

Arizona Institute for Nanoelectronics Kickoff

Stephen Goodnick
4-4-08

Arizona Institute
for Nano-Electronics (AINE)



The Arizona Institute for Nano-Electronics (AINE) is a coordinated network of research centers focused on ASU research in nanoelectronics, including nanophotonics, molecular electronics, nanoionics and computational nanoscience. We invite you to join us for a one-day workshop featuring invited presentations from ASU researchers and international experts in nanotechnology. Register online at <http://www.asu.edu/aine/>. There will be a poster session for presentations of current research in nanotechnology. If interested, please submit an abstract on the poster session registration form found on our Web site. Space is limited so please register for the workshop and poster session today!

Kick-off Meeting

Friday, April 4, 2008
8 a.m.
Tempe Mission Palms
60 E. 5th Street
Tempe, AZ 85281
www.asu.edu/aine/

ASU ARIZONA STATE UNIVERSITY
FULTON
SCHOOL OF ENGINEERING
ARIZONA STATE UNIVERSITY

Agenda

- 8:00-8:30** **Welcome, Stephen Goodnick, “Overview ASU nanotechnology and AINE”**
- 8:30 9:00** **Mark Lundstrom, Purdue University, “Computational nanoelectronics in the 21st century: challenges and opportunities”**
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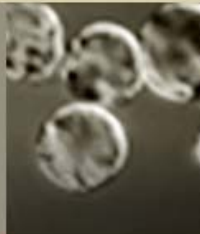
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Office of the Vice President for Research and Economic Affairs (OVPREA) <http://ovprea.asu.edu/>



STIMULATING THE
DESIGNING THE *future*



BIOSCIENCES



SOCIETY



ENVIRONMENT



WORLD



ECONOMY



FUTURE

- Research at ASU
- Economic Affairs
- Research Administration
- Research Enhancement
- Business Resources
- Clinical Partnerships
- Faculty Expertise
- Presentations



ASU Research Magazine Online

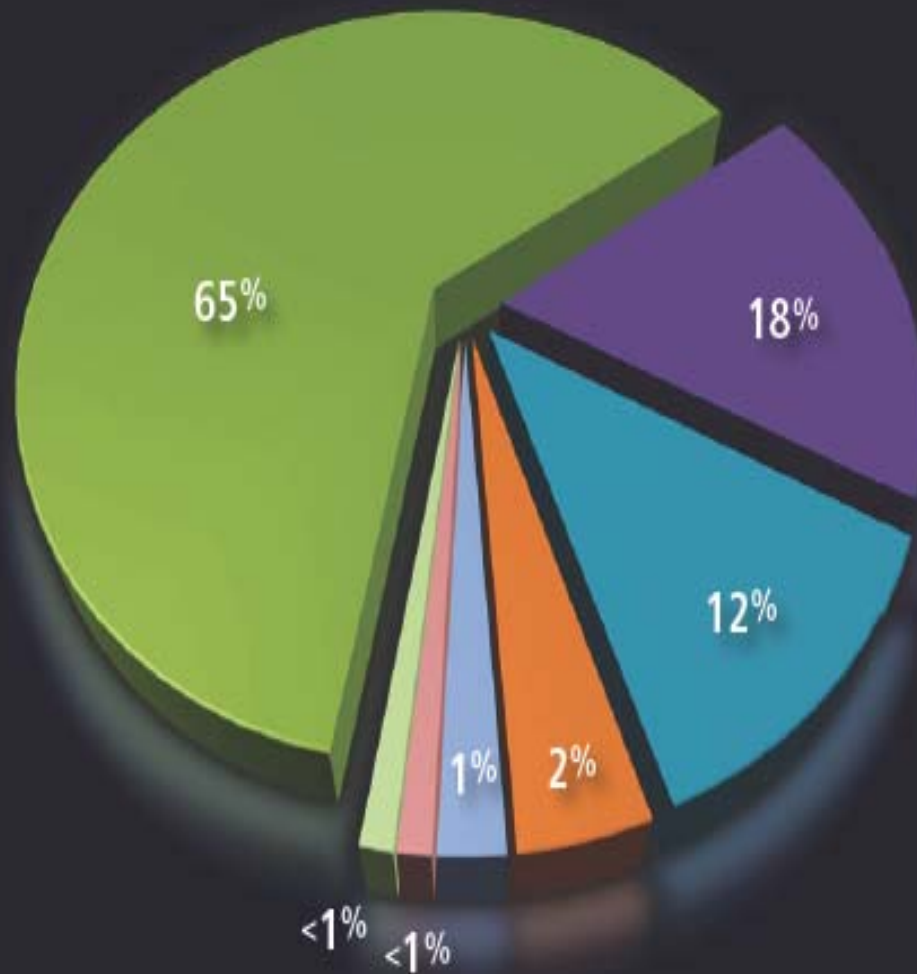
RESEARCH NEWS AND STORIES

Science Foundation Arizona Initiatives

Biodesign Institute leads innovative project to prevent cancer - Biodesign Institute researchers have received nearly \$9 million in grants to develop a preventive vaccine against cancer.

Professor makes proteins from scratch - A new Biodesign Institute research team, led by John Chaput, is now trying to mimic the process of Darwinian evolution in the laboratory by evolving new proteins from scratch.

ASU Research at a Glance

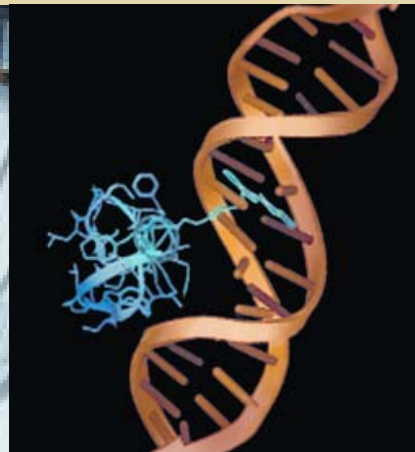
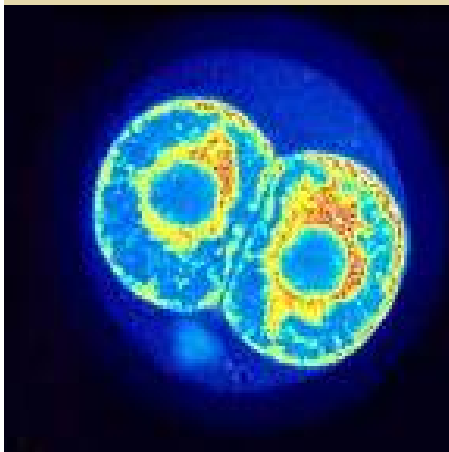


Expenditures by Sponsor (2007)

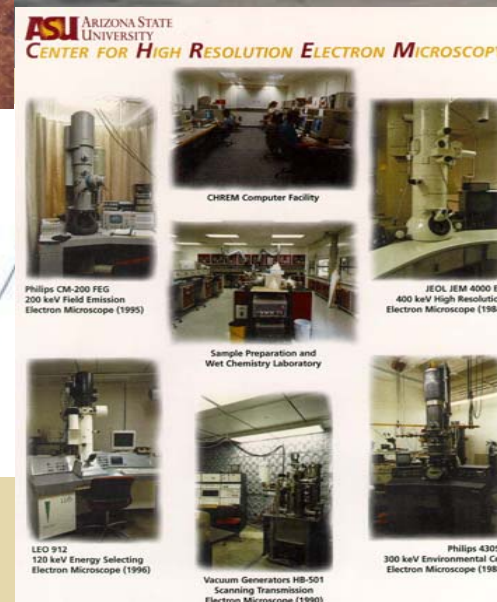
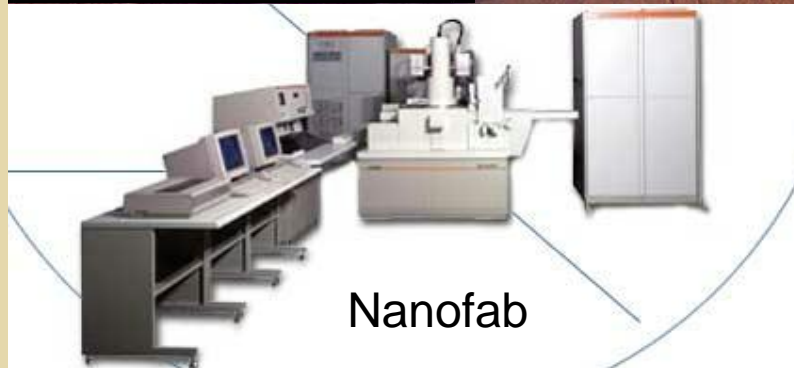
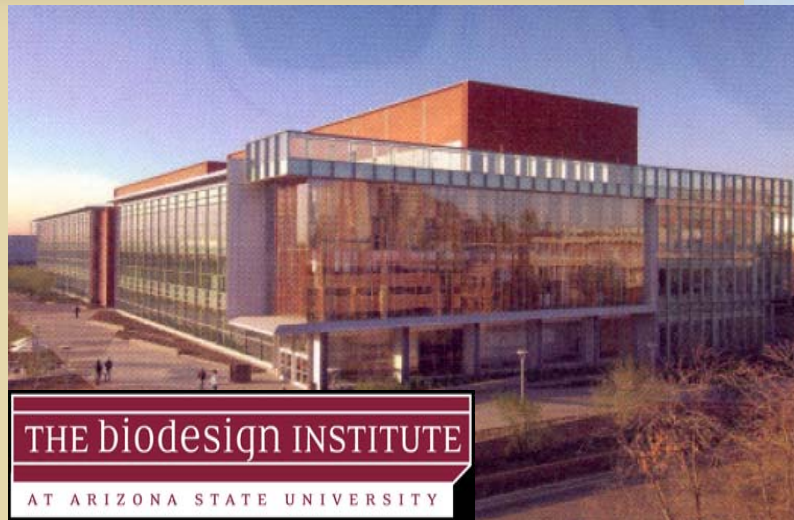
Federal	\$142,975,838
State	\$39,099,919
Private	\$27,115,086
ASU Foundation	\$4,306,965
Foreign	\$2,520,725
Local	\$1,825,839
Program Income	\$685,421
Total	\$218,529,795

Nanotechnology Initiatives

Arizona State University



Nanotechnology Infrastructure



The Biodesign Institute at ASU

The integration and translation of formerly distinct disciplines of discovery, including biology, chemistry, physics, medicine, agriculture, environmental science, electronics, engineering and computing



ASU ARIZONA STATE
UNIVERSITY

RESEARCH & ECONOMIC AFFAIRS

USE INSPIRED • TRANSDISCIPLINARY • INTELLECTUAL FUSION • SOCIAL EMBEDDEDNESS

Nanoscale Systems

Bio-Optical Nanotechnologies

Neal Woodbury, Director

Single Molecule Biophysics

Stuart Lindsay, Director

Bioelectronics and Biosensors

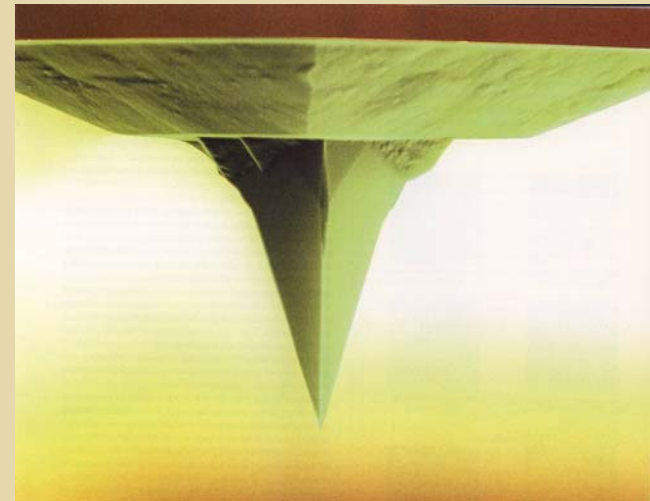
Joseph Wang, Director

Center for Ecogenomics

Deidre Meldrum, Director

Applied NanoBioscience

Frederic Zenhausern, Director



MacroTechnology Works



MacroTechnology Works (MTW) is the bridge that connects conceptual research and early-stage proof-of-concept to engineering of commercial-ready prototypes and technology demonstrators



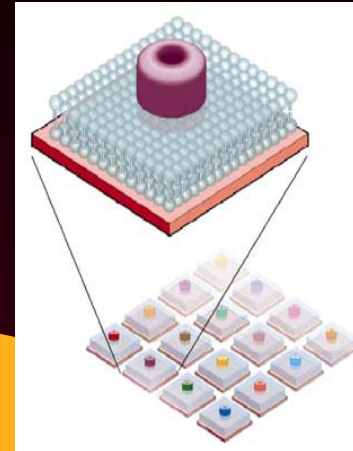
Macro-Technology Works (MTW) is the home of the Army-Sponsored Flexible Display Center



Arizona Institute for Nanoelectronics



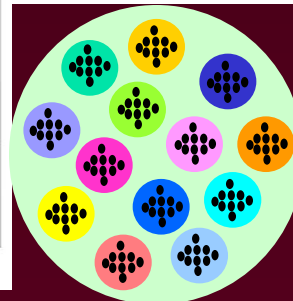
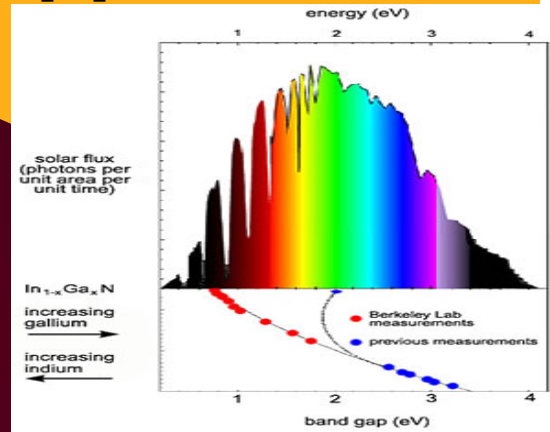
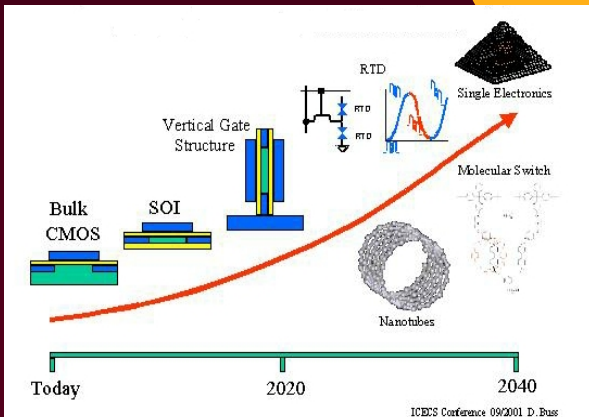
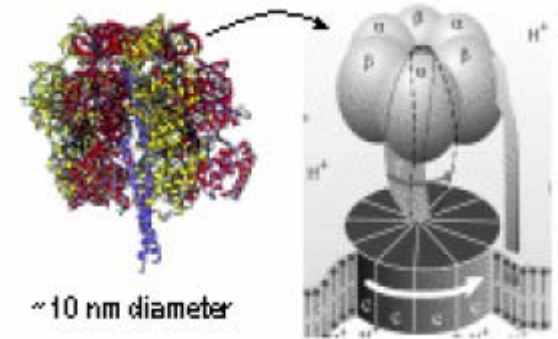
Communications



Sensing

Future Information Processing

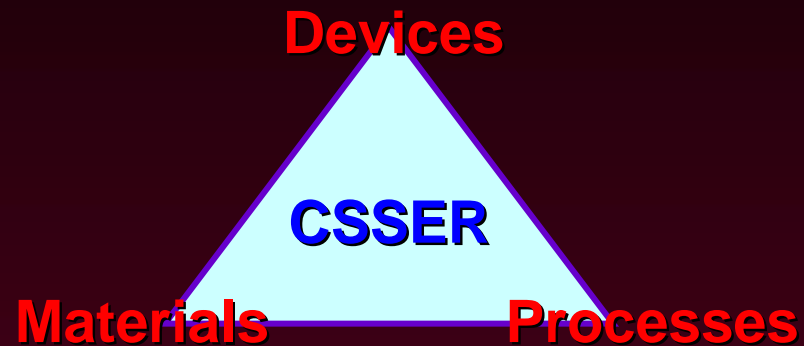
NanoElectronic Applications



Bioelectronics

Energy


Center for Solid State Electronics Research




Nanostructures
Devices
Advanced Materials
Optoelectronics
Low Power Electronics
Focused Ion Beam
Bio & Molecular Electronics

LeRoy Eyring Center for Solid State Science


ASU ARIZONA STATE UNIVERSITY
CENTER FOR HIGH RESOLUTION ELECTRON MICROSCOPY




Philips CM-200 FEG
 200 keV Field Emission
 Electron Microscope (1995)




CHREM Computer Facility




JEOL JEM 4000 EX
 400 keV High Resolution
 Electron Microscope (1984)




Sample Preparation and
 Wet Chemistry Laboratory



LEO 912
 120 keV Energy Selecting
 Electron Microscope (1996)

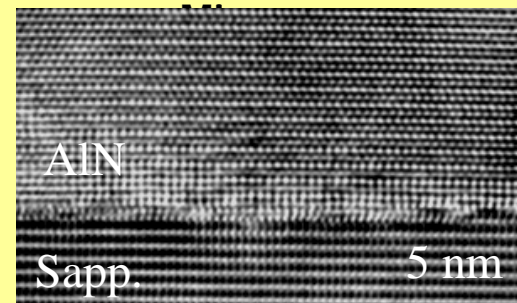


Vacuum Generators HB-501
 Scanning Transmission
 Electron Microscope (1990)

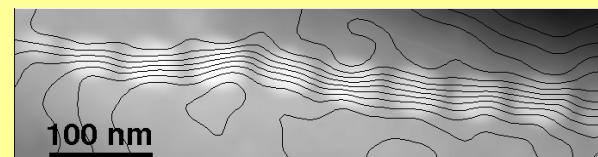
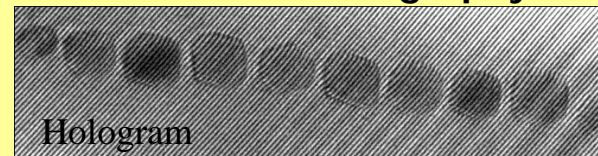


Philips 430ST
 300 keV Environmental Cell
 Electron Microscope (1988)

High-Resolution Electron

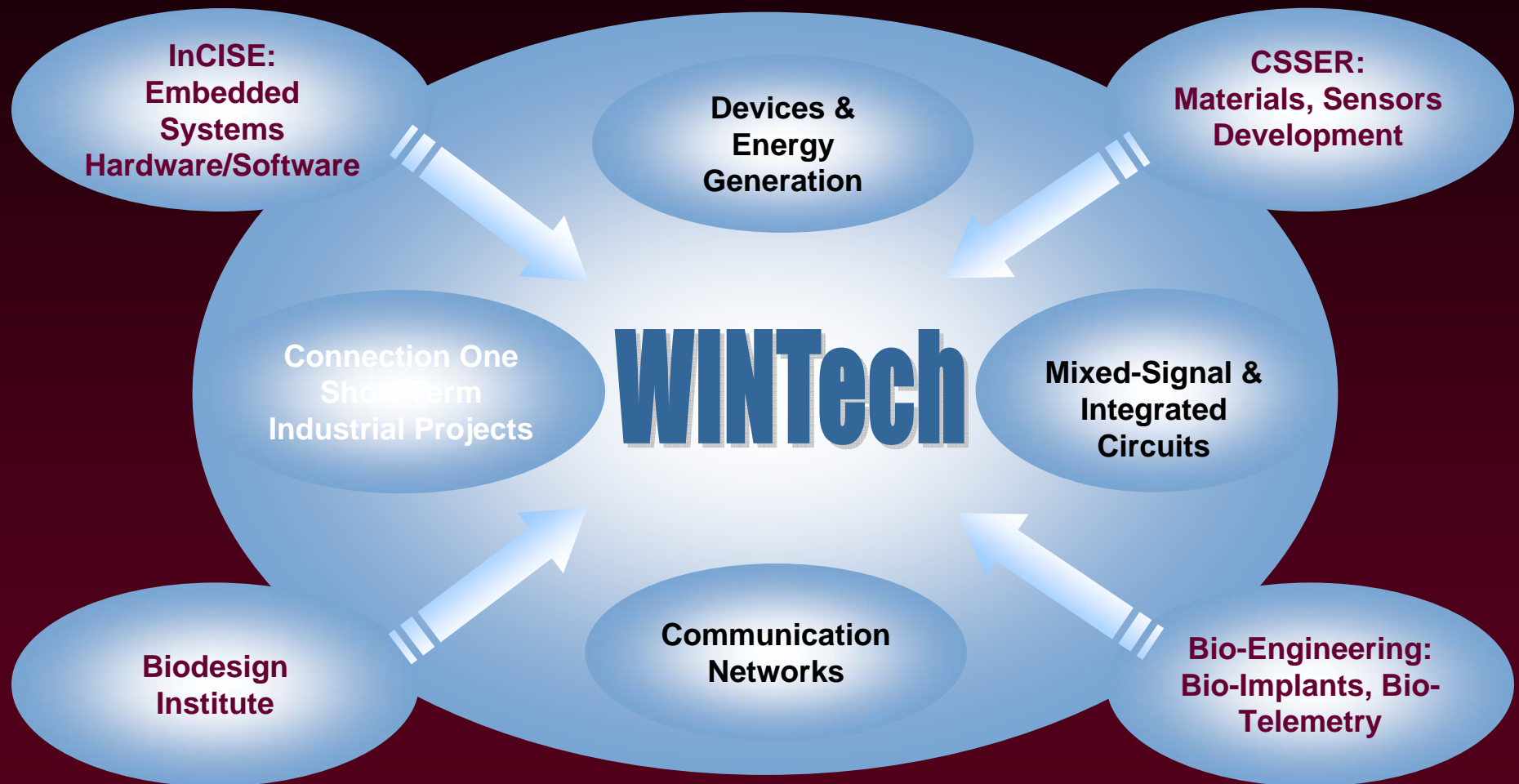


Electron Holography



Wireless Integrated NanoTechnology:

ConnectionOne/WINTECH



Center for Nanotechnology In Society

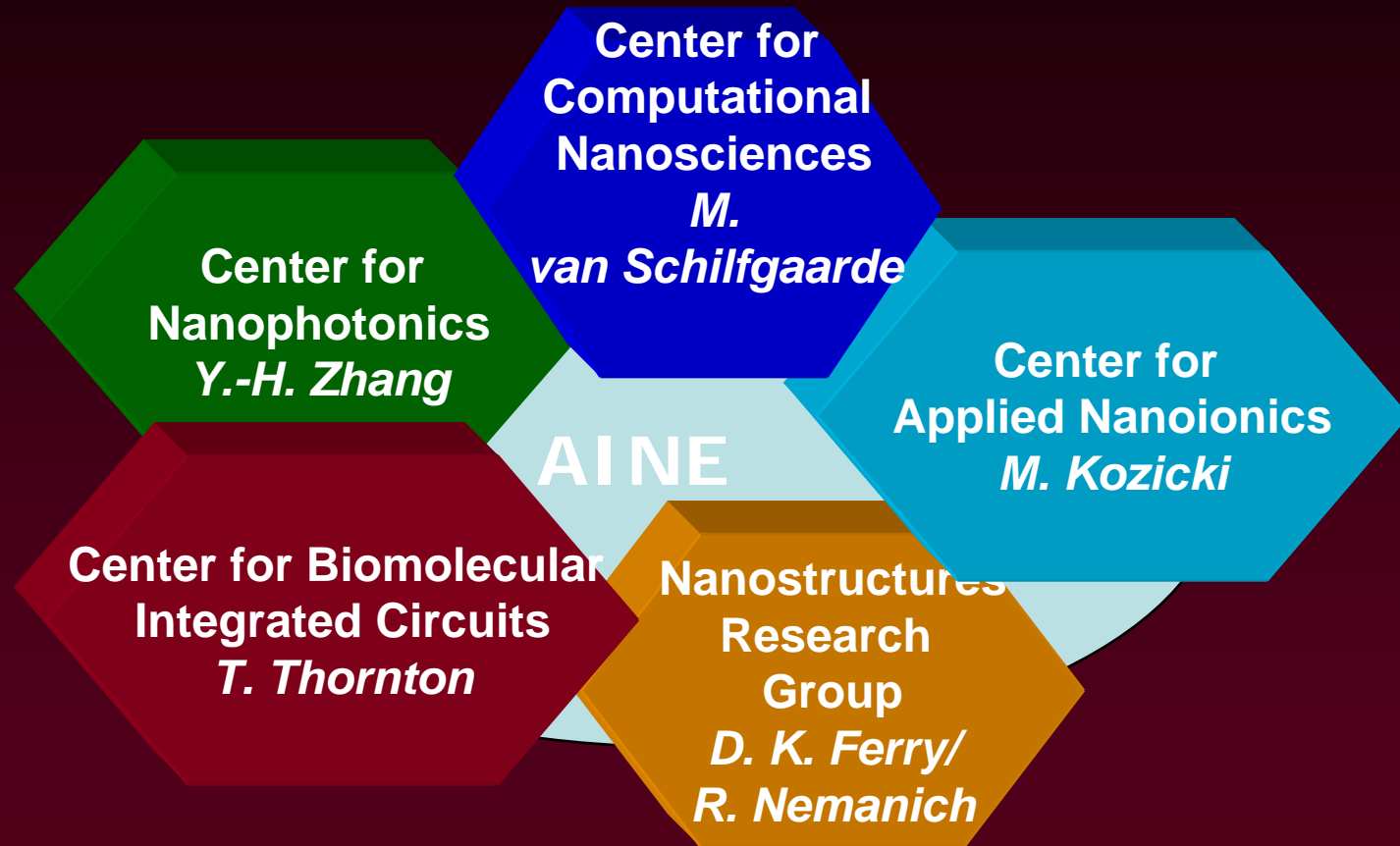
CNS-ASU began its funding on 1 October 2005 and held its Public Launch on 30 January 2006



The Center for
Nanotechnology in Society
ARIZONA STATE UNIVERSITY

- Research the societal implications of nanotechnologies
- Train a community of scholars with new insight into the societal dimensions of nanoscale science & engineering (NSE)
 - Undergraduate, graduate and post-doctoral courses
- Engage the public, policy makers, business leaders, and NSE researchers in dialogues about the goals and implications of NSE
 - Build network committed to making NSE socially beneficial & addressing NSE-related societal conflicts
- Partner with NSE laboratories to introduce greater reflexiveness in the R&D process
 - Address problems as ideas are being generated, evaluated & developed

Arizona Institute for Nanoelectronics (AINE)



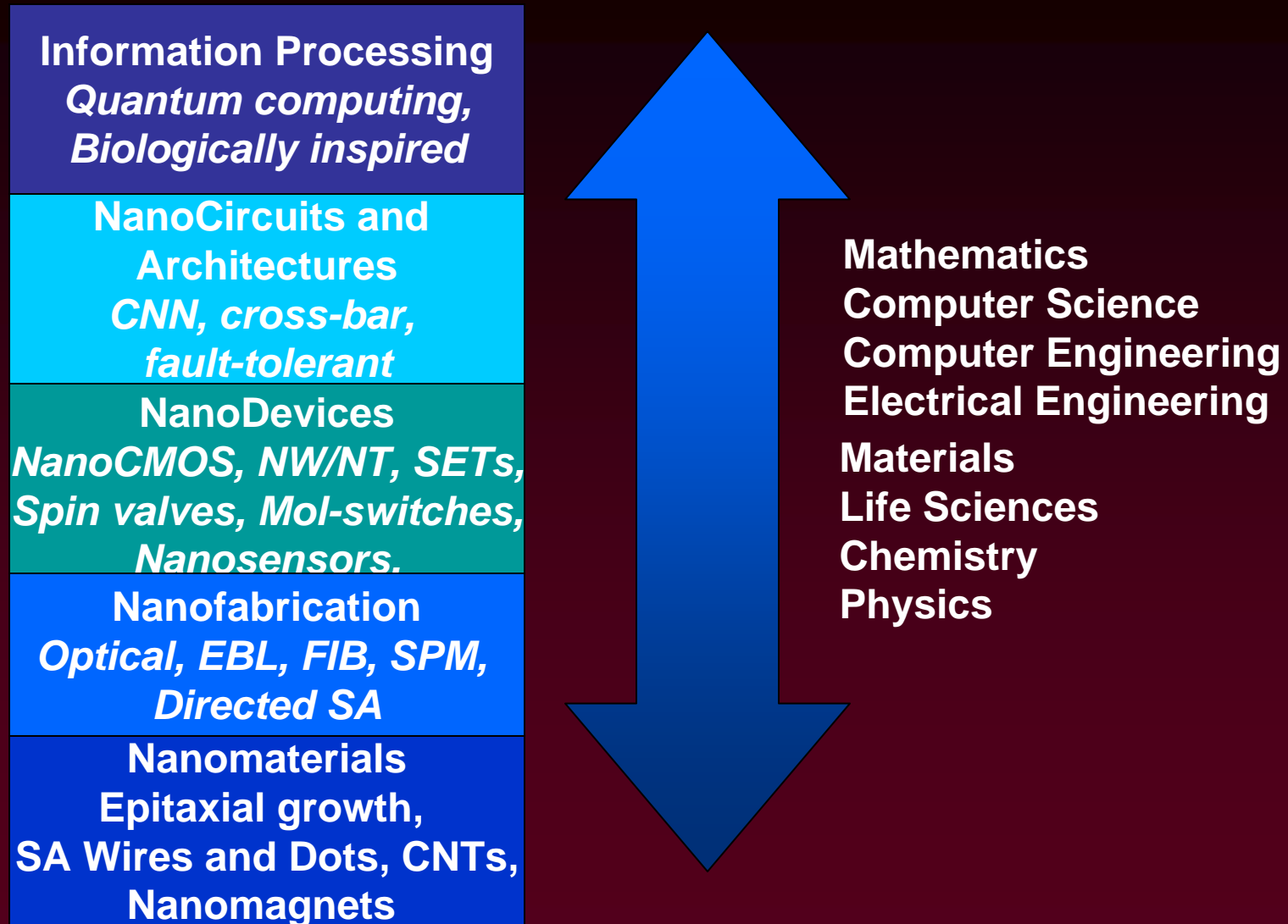
Executive Committee

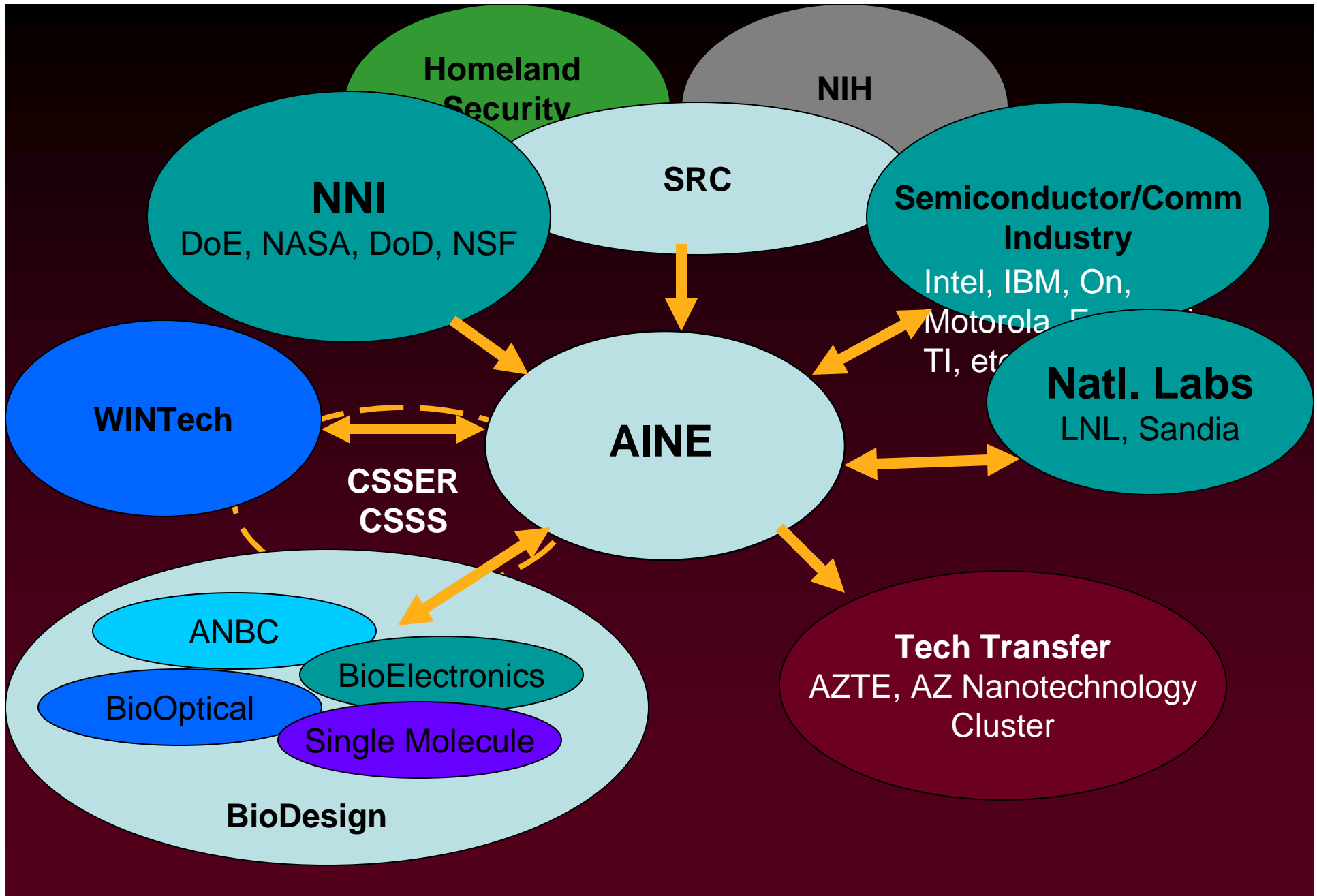
- **Stephen Goodnick, Chair**
- **Larry Cooper**
- **Peter Bennett**
- **Jeff Drucker**
- **David Ferry**
- **Robert Nemanich**
- **Nathan Newman**
- **David Smith**
- **Trevor Thornton**
- **Yong-Hang Zhang**

External Advisory Board

- **Robert Chau, Director of Transistor Research and Nanotechnology, Intel**
- **Michael Lebby, Director OIDA**
- **Herb Goronkin, Lux Capital**
- **George Maracas, Past Director of Nanotechnology, Motorola ENPS Labs**
- **Meyya Meyyapan, Director, Center for Nanotechnology, NASA Ames Research Ctr.**
- **Tom Picraux, CTO, DoE Center for Integrated Nanotechnologies (CINT), LANL**

Interdisciplinary Hierarchy





Small Times Magazine 2007

RESEARCH

1	Penn State University
2	University of Washington
3	University of Illinois at Urbana-Champaign
4	Cornell University
5	University of Michigan
6	University at Albany-SUNY
7	University of Maryland
8	University of Pittsburgh
9	Rice University
10	University of Minnesota

EDUCATION

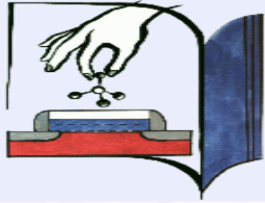
1	University at Albany-SUNY
2	University of Michigan
3	University of Illinois at Urbana-Champaign
4	Penn State University
5	University of Maryland
6	Rice University
7	North Carolina State University
8	University of Washington
9	Arizona State University
10	Cornell University

FACILITIES

1	University at Albany-SUNY
2	University of Illinois at Urbana-Champaign
3	Arizona State University
4	University of Michigan
5	Rutgers University
6	Cornell University
7	University of California Los Angeles
8	Purdue University
9	Rice University
10	Rensselaer Polytechnic Institute

COMMERCIALIZATION

1	Arizona State University
2	University at Albany-SUNY
3	North Carolina State University
4	Penn State University
5	Cornell University
6	Stanford University
7	University of Michigan
8	University of Washington
9	University of Louisville
10	Louisiana Tech



Symposium and School on Nano and Giga Challenges in Electronics and Photonics (NGC2007):

from Atoms to Materials to Devices
to System Architecture

Phoenix, Arizona, March 12-16, 2007



<http://asdn.net/ngc2007/>

Co-chairmen: *Herbert Goronkin, Stephen Goodnick, Anatoli Korkin*

Summary

- About 300 participants from 41 countries
- Broad presentation: Nobel laureates, science and business leaders and government officials
- Sponsored and supported by 37 organizations: funding, government and media agencies, companies and universities
- Published special issues in Nanotechnology and Solid State Electronics and tutorial book with Springer

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