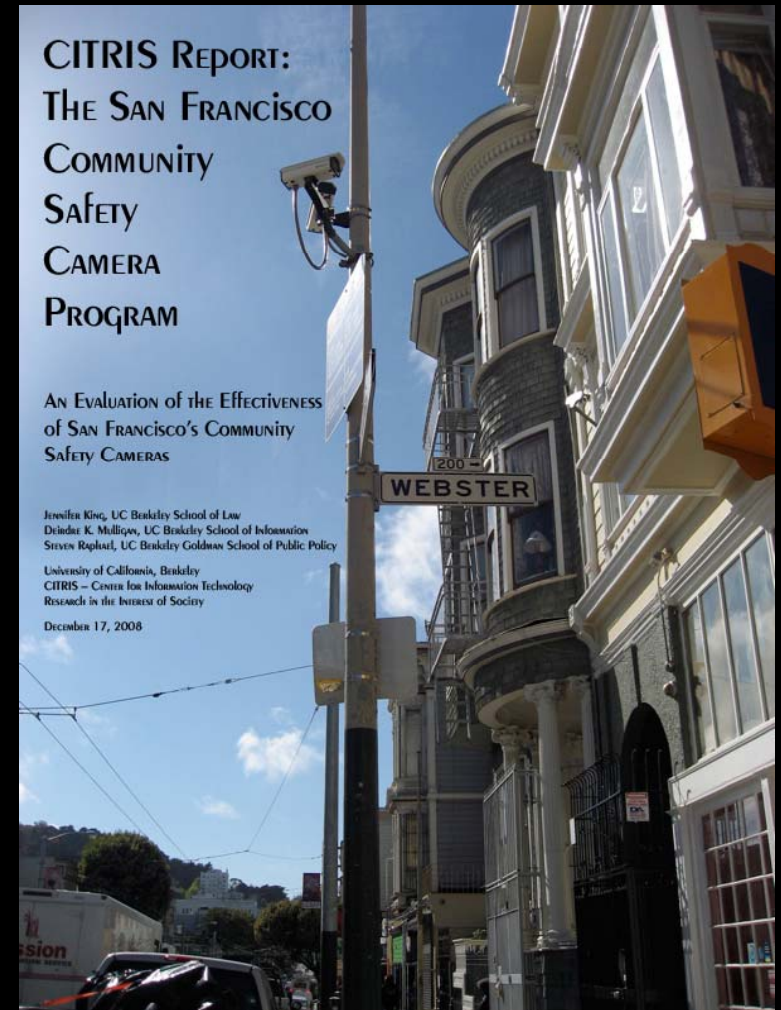
## The power of ubiquitous GPS

- 30K seed grant from Tekes through CITRIS
- Current # of users: 3,200
- By June this year: 10,000 users
- Current MM northern California Coverage: 8,300 miles of roads
- Eventual MM Coverage: 100,000 miles
- 3,000 users, expending half of the wasted time (30 hours / year) would save 70,500 gallons of fuel and 90,000 hours / year.



# Evaluating Crime-Prevention: Video Monitoring (with SF City)

- **Multi-disciplinary Expertise**
  - **Legal** challenges: Privacy protection
  - **Administrative** challenges: who's in charge?
  - **Technical** challenges: memory and retrieval capacity



## 4. Art and Technology: Screening for Fragile X

- Fragile-X: most common form of inherited mental impairment
  - 200 cases diagnosed in Davis alone each year
- Delayed diagnosis in underserved environments
  - serious consequences for patient, family, society
- CITRIS-supported screening game:  
Track FX



# 5. Technology for Emerging Regions

Eye Exams by Wi-Fi: Connecting remote villages to urban doctors

- Modifications to existing tech
- Low-cost, high-reliability networks
- 5,000 patients seen each month
- 100,000 patients total
- 14,000 patients whose vision has been saved
- Centers economically self-sustaining



# CITRIS annual conference

## June 4<sup>th</sup> and 5<sup>th</sup> California Healthcare Network



- **Currently inked to 64 clinics and hospitals**
- **500+ Nodes selected for development across California**
- **21 Specialties offered**
- **2,615 real-time video consultations this year**

*Support for program: Governor's office, CPUC, DHHS, DMHC, foundations, nonprofits, federal clinics, safety net hospitals, etc. all collaborating.*

# Invitation to the CITRIS Commercialization Meeting Sept 15<sup>th</sup> and 16<sup>th</sup>



**Example of Success**  
**Wireless Thermostat**  
**Reference Designs**  
**CITRIS Technology (2003) to**  
**Golden Power Thermostat (2007)**



# Summary

## How CITRIS gets technology into the world

- 1. “Use-inspired” research mission
  - Listening to the needs of companies
  - CITRIS identifies appropriate researchers on all 4 campuses
  - “One stop shopping” throughout 4 campuses
- 2. Shortening the “pipeline” of research to products
  - Mix of students MS and PhD (and MBA)
  - Working in our new building - Company engineers with researchers
  - Streamlining IP issues
  - Incubator program within the building (MOT and CET)
- 3. Example: partnering with VC community in Bay Area
- 4. Example: partnering with California Energy Commission