Three Disruptive Leadership Opportunities for Washington State to "Live in the Future"

Keynote Talk
Washington Innovation Summit:
New Decade, New Partnerships, New Solutions
Microsoft Executive Conference Center
Redmond, Washington
March 18, 2011

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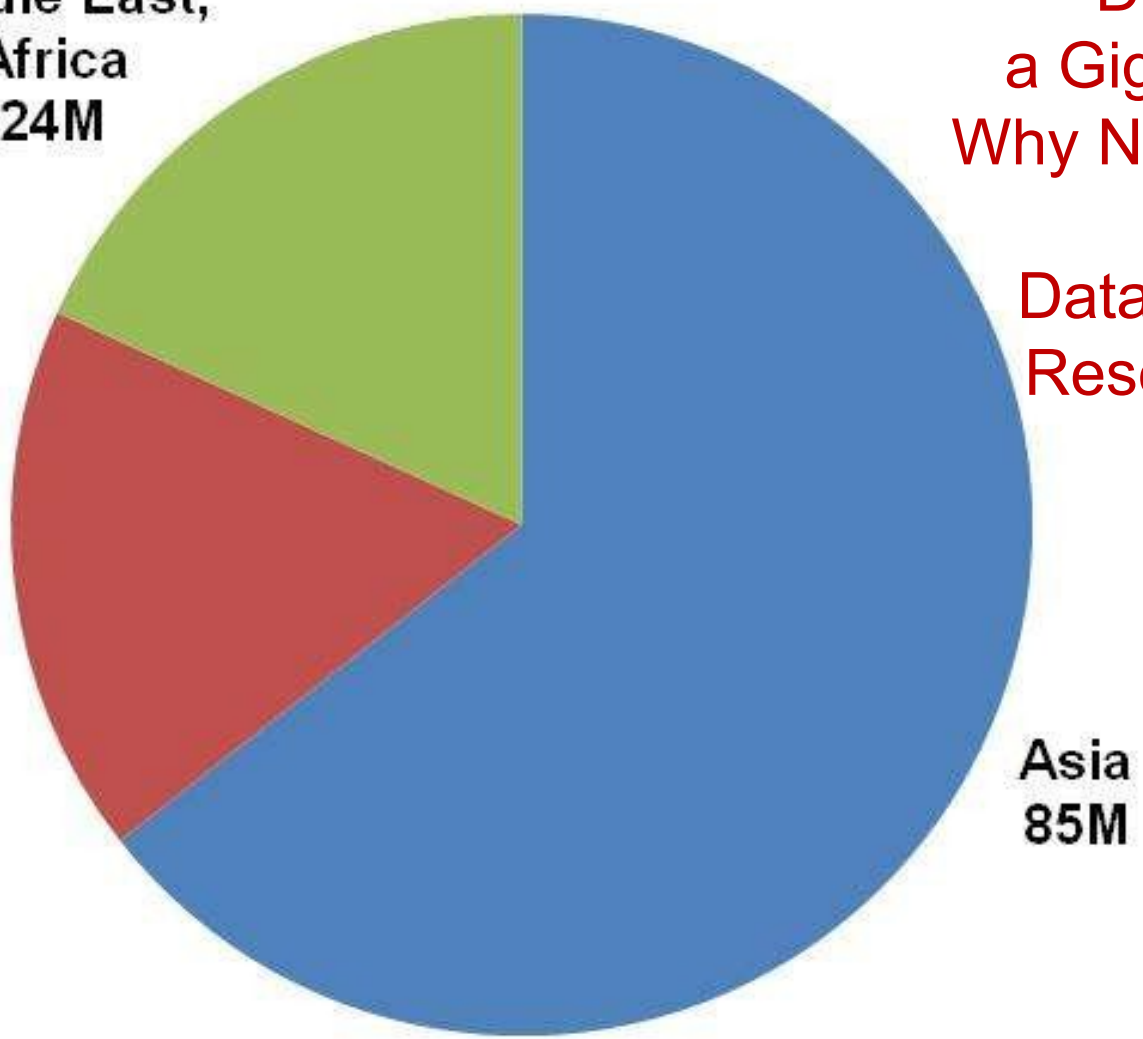
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Three Disruptive Leadership Opportunities for Washington State

- The Copper to Glass Transition
  - Towards Unlimited Broadband
- The High Carbon to Low Carbon Transition
  - Towards a Sustainable Society
- From a Sickness to a Wellness Medical Paradigm
  - Towards Digitally Enabled Lifetime Health

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Globally Fiber to the Premise is Growing Rapidly, Mostly in Asia



FTTP Connections Growing at ~30%/year

130 Million Households with FTTH in 2013

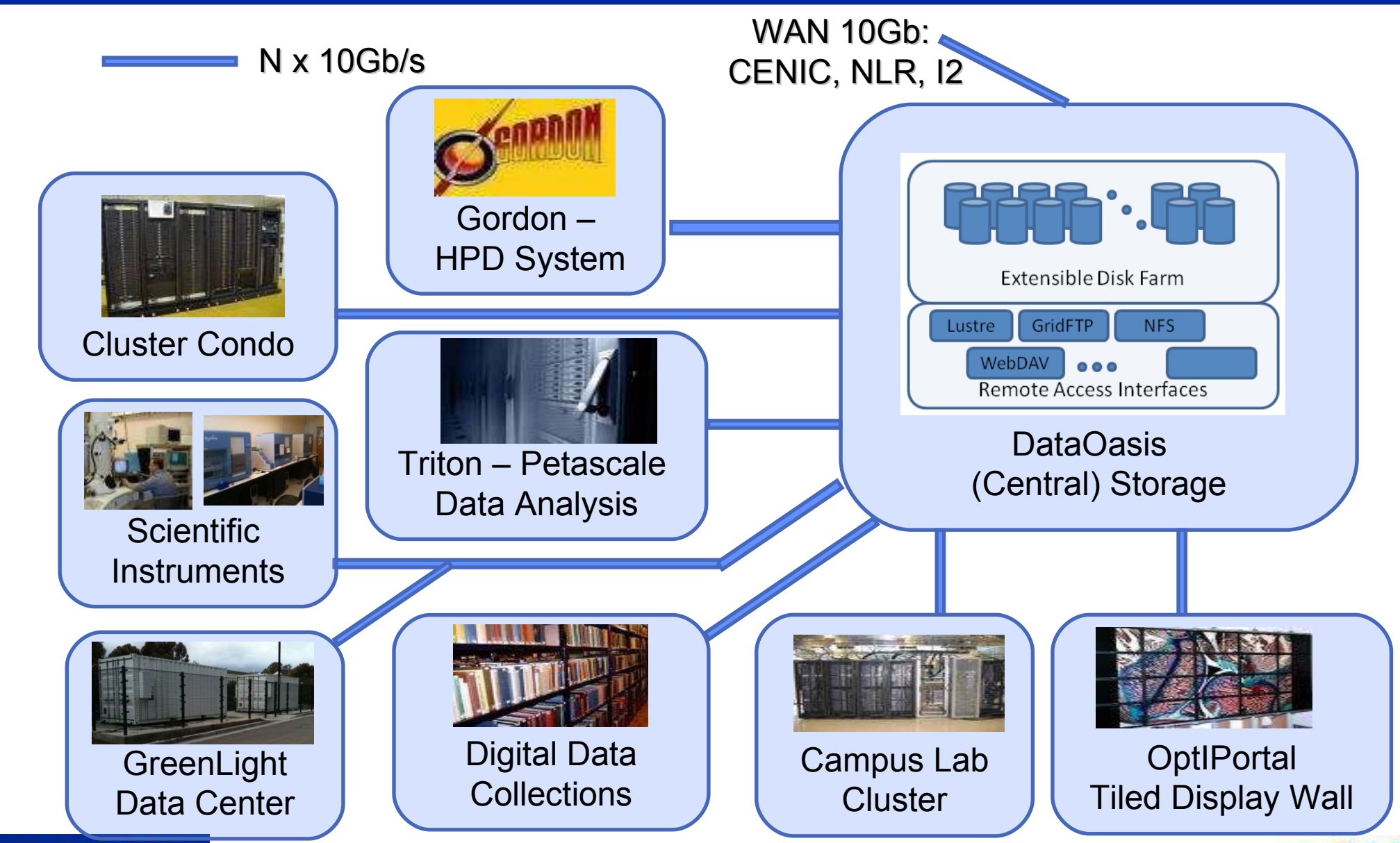
If Couch Potatoes Deserve a Gigabit Fiber, Why Not University Data-Intensive Researchers?

Source: Heavy Reading (www.heavyreading.com), the market research division of Light Reading (www.lightreading.com).

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UCSD Campus Investment in Fiber Enables Consolidation of Energy Efficient Computing & Storage



Source: Philip Papadopoulos, SDSC, UCSD

OptIPuter Persistent Infrastructure Enables Calit2 and U Washington Collaboratory



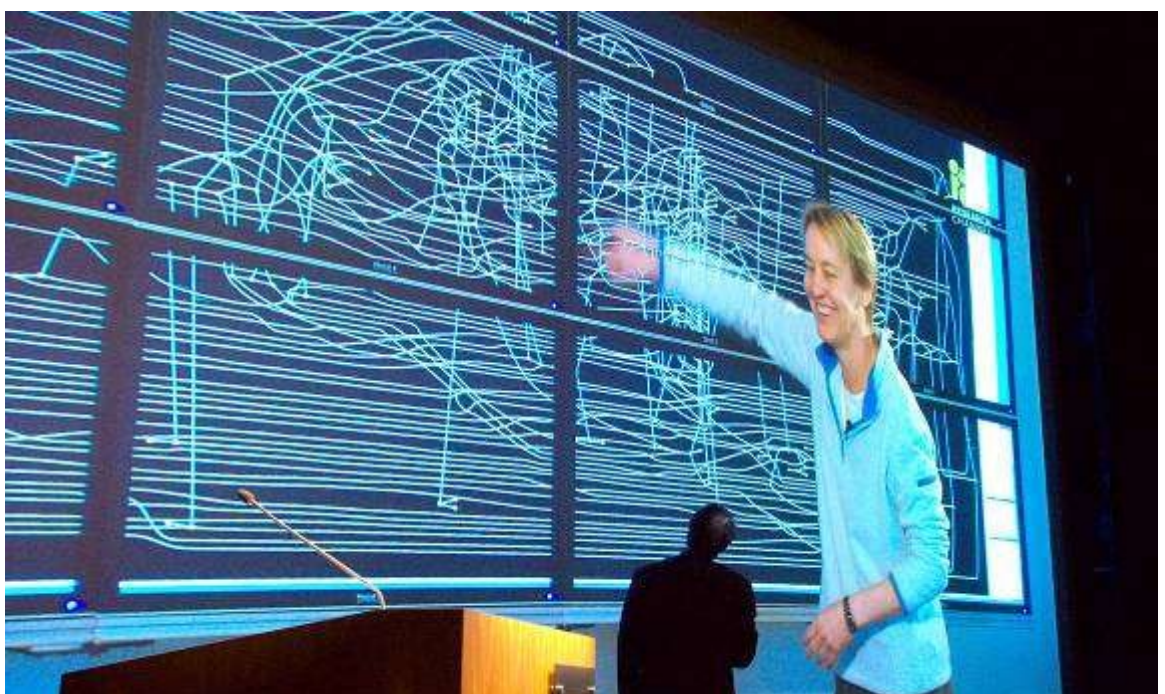
OptIPuter

Ginger Armbrust's Diatoms: Micrographs, Chromosomes, Genetic Assembly

ROCKS



MOORE FOUNDATION



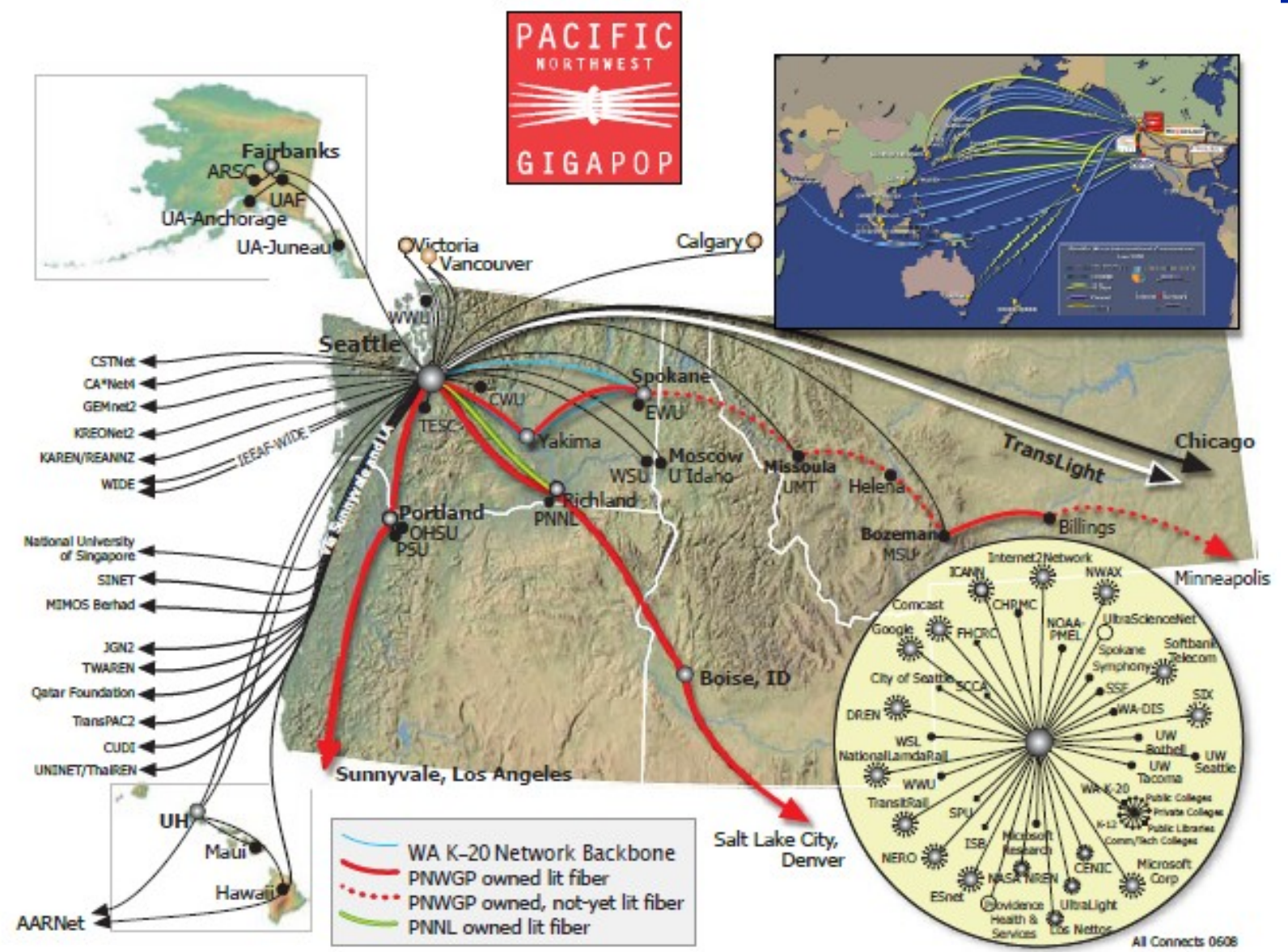
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Marine Microbial Ecology

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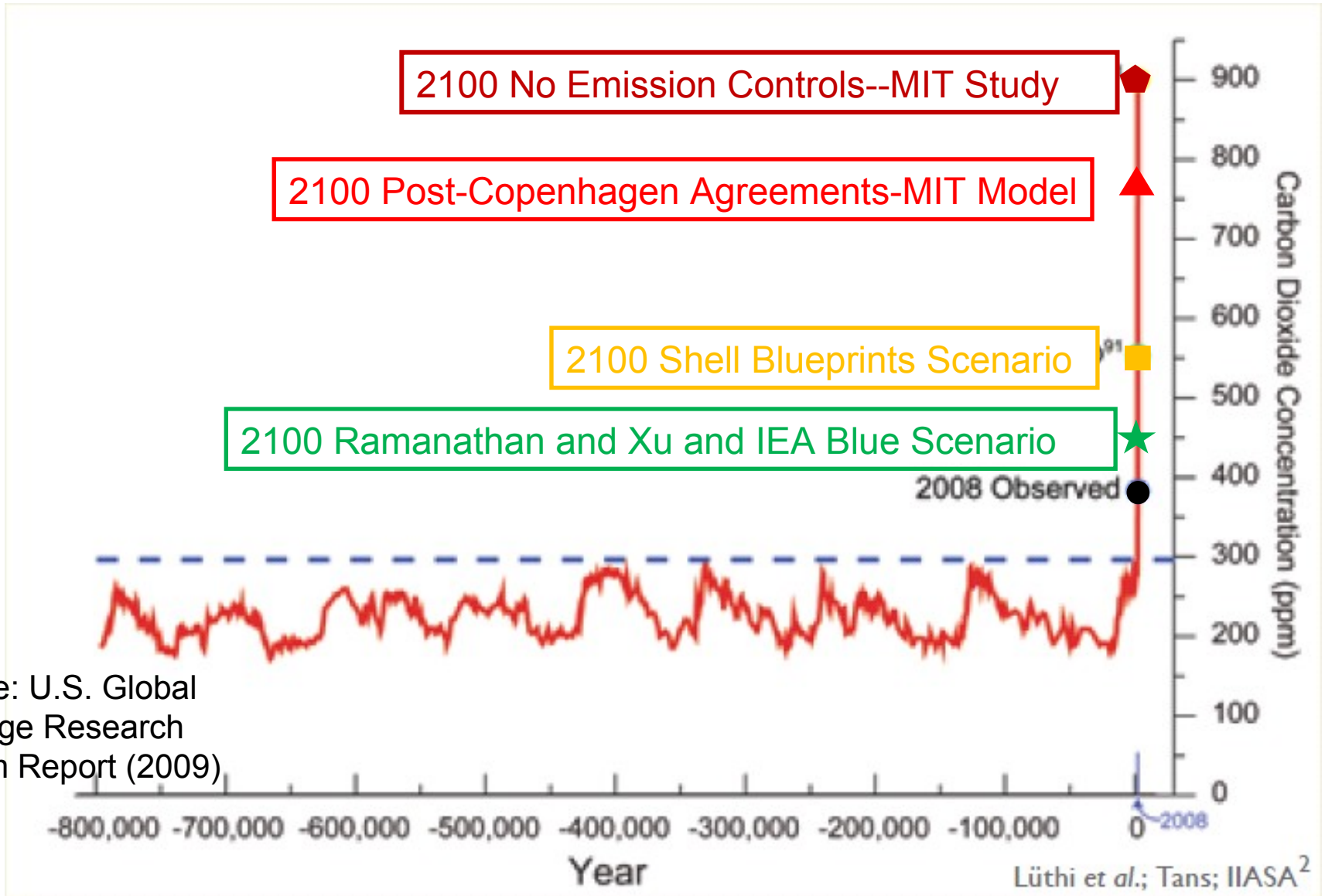
University of Washington is Poised to Drive Fiber to the Lab and to the Home for State



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Atmospheric CO_2 Levels for Last 800,000 Years and Several Projections for the 21st Century



Source: U.S. Global Change Research Program Report (2009)

Graph from:
www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/download-the-report

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Transition to Low Carbon Infrastructure: Race for Low-Carbon Industries is New Driver

Europe must up CO_2 cuts to 30%: EU

July 15, 2010 - 7:04PM

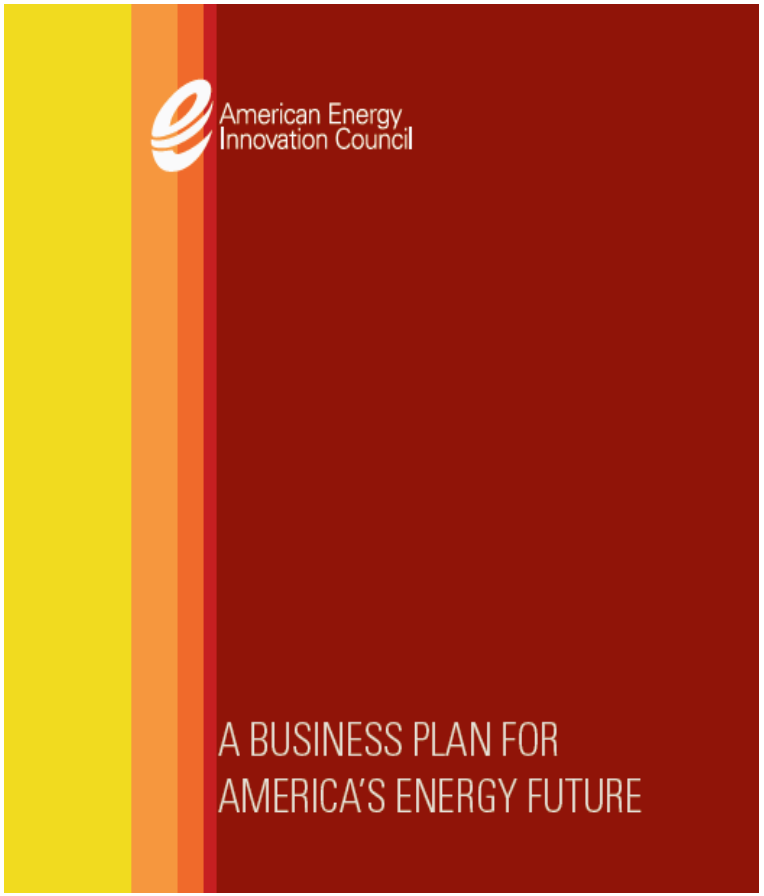
Previous Goal—By 2020, 20% Cut Below 1990 Levels

"If we stick to a 20 per cent cut, Europe is likely to lose the race to compete in the low-carbon world to countries such as China, Japan or the US - all of which are looking to create a more attractive environment for low-carbon investment," --British, French, and German Climate and Environmental Ministers

Source: Sydney Morning News

A Business Plan for America's Energy Future







OUR RECOMMENDATIONS

Create an independent national energy strategy board.
Invest $16 billion per year in clean energy innovation.
Create Centers of Excellence with strong domain expertise.
Fund ARPA-E at $1 billion per year.
Establish and fund a New Energy Challenge Program to build large-scale pilot projects.

www.americanenergyinnovation.org

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Washington State Can Lead the Switch from High Carbon Electricity to Renewables

Last coal plant in Pacific Northwest to shut down starting in 2020

March 6, 2011 | 12:45 pm (91) (564) Comments (20)



The nation's fleet of over 100 coal plants is responsible for 57 % of the electricity generated in the U.S.

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Countries, States, and Cities are Beginning to Conceive of a New Low Carbon Future

Australian Sustainable Energy
Zero Carbon Australia
Stationary Energy Plan

ZEROCARBONBRITAIN
A NEW ENERGY STRATEGY

CARBON NEUTRAL BRITISH COLUMBIA

Masdar City: Zero Carbon, Zero Waste

Seattle as North America's First Carbon-Neutral City
ALEX STEFFEN, 3 DEC 09

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ICT is a Key Sector in the Fight Against Climate Change

Applications of ICT
could enable emissions reductions
of 7.8 Gt CO_2e in 2020,
or 15% of business as usual emissions.
But it must keep its own growing footprint in check
and overcome a number of hurdles
if it expects to deliver on this potential.





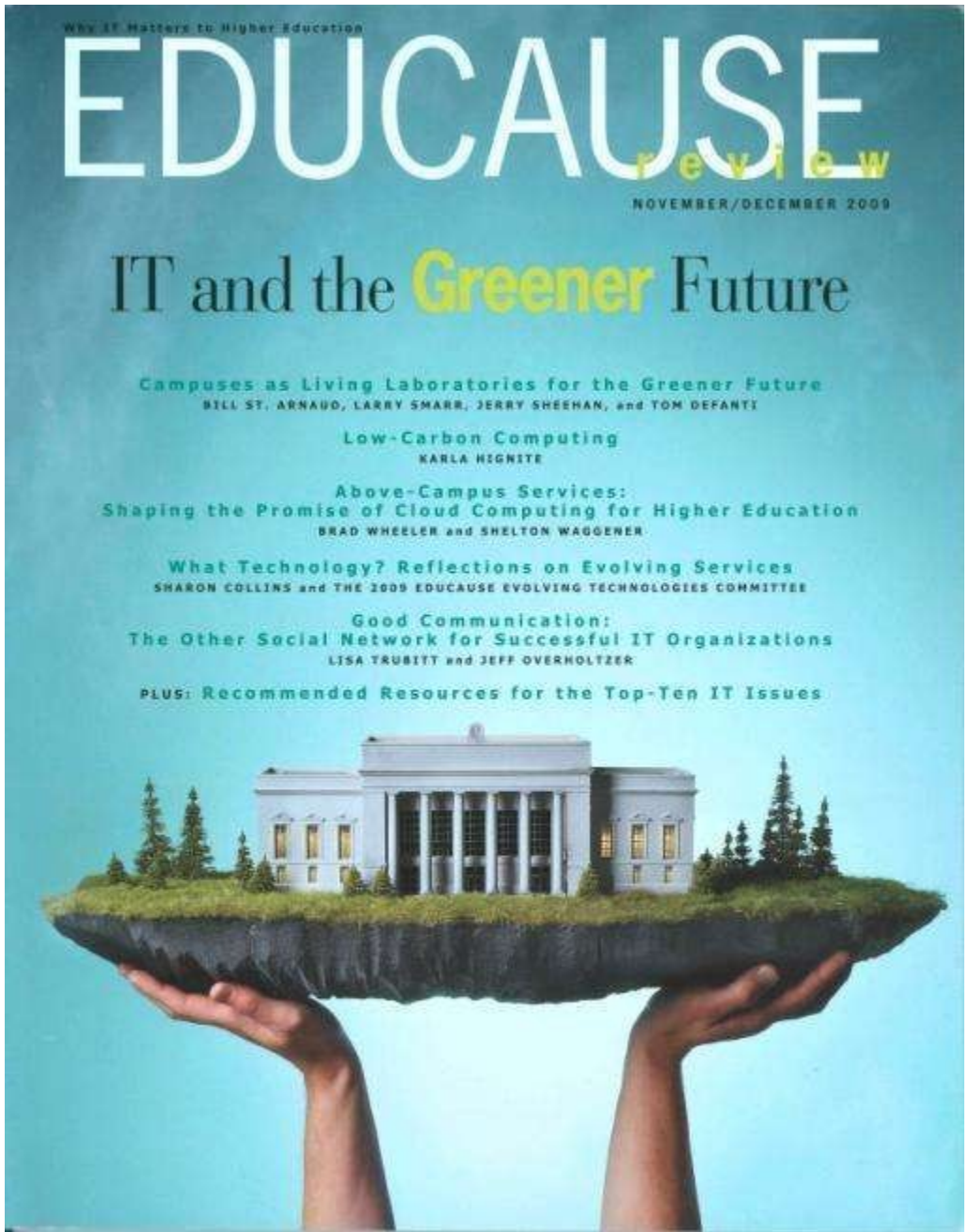
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www.smart2020.org

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Making University Campuses Living Laboratories for the Greener Future

www.educause.edu/EDUCAUSE+Review/EDUCAUSEReviewMagazineVolume44/CampusesasLivingLaboratoriesfo/185217



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The GreenLight Project: Instrumenting the Energy Cost of Computational Science

- **Focus on 5 Communities with At-Scale Computing Needs:**
  - Metagenomics
  - Ocean Observing
  - Microscopy
  - Bioinformatics
  - Digital Media





- **Measure, Monitor, & Web Publish Real-Time Sensor Outputs**
  - Via Service-oriented Architectures
  - Allow Researchers Anywhere To Study Computing Energy Cost
  - Enable Scientists To Explore Tactics For Maximizing Work/Watt
- **Develop Middleware that Automates Optimal Choice of Compute/RAM Power Strategies for Desired Greenness**
- **Partnering With Minority-Serving Institutions Cyberinfrastructure Empowerment Coalition**

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Source: Tom DeFanti, Calit2; GreenLight PI

I am the Future Digital Health Consumer: Measuring the State of Your Body and "Tuning" It

I Arrived from 20 Years in the Midwest in 2000 and Decided to Move Against the Obesity Trend

Age 52





Age 62

HEALTH IT, PEOPLE, WIRELESS

How Internet Pioneer Larry Smarr Lost 20 Pounds by Becoming a "Quantified Self"

Luke Timmerman 5/12/10

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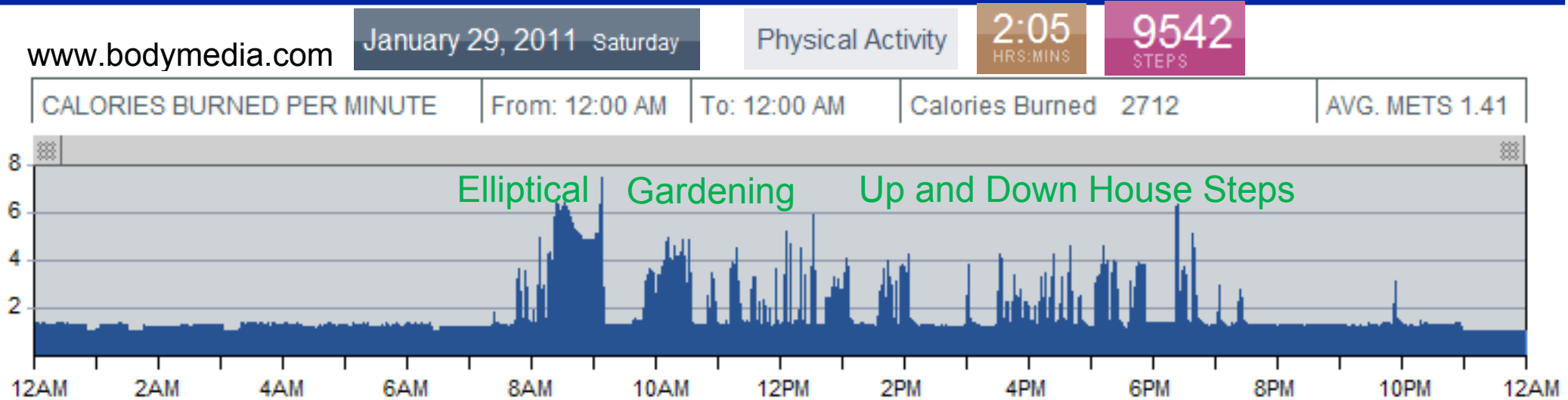
www.xconomy.com/san-diego/2010/05/12/how-internet-pioneer-larry-smarr-lost-20-pounds-by-becoming-a-quantified-self/

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Nine Years Later I Am Recording My Metabolic Self

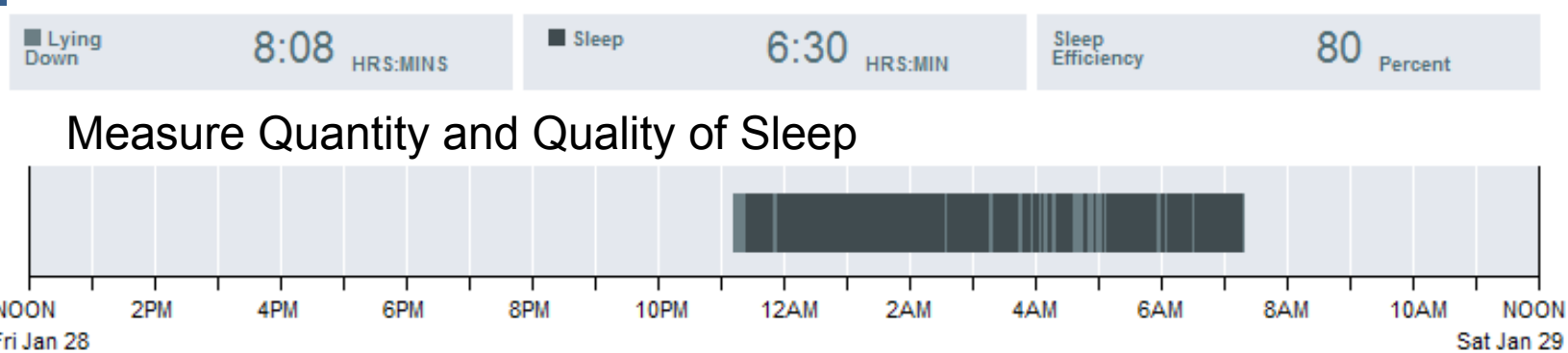
BODYMEDIA®
Know your Body. Change your life

www.bodymedia.com





25 Week Average:
2473 Calories Burned/Day
1:19 hr Physical Activity/Day (>3 METs)
6887 Steps/Day (~3.4 Miles)

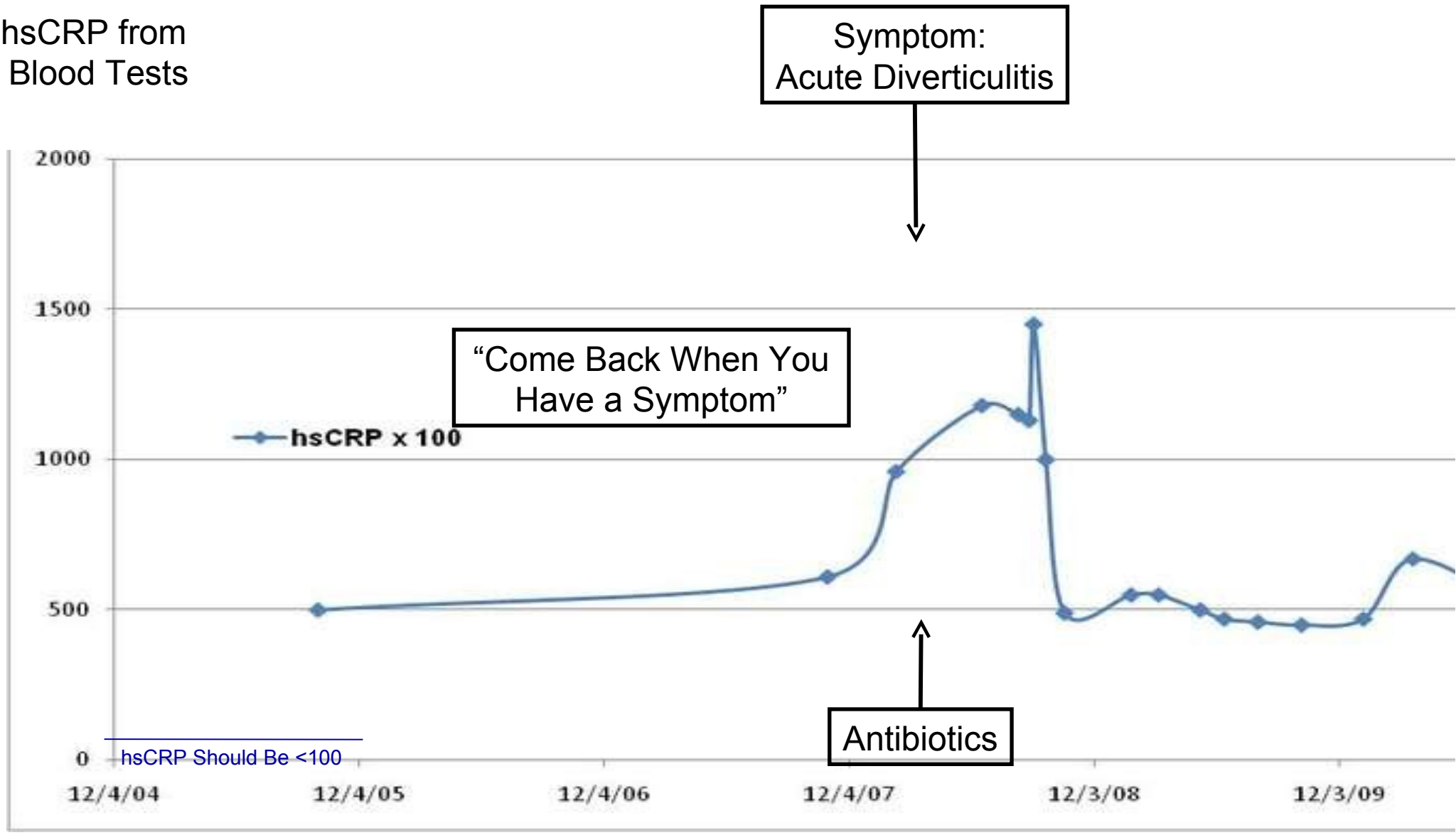


25 Week Ave: 6:51 hrs with 81% Efficiency

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In Spite of My High Levels of Omega-3s, Blood Measurements Show Chronic Inflammation



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High Sensitivity Complex Reactive Protein is the Standard Blood Test for Inflammation

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Where I Believe We are Headed: Predictive, Personalized, Preventive, & Participatory Medicine

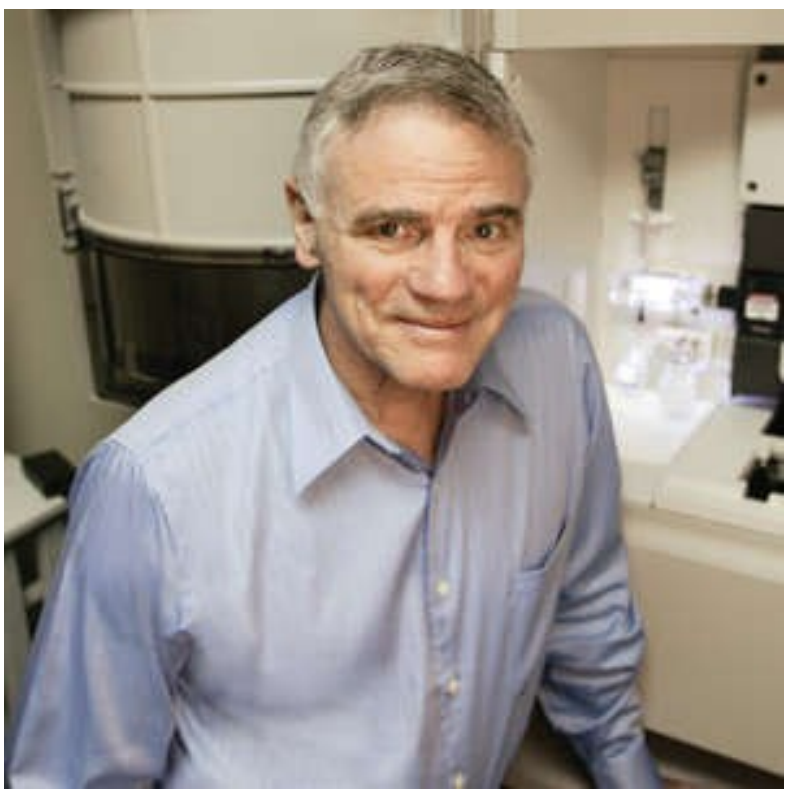
Newsweek

A Doctor's Vision of the Future of Medicine

Leroy Hood
NEWSWEEK

From the magazine issue dated Jul 13, 2009

Quantify ~2500 Blood Proteins,
50 Each from 50 Organs or Cell Types
from a Single Drop of Blood
To Create a Time Series



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Lee Hood, Director, Institute for Systems Biology, Seattle, WA

www.newsweek.com/2009/06/26/a-doctor-s-vision-of-the-future-of-medicine.html

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You Can Download This Presentation at lsmarr.calit2.net



ABOUT LARRY SMARR

Larry Smarr is the founding Director of the California Institute for Telecommunications and Information Technology (Calit2), a UC San Diego/UC Irvine

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Complete List of Larry's Recommendations

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