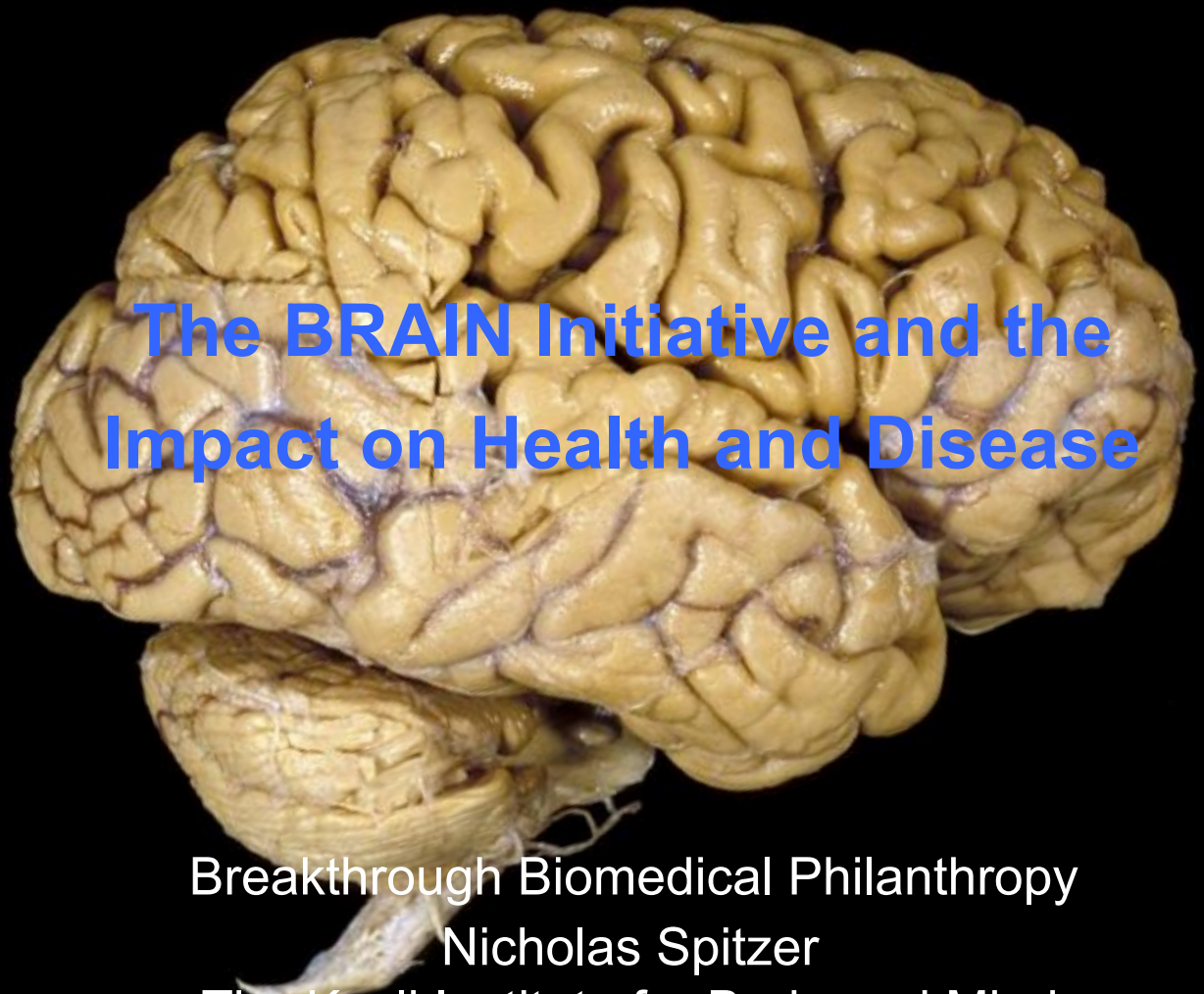
Biological Sciences
where discovery comes to life UC San Diego

THE KAVLI Institute for Brain and Mind at UCSD
University of California, San Diego



The BRAIN Initiative and the Impact on Health and Disease

Breakthrough Biomedical Philanthropy

Nicholas Spitzer
The Kavli Institute for Brain and Mind

State of the Union Address
February, 2013

"…mapping the human brain…"

The New York Times

Obama to Unveil Initiative to Map the Human Brain

By JOHN MARKOFF and JAMES GORMAN
Published: April 2, 2013

National Initiatives

1961 Man on the Moon

1971 War on Cancer

1990 Human Genome Project

2013 BRAIN Initiative

Basis for Success

Visionary goal

Good timing

Focused objective

Great economics

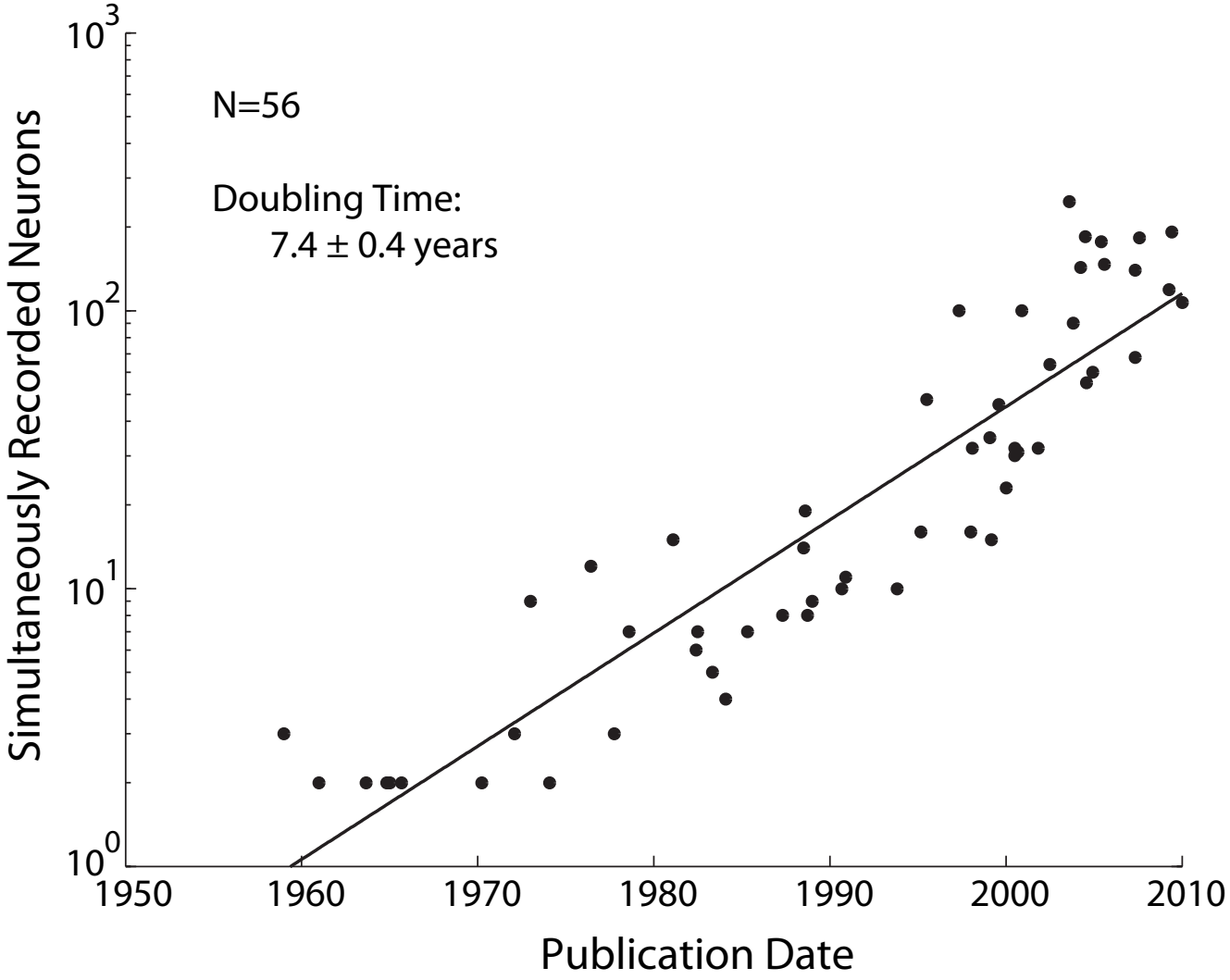
Center for Brain Activity Mapping
UC San Diego

May 14, 2013

Ralph Greenspan, Director
Nick Spitzer, Director, Kavli Institute for Brain and Mind

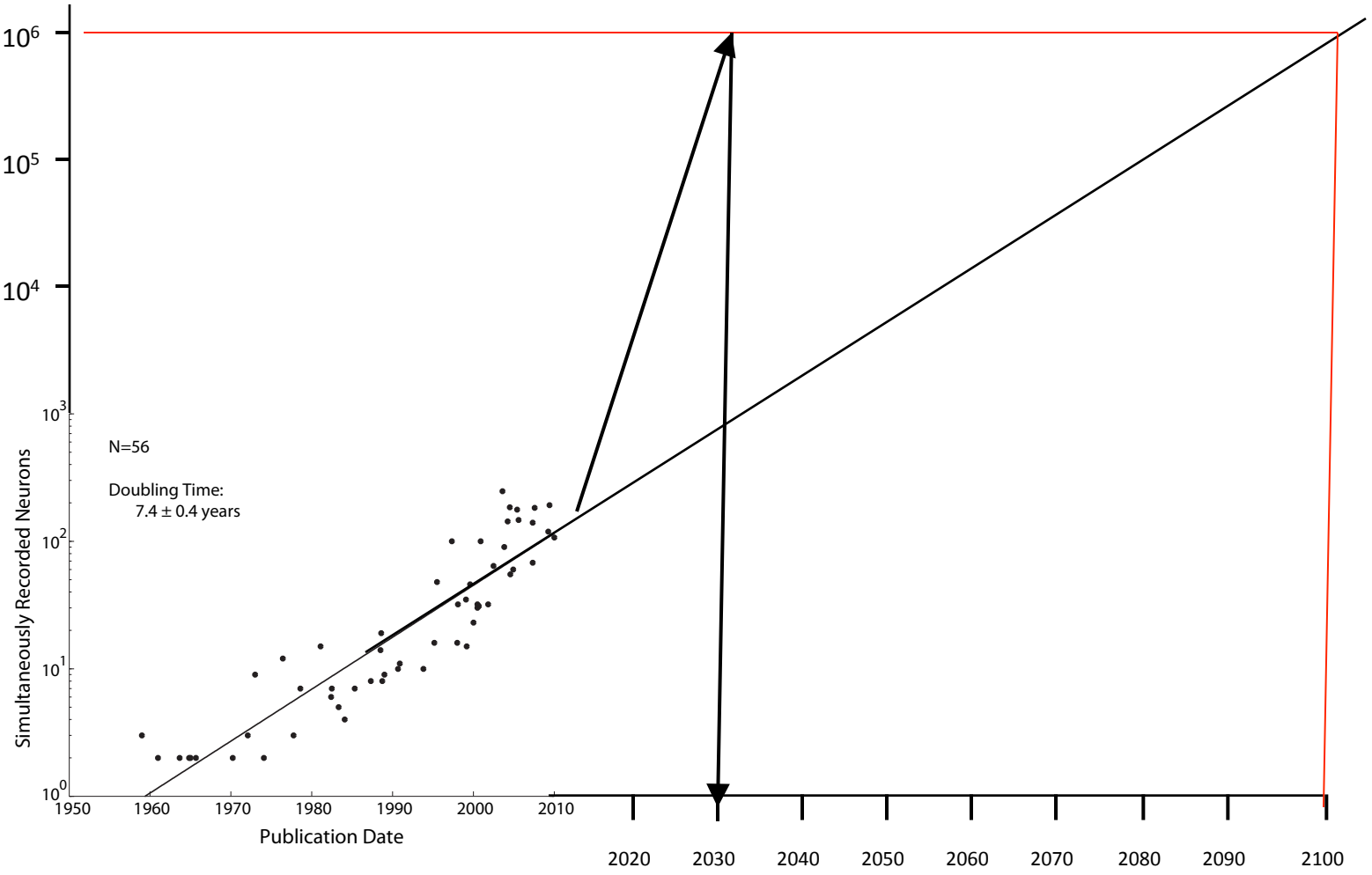
- Stimulated conversations between engineers and neuroscientists
- Awarded seed money grants for collaborative research
- Convened scientific meetings to rapidly disseminate progress

Moore's Law for Neurons



Stevenson and Kording, 2011

Moore's Law for Neurons, with the BRAIN Initiative

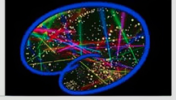


Stevenson and Kording, 2011

Examples of funded seed money grants

- A fully-encapsulated, wireless, modular, and conformable neural recording system
- Enzyme encapsulating nanoshells to probe and modulate neurotransmitter distribution
- Multi-focus optical microscopy for 3D imaging of nervous systems
- Focused transcranial magnetic stimulation

Center for Brain Activity Mapping



cbam.ucsd.edu

of the KAVLI Institute for Brain and Mind at UCSD

SENSOR TECHNOLOGIES FOR THE NERVOUS SYSTEM

JUNE 4, 2014 8:00AM – 5:30PM

ATKINSON HALL, QUALCOMM INSTITUTE, UCSD

A Symposium Sponsored by
the Center for Brain Activity Mapping at UCSD
Registration at cbamsensor2014.eventbrite.com

The B.R.A.I.N. Initiative faces a major technological barrier in obtaining high resolution, real-time recordings of brain activity over large areas of the brain. Leading researchers will explore available and promising approaches to surmounting that barrier, exploring current work and future possibilities for the detection and recording of the range of relevant electrical and chemical signals in the nervous system.

speakers

ralph greenspan	*Opening Remarks*
adam cohen	*All-optical Electrophysiology with Microbial Rhodospins*
alan jasanoff	*Molecular Probes for Noninvasive Neuroimaging*
james schuck	*Optimizing Nanocrystals for Deep-Tissue Imaging*
erkki ruoslahti	*Targeting of the Brain and its Diseases with Nanoparticles*
ania bleszynski jayich	*Nanoscale Sensing with Diamond Spins: Prospects for Bio-sensing*
r. mark wightman	*Electrochemical Monitoring of Neurotransmitters and Metabolites*
paul weiss	*Developing Nanoscale Measurements for the Brain*

First Annual CBAM Seed Grant Symposium

March 6, 2015
1:00pm – 5:00pm
San Diego Supercomputer Center,
UC San Diego

"Our ultimate goal is no less than a full understanding of the global network activity of the brain." - Ralph Greenspan

Achieving this goal requires that we develop the capability of monitoring real-time activity in the brain in a comprehensive way, a project that cannot succeed without integrating neuroscience with engineering. Our Center will provide the framework for this program of integration by catalyzing and supporting joint projects for research and training.

A Symposium Sponsored by the Center for Brain Activity Mapping at UCSD
cbam.ucsd.edu

State Cal-BRAIN Act of 2014

SB-836 Brain research: Cal-BRAIN program

[California Blueprint for Research to Advance Innovations in Neuroscience]

- Budget of $2 million voted in the legislature, June 15th
- SB-836 wound up on the Governor's desk
- Was spent in 2014-2015 to jump start the program

- "(f) The BRAIN Initiative has the potential to be a major driver of
- new industries and jobs in biotechnology, artificial intelligence,
- and information technologies, as well as a catalyst for major breakthroughs in brain-related diseases, injuries, and illnesses…"

The Plan for San Diego

- Innovative **neurotechnology** will be developed here
- Companies will be founded
- Students will be trained in neurotechnology
- Jobs will become available in this sector
- Patients will benefit from this technology

Patient Benefits

- Early diagnosis
- Continuous monitoring
- Less invasive
- Less expensive
- Useful across medical fields

Acknowledgements

The Kavli Foundation
Ralph Greenspan
Terry Sejnowski

Chancellor Pradeep Khosla
UC President Bob Dynes
UC President Dick Atkinson