

Software Environments for VIA

Michael McLennan

Software Architect for nanoHUB.org and HUBzero.org

Rosen Center for Advanced Computing

Purdue University

From the session challenges...

- Synthetic environments approaching reality
- Geographically dispersed users
- Rapid scene rendering
- Physical simulations

From the session challenges...



Halo 3

For serious work...



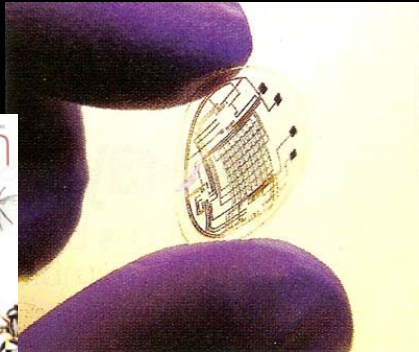
...Give me a desktop!

The screenshot shows a Mozilla Firefox browser window displaying the nanoHUB website. The browser title is "nanoHUB - Mozilla Firefox". The address bar shows the URL "https://www.nanohub.org/index.php?option=com_mw&invoke=cntbands-ext_r18&ap". The page header includes the nanoHUB logo and navigation links. The main content area displays the "CNTbands 2.0" simulation tool interface. The tool settings are as follows:

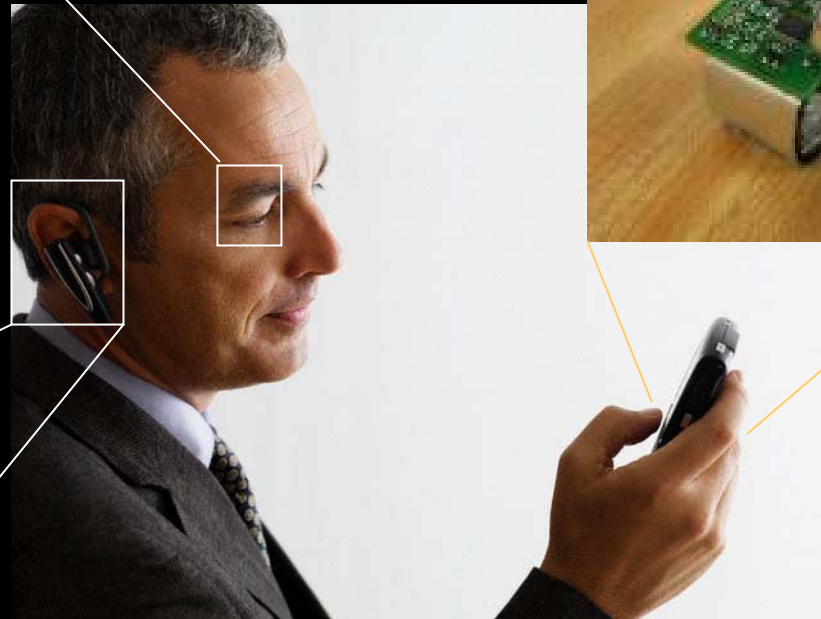
- Structure: Carbon Nanotube
- Simulation Method: Pz orbital
- Chirality (n,m): n: 7, m: 0
- Model parameters:
 - Tight Binding Energy: 3eV
 - Carbon-carbon spacing: 1.42A
- Length in 3-D view: 15

The 3D visualization shows a carbon nanotube structure with green spheres representing atoms. The simulation results are displayed below the visualization, showing "2 results" and "Simulation = #2". The "m" parameter is set to 0.

Using a VIA Environment



Contact Lenses
Univ Washington
Sandia



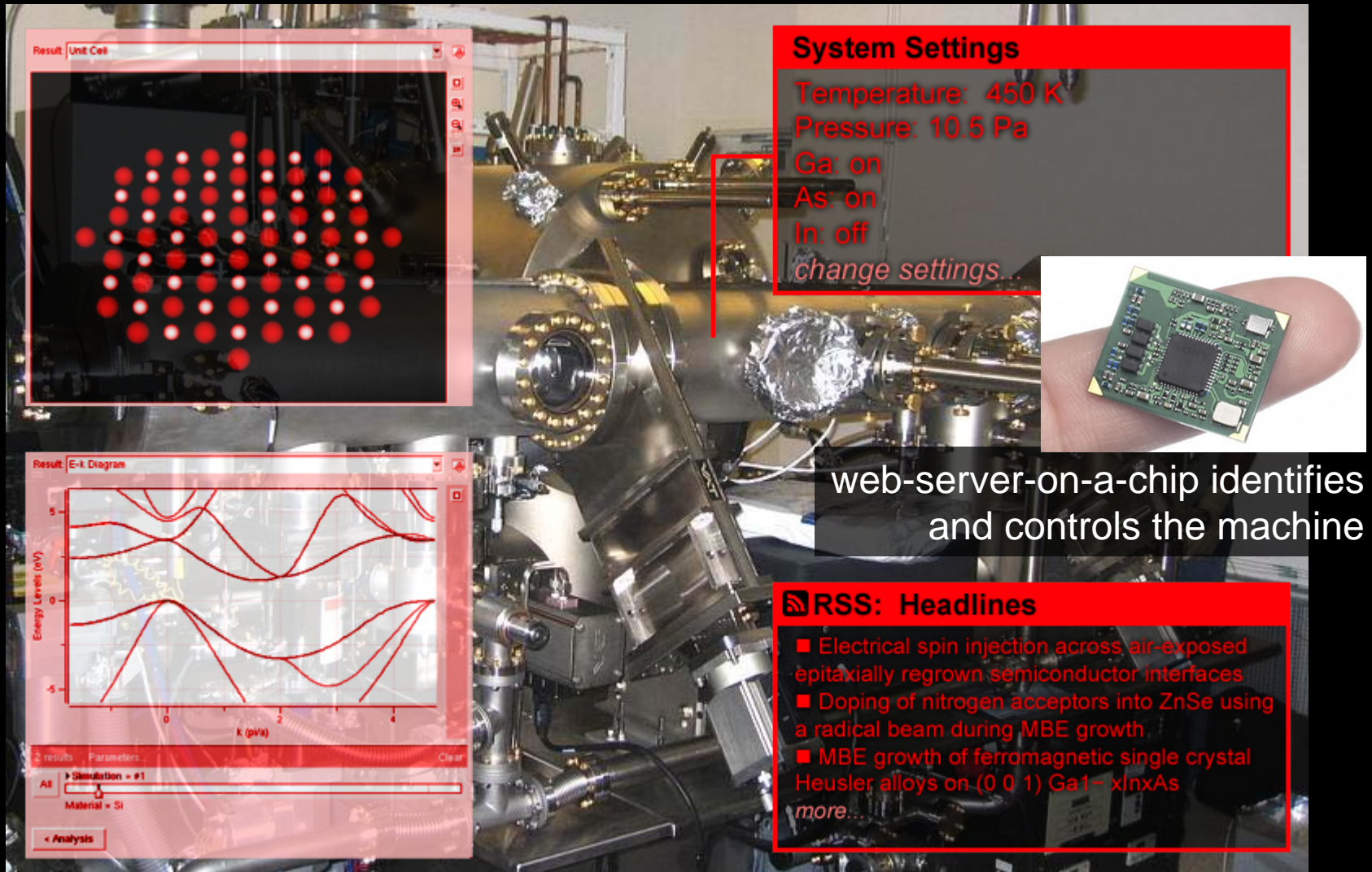
ring mouse



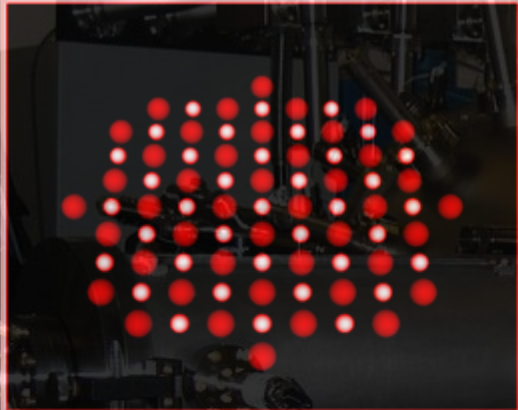
headset

- ✓ See the data
- ✓ Listen to music, commentary, audio cues
- ~~✗ Smell my data~~
- ~~✗ Feel my data~~

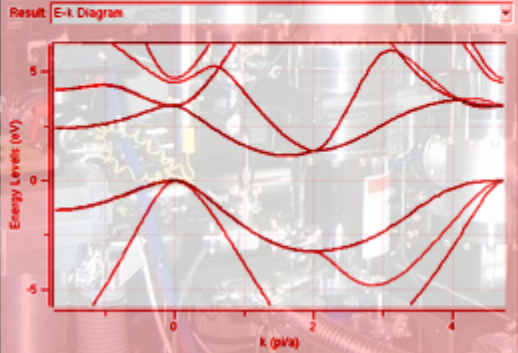
What the world looks like



Result: Unit Cell



Result: E-k Diagram



2 results Parameters Clear

All Simulation #1

Material Si

< Analysis

System Settings

Temperature: 450 K
Pressure: 10.5 Pa
Ga: on
As: on
In: off
change settings...

web-server-on-a-chip identifies and controls the machine

RSS: Headlines

- Electrical spin injection across air-exposed epitaxially regrown semiconductor interfaces
- Doping of nitrogen acceptors into ZnSe using a radical beam during MBE growth
- MBE growth of ferromagnetic single crystal Heusler alloys on (0 0 1) Ga_{1-x}In_xAs

more...

What the world looks like to my wife



Incoming call...
Sandy Davis
765-555-3148

Black & Decker® Coffee Express

Filter: Needs to be refreshed

Tank: Empty

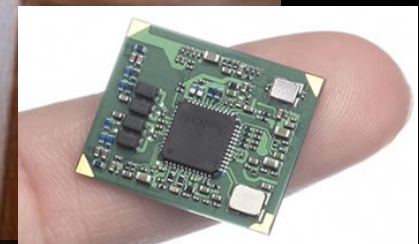
■ Auto Brew: 7 30am change...

Kenmore® 2020 Dishwasher

Dishes: Dirty

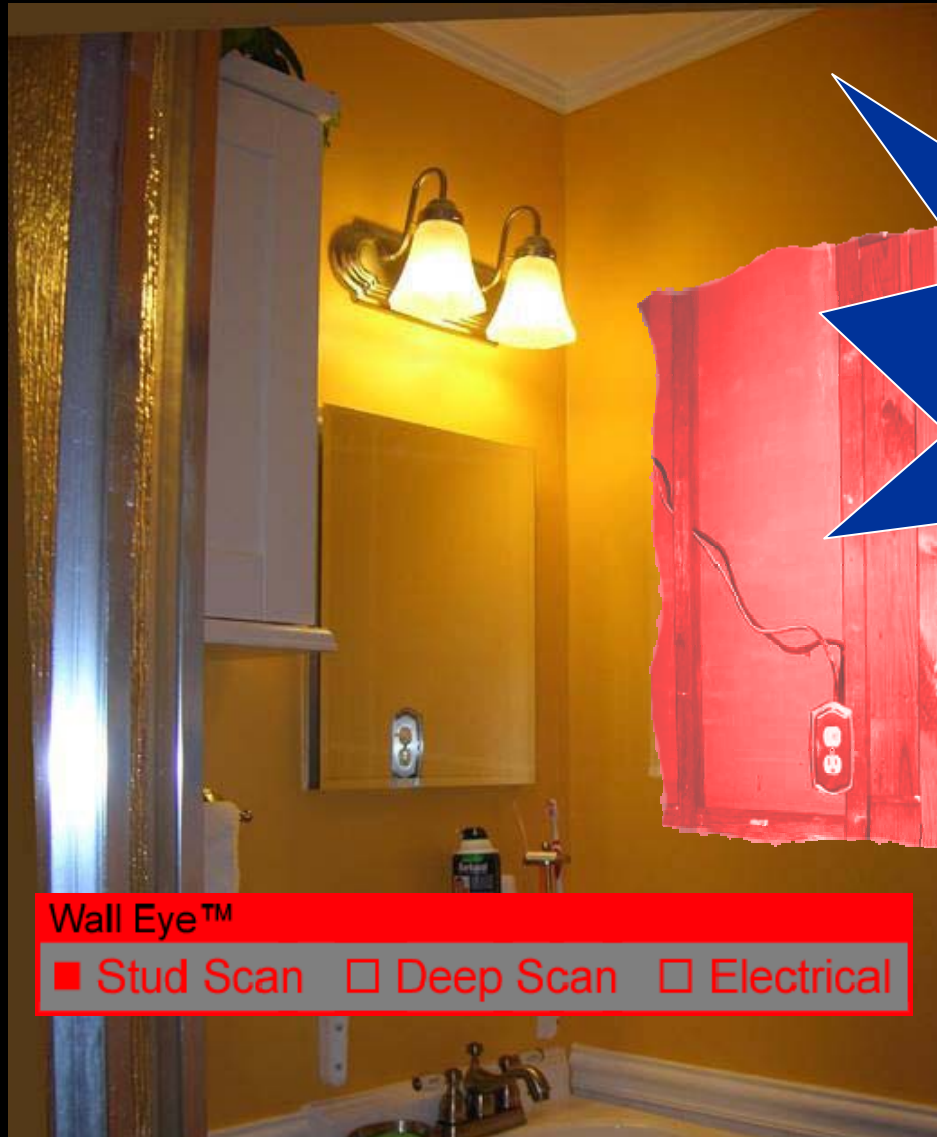
■ Normal Wash □ Pots & Pans

■ Normal Dry □ Economy Dry



web-server-on-a-chip embedded
in all appliances

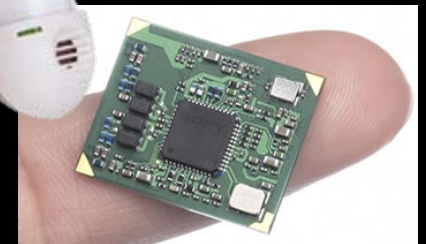
What the world looks like on the weekend



Wall Eye™

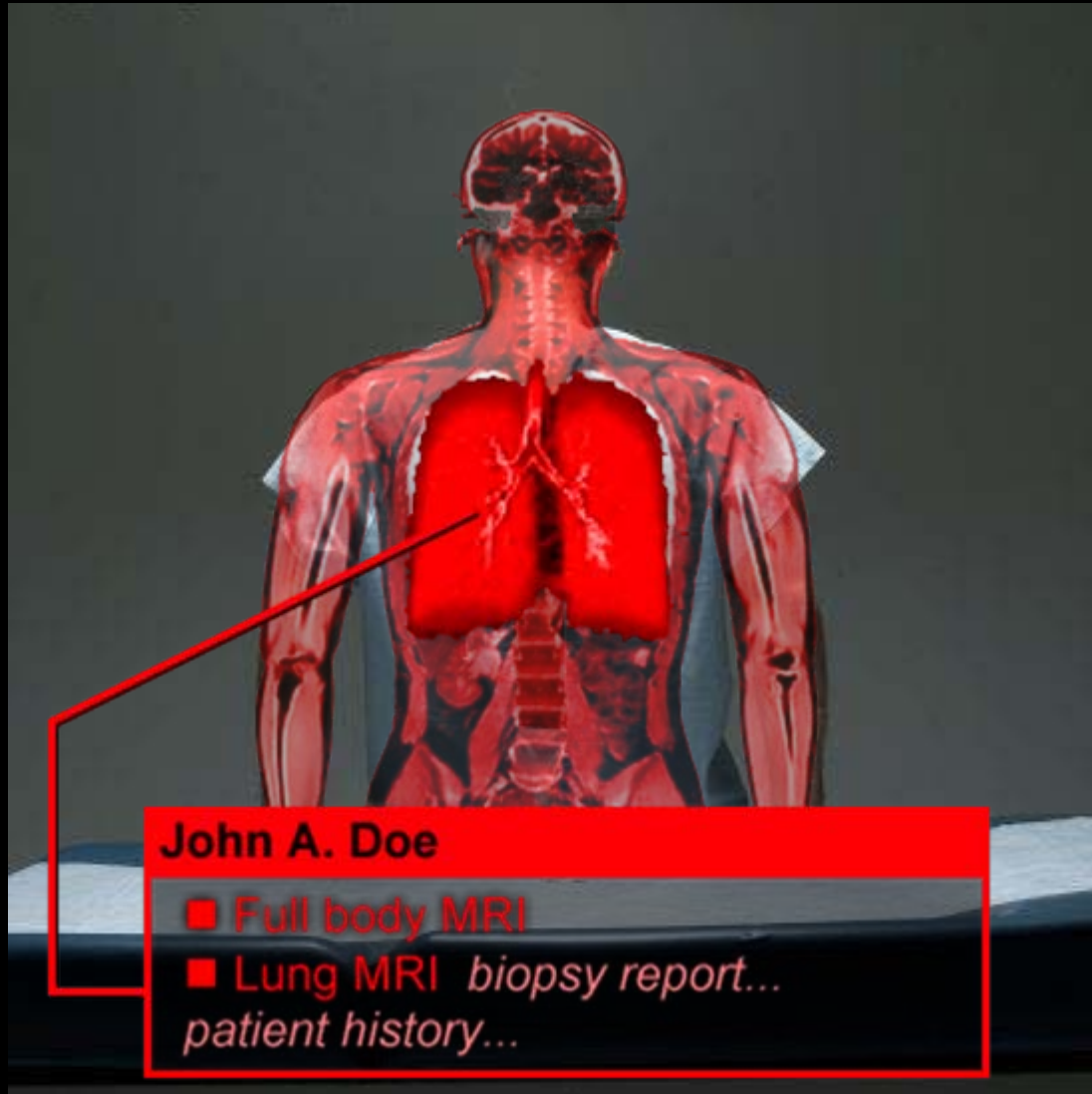
■ Stud Scan □ Deep Scan □ Electrical

Wall Eye™
Ultrasonic wall
inspector from
Home Depot
\$39.99

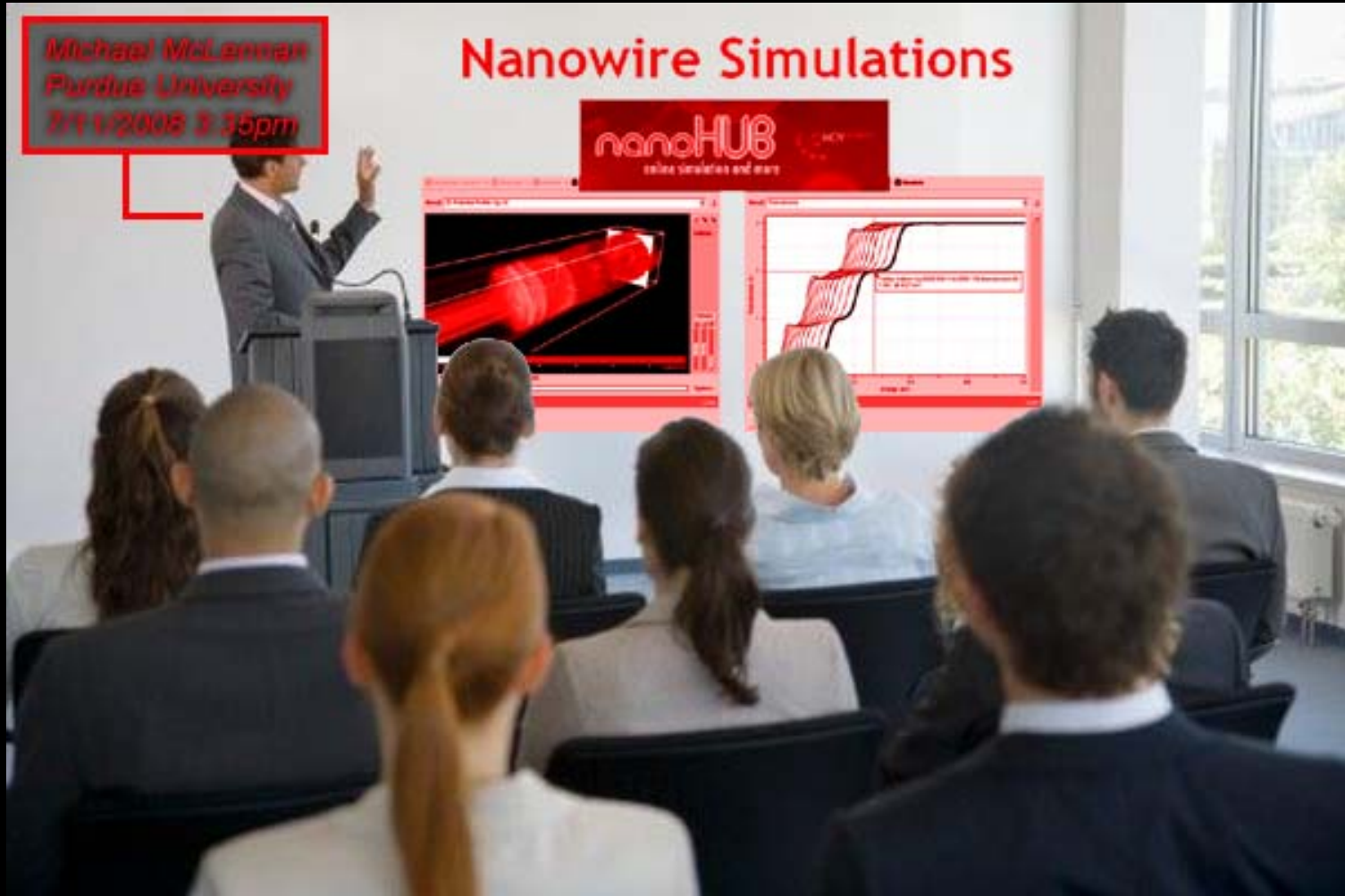


web-server-on-a-chip identifies
and controls the machine

What the world looks like to my doctor



What the world looks like to all of you

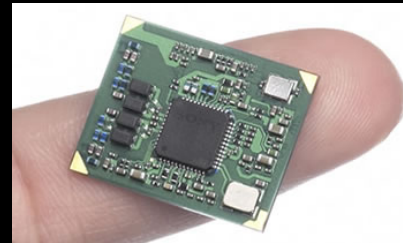
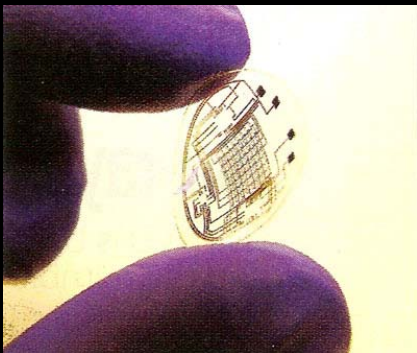


Pieces we have

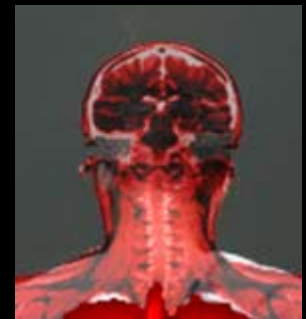
- Drawing layers: Quartz, Cairo
- Web servers feeding information, mash-ups
- Rich clients in Flash, Java
- Simulation tools (nanoHUB.org)
- Wireless communication protocol (Bluetooth) between computer and lenses/headset
- Mesh networking between people

Pieces we need

- High resolution lenses
- Wireless power for lenses & mouse
- Server-on-a-chip for appliances
- Software to overlay data on real world view



web-server-on-a-chip



Where do we go from here?



You will be assimilated