US-Japan Collaborations in Computer Science/Electrical Engineering

Lawrence S. Goldberg
Senior Engineering Advisor
Division of Electrical, Communications and Cyber Systems
U. S. National Science Foundation
lgoldber@nsf.gov

NSF Tokyo Office
50th Anniversary Symposium
Tokyo, Japan
October 6, 2010

Outline

- US-Japan Joint Optoelectronics Project (JOP) 1995-2001
- NSF-MEXT Biannual Workshops in Nanotechnology 2003-2005
- NSF/CISE and Japan Science and Technology Agency (JST) – Collaboration in Robotics
- NSF/OISE Partnerships for International Research and Education (PIRE) – Junichiro Kono, Rice University
- NNIN-NIMS Undergraduate and Graduate Student Summer Programs

US-Japan Joint Optoelectronics Project (JOP)

- Conceived in 1990 by OSTP to channel US participation in Japan's Real World Computing Program (RWCP) into area of mutual benefits
  - Planning conducted Under Auspices of US-Japan Agreement on S&T
- Program implemented in 1995 and concluded in Dec 2001
- Developed a symmetric model for US-Japan cooperation in research
  - improved availability of novel prototype optoelectronic devices, circuits and modules, and stimulated their applications to computing
  - streamlined handling of export, import, and intellectual property
- US-Japan Joint Management Committee
  - US: NIST, NSF, DARPA, DOE, DOS // Japan: MITI , RWCP
- METI supported Broker Services in both US and Japan
  - US: Optoelectronics Industry Development Association (OIDA)
  - Japan: Optoelectronic Industry & Technology Development Assoc (OITDA)
- NSF and DARPA provided competitive funds for US university Users of these services
  - 105 enrolled university Users and 29 enrolled industry Suppliers (large and small companies) in both countries

JOP Concluding Ceremony – Tokyo, 2001

NSF-MEXT Biannual Workshops in Nanotechnology 2003-2005

Organized by Dr. Rajinder Khosla, ECCS/NSF, while posted at US Embassy in Tokyo as Science Fellow

- January 2003: Cornell University – Tools and Metrology in Nanotechnology
- October 2003: Yokohama – Nanomedicine and Drug Delivery
- January 2004: UC Santa Barbara – Self-Assembly and Self-Organization
- October 2004: Tokyo – Nanophotonics
- September 2005: Stanford University – Nanotubes and Fullerenes

NSF/CISE and Japan Science and Technology Agency (JST) – Collaboration in Robotics

- ❖ Cooperation in Science and Technology for a Secure and Safe Society
  - » Joint workshops and cooperative projects since 2004
- ❖ Current efforts to develop closer collaborative joint research funding efforts in robotics;
- o Support collaborative research and education planning workshops in robotics; and
- o Collaborate more effectively in robotics in the Framework Initiative for Safety, Security and Quality of Life
  - 2008 Workshop Focus Areas
    - » Human-Robot Interaction and Social Robots
    - » Search and Rescue Robots
    - » Learning and Cognitive Robots
    - » Cyber-Physical Systems (CPS), Surgical and Rehabilitation Robots, and Assistive Robotics Technology

Stefan Schaal, USC

Associate Professor, Computer Science and Neuroscience, & ATR Computational Neuroscience Laboratory, Kyoto, Japan.

The Computational Learning and Motor Control Lab is also part of the Computational Neuroscience and Humanoid Robotics Dept located at the ATR Laboratories in Japan.

Members of the lab have ample opportunities to visit the Japanese research facilities for short or extended times, as we have a lab-owned permanent apartment next to ATR.

Cynthia Breazeal
Associate Professor of Media Arts & Sciences
Director of Personal Robotics Group
Massachusetts Institute of Technology

The Personal Robots Group focuses on developing the principles, techniques, and technologies for personal robots. Ongoing research includes the development of socially intelligent robot partners that interact with humans in human-centric terms, work with humans as peers, and learn from people as an apprentice.
The ability of these robot systems to naturally interact, learn from, and effectively cooperate with people has been evaluated in numerous human subjects experiments, both inside the lab and in real-world environments.

Office of International Science and Engineering (OISE)

Partnerships for International Research and Education (PIRE)

- Building research and education partnerships with foreign counterparts;
- Supporting science and engineering research excellence;
- Providing strong international research experiences for US students; and
- Engaging resources, strengthen ability of US institutions to internationalize S&E

PIRE 2006-2010

U.S.-Japan Cooperative Research & Education:

Semiconductor Nanostructures & Carbon Nanotubes for Nanophotonics & Nanoelectronics

Junichiro Kono, Alexey Belyanin, Chris Stanton, Cheryl Matherly, and Sarah Phillips

The University of Tulsa · Texas A&M University · UF University of Florida · Rice

PIRE Renewal 2011-2015

THz Science and Technology of Carbon Nanomaterials

Rice University:

Junichiro Kono
Pulickel M. Ajayan
Rui-Rui Du
Daniel M. Mittleman

SUNY Buffalo:

Jonathan P. Bird
Vladimir V. Mitin

Southern Illinois University:

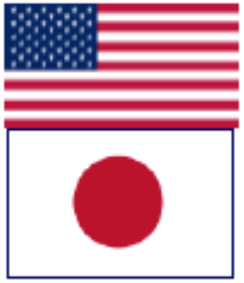
Aldo D. Migone
Saikat Talapatra

Texas A&M University:

Alexey A. Belyanin

University of Florida:

Christopher J. Stanton



Japan:

Nobuyuki Aoki (Chiba U.)
Morinobu Endo (Shinshu U.)
Kazuhiko Hirakawa (U. of Tokyo)
Iwao Hosako (NICT)
Yasutaka Imanaka (NIMS)
Yukio Kawano (RIKEN)
Shigeo Maruyama (U. of Tokyo)
Yuichi Ochiai (Chiba U.)
Taiichi Otsuji (Tohoku U.)
Victor Ryzhii (U. of Aizu)
Riichiro Saito (Tohoku U.)
Maki Suemitsu (Tohoku U.)
Kazuhisa Sueoka (Hokkaido U.)
Masayoshi Tonouchi (Osaka U.)

RICE UNIVERSITY

NanoJapan Program

SUMMER NANOTECHNOLOGY STUDY PROGRAM IN JAPAN

- Select 16 undergraduate students (freshmen & sophomores)
- 3-week orientation
  - Intensive language instruction
  - Culture and society of Japan
  - Introduction to the science
- 8-week research internships with university and government labs in Japan
- Post-program research conference (Rice Quantum Institute Colloquium)

NanoJapan 2008 students with Arden L. Bement (NSF Director) and Machi Dilworth (NSF Tokyo Director), at Tokyo Intitute of Technology

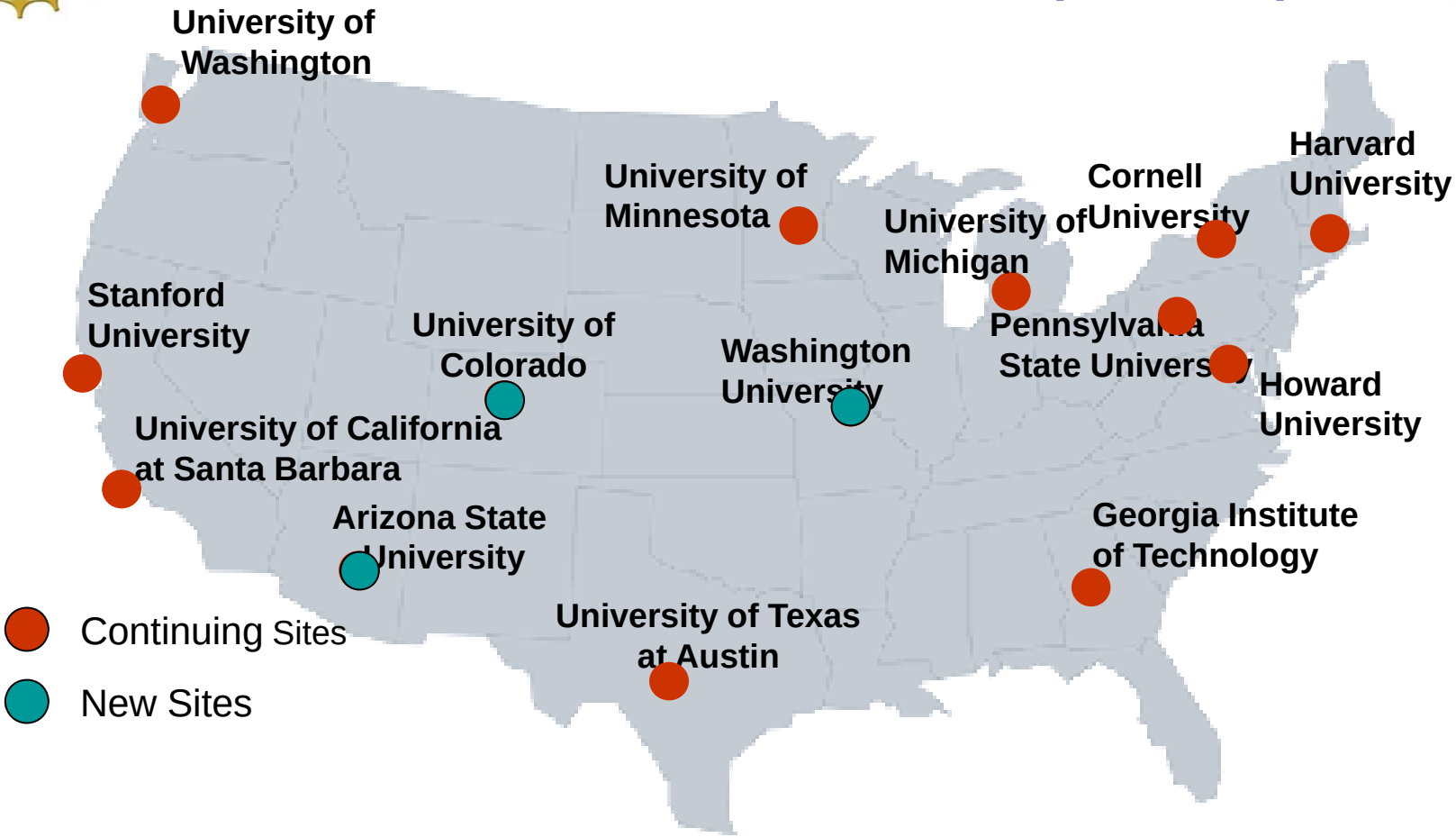
RICE UNIVERSITY

Institutional Impact

- MOUs with Keio University, Tokyo Tech., Hokkaido, and Osaka Tech.
- Reciprocal visits of Japanese students and post-docs to Rice
- Internationalizing Rice Quantum Institute through NanoJapan participation
- Utilizing PIRE and NanoJapan as recruiting tool, e.g., via engineering freshman seminars
- International engineering panel discussions, including NanoJapan alumni

RICE UNIVERSITY

National Nanotechnology Infrastructure Network (NNIN)



An integrated national network of user facilities providing researchers open access to resources, instrumentation and expertise in all domains of nanoscale science, engineering and technology

http://www.NNIN.org

NNIN International Research Experience for Undergraduates (iREU)

A second year experience for prior undergraduate summer interns

- National Institute of Materials Science (NIMS) in Japan
- Forschungszentrum, Jülich Germany Helmholtz Research Institute
- IMEC-Leuven, Belgium - (begun in 2010)
  - 2008 – 8 participants (5 to NIMS) - funded by NSF (OISE*, ENG)
  - 2009 – 10 participants (6 to NIMS) - funded by NNIN & OISE*
  - 2010 – 18 participants (9 to NIMS) - funded by NNIN & OISE*

(*OISE International Research Experience for Students (IRES) program)

National Institute of Materials Science, Tsukuba, Japan

Forshungszentrum Jülich (Germany)

NNIN-NIMS (Nanonet) International Research Experience for Graduate students (iREG)

NIMS Graduate Students
Summer Research Program

NIMS provides support costs (travel, lodging, etc) for visiting students

3-5 NIMS graduate students (from Nanonet) to NNIN sites

NNIN Sites Summer ’08,’09,’10

NNIN Sites provide lab/user costs

NNIN site faculty identified through research

Japan Nanonet Graduate Students to NNIN (iREG)

2008

- Harvard University
  YASUI Takao, Nagoya U.
  Soft Lithography
  Dr. Jiangdong Deng
- University of Texas
  Atsushi Tanaka , Nara Inst. of Tech.
  Semiconductor Nanowires
  Prof. Brian Korgel
- Penn State University
  Chuanyu Shao, Tohuku. U.
  PZT Materials for MEMS Devices
  Prof. Susan Trolier-McKinstry
  Kazunori Ohash, Nagoya U.
  Studies surface processes using UHV-STM
  Prof. Paul Weiss
- UC Santa Barbara
  Yoshiyuk Nonoguchi, Nara Inst. of Tech.
  Semiconductor Nanoparticles
  Prof. Galen Stucky

2009

- Cornell University
  Chiaki Kobayashi, Waseda U.
  Biosensing FET structure
  Prof. Edwin Kan
  Tatsuro Morimoto, Kyushu U.
  Mesoscopic metalic structures from metal nanoparticles and block copolymers
  Prof. Ulrich Wiesner
- University of Texas
  Kenta Aoyagi, Tohuku U.
  Semiconductor Nanowires
  Prof. Brian Korgel