JUNBA

JAPANESE UNIVERSITY NETWORK IN THE BAY AREA

Welcome to the 1st JUNBA Symposium

We are honored to welcome you to the inaugural Japanese University Network in the Bay Area (JUNBA) Symposium on nano-material science, covering the latest advances in nanomaterials, nano-biology and nanotechnology.

As you might know, Japan's national universities were reorganized into independent semi-private institutions in April of 2004. This immense change has created a greater priority among all universities in Japan to introduce programs that better tackle collaborative international research, a globalized economy, interdisciplinary study and other emerging trends.

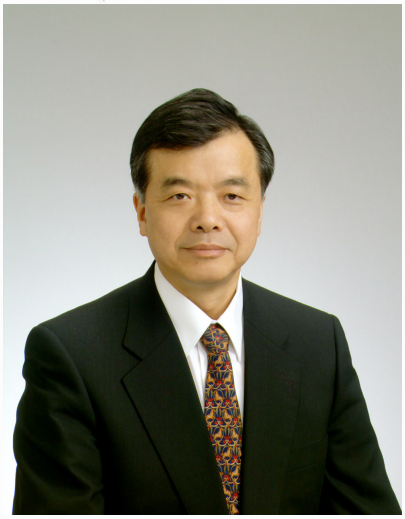
Towards that, Japanese universities have started to launch overseas offices in China, Europe and the US. In particular, many have chosen the San Francisco – Bay Area, since this region has a highly-educated work force, an environment constantly pushing technology's capabilities and the largest influx of venture capital in the world. Due to both of these "perfect storms", Japanese universities Bay Area presence has increased rapidly in the past few years, leading to the creation of JUNBA in August 2006.

JUNBA aspires to speed up internationalization of Japanese universities, support exchange students, collaborate on science and technology symposia and increase the rate of technology transfer from Japanese universities. In order to be more effective, we are working closely with other universities, private companies, non-profit organizations and government offices. We sincerely hope that this new synergy will stimulate more collaborative education and research opportunities between the US and Japan.

We fervently hope that this symposium's cross-disciplinary approach will spark practical applications beyond academia and help develop such relationships. We look forward to meeting you!

Yoshikatsu MUROOKA, President of JUNBA

CONSULATE GENERAL OF JAPAN
50 FREMONT STREET, 23RD FLOOR
SAN FRANCISCO, CALIFORNIA 94105



I congratulate the members of the Japanese University Network in the Bay Area (JUNBA) on the Network's first Academia Summit and Symposium, and I extend a warm welcome to all of its participants. It is very appropriate to begin this new year with these gatherings that take advantage of and facilitate the close ties between Japan and the United States.

Japan and the San Francisco Bay Area have a history of friendship and partnership, and this is particularly true in the areas of academic and business cooperation. The formation of JUNBA is a natural expression of such cooperation, and it reflects the aspiration for a greater cooperation.

Cooperation has become increasingly important in our lives – between universities, between researchers, between business efforts, and, of course, between nations. I applaud the cooperation that the JUNBA Academia Summit and Symposium promote, and I wish JUNBA much success in achieving its goals. These gatherings are an important step in that direction.

Sincerely,

Makoto Yamanaka
Consul General

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JAPANESE UNIVERSITY NETWORK IN THE BAY AREA

- The First JUNBA Symposium -

DATE January 12th, 2007
SYMPOSIUM 1:30pm—7:30pm
RECEPTION 7:30pm—9:00pm
VENUE Bio X—Clark Center Auditorium
Stanford University

HOSTED BY JUNBA
CO-ORGANIZED BY
Consulate General of Japan in San Francisco
Japan Society for the Promotion of Science
SUPPORTER BY JETRO San Francisco

presider Toshihiko NISHIMURA
JUNBA Board Member/ Director—Tohoku University US Office

Opening Remarks 1:30pm—2:00pm

Yoshikatsu MUROOKA *(President-JUNBA)*
Isao KISO *(Executive Director-Japan Society for the Promotion of Science JSPS)*
Ronald PEARL *(Professor & Chairman-Department of Anesthesia, Stanford University School of Medicine)*

Keynote Talk

2:00pm-2:30pm	George HARA President, DEFTA PARTNERS GROUP	Globalization of Business– Academia Collaborations

Introduction

2:30pm-2:40pm	Yoshio NISHI Professor of Electrical Engineering Director, Stanford Nanofabrication Facility, Stanford University	Brief Introduction to Nano–Material Science

Session1- Moderator: Prof. Yoshio NISHI, Stanford University

2:40pm-3:10pm	Robert SINCLAIR Professor of Material Science and Engineering, Stanford University	Recent Advances in Nano– Characterization of Materials
3:10pm-3:40pm	Hideo OHNO Professor, Research Institute of Electrical Communication, Laboratory for Nanoelectronics and Spintronics, Tohoku University	Spintronics – From Materials to Circuit –

Coffee Break 3:40pm – 3:50pm

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Session 1 cont.

3:50pm-4:20pm	**H.S.Philip WONG** Professor of Electrical Engineering, Stanford University	Nanotechnology for the Semiconductor Industry
4:20pm-4:50pm	**Takashi YOKOYAMA** Associate Professor, International Graduate School of Arts and Sciences, Yokohama City University	Controlled Assembly of Surface-Supported Molecular Nanostructures
4:50pm-5:20pm	**David LUNDBERG** Director, International Strategic Alliances Office of External Affairs, California NanoSystems Institute (CNSI), University of California, Los Angeles	The California NanoSystems Institute (CNSI) at UCLA: An Overview of CNSI and Summary of its Collaborative Relationships with Asia Universities, Research Institutes, and Corporations

Coffee Break 5:20pm—5:30pm

Session2—Moderator: Prof. Yoshio NISHI, Stanford University

5:30pm-6:00pm	**Hirochika NAKAJIMA** Professor, Faculty of Science and Engineering, Waseda University	Intrinsic/Artificial Nanostructure in Ferroelectric Single Crystals for Functional Photonic Devices
6:00pm-6:30pm	**Atsushi TAKAHARA** Professor, Institute for Materials Chemistry and Engineering , Kyushu University	Surface Nanostructure Control of Polymeric Solids
6:30pm-7:00pm	**Tomoji KAWAI** Director, Institute of Scientific and Industrial Research, Osaka University	DNA Nano-Science
7:00pm-7:30pm	**Yasuo SUDA** Professor, Graduate School of Science and Engineering, Director of Venture Business Laboratory Kagoshima University	Sugar Chips and Sugar-immobilized Gold Nano-particles (SGNPs) : Advanced Analytical Systems for the Binding Interaction of Sugar Chains with Proteins, Cells or Viruses

Reception 7:30pm—9:00pm

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Keynote Talk

George HARA

Group Chairman and CEO, DEFTA Partners
Prime Minister's Government Special Commissioner on Tax Reform.
Advisor to the Minister of Finance
UN Representative Ambassador of WAFUNIF, UNONG.

Mr. Hara is internationally known as a leading edge capitalist and visionary architect in the field of post-computer technology, namely *Pervasive Ubiquitous Communications* (PUC). DEFTA Partners is the pioneer in the creation of post computer enterprises in the US, EU and Asia. At the age of 29, he successfully started up a fiber optic display company in Silicon Valley, which later led to the formation of his technology venture capital. He is currently Chairman of XVD, (world leader of the HDTV codec) and Board member of Fortinet (leading security gateway). In Feb.2005, he merged Oplus Technologies (the leader of LCD and plasma display chip) with INTEL. He served as chairman of Oplus and Borland (3rd largest PC software company in the world in 90'). He has also been board member or major investor of PictureTel (world leader of video conference), SCO (the largest PC Unix), Accerelate Network (pioneer of ADSL), Zoran (world major DVD chip), Wollongong (world 1st commercialized TCP-IP) and Tradex (inventor of B2B engine, merged with Ariba at 1.8 billion USD).

DEFTA also started ICT projects in the least developing countries for Asia, Latin America and Africa. in Oct. of 2005. In the public sector, he serves Honorary Co-Chairman of the Republican Business Advisory Council in the US. And has served on the boards of the Alliance Forum Foundation (chairman), the San Francisco Opera, Zoo, Univ. of San Francisco, Tokyo Foundation, and Hara Research Foundations which offers more than 250 fellowships for interdisciplinary research. He was a UN Fellow and holds LL.B. from Keio Univ. and an MS from the School of Engineering at Stanford University.

Introduction

Yoshio NISHI

Professor of Electrical Engineering, Stanford University
Director of Stanford Nanofabrication Facility
Research Director, Center for Integrated Systems

A few of Professor Nishi's research areas focus upon MOS device physics and technology, nanoscale devices, 3 dimensional integrated circuits, and nonvolatile memory.

His specific research interests entail metal gate work function science and engineering, high mobility channel and transport, nanowire based memory, device layer transfer, and ferroelectric memory.

Special projects include:
Initiative for Nanoscale Materials and Processes

"Since joining TI in 1995, Yoshio has led a transformation of the R&D function to an effective and well aligned organization providing substantial competitive technical advantage to our digital signal processor (DSP) and analog businesses. His continued efforts as TI's chief scientist and director of Stanford's Nanofabrication facility will help maintain TI's position at the forefront of semiconductor process technology," said Rich Templeton, TI chief operating officer and executive vice president.*

*Texas Instruments, News Releases. 2002. 22 April 2002
<http://www.ti.com/corp/docs/press/company/2002/c02026.shtml>.

Session 1

Robert SINCLAIR

Professor of Material Science and Engineering
Stanford University

Dr. Robert Sinclair has been on the faculty in the Department of Materials Science and Engineering at Stanford University since 1977. He is currently Professor and Chair, and is also Director of the Stanford Nanocharacterization Laboratory. During 2003-2006 he chaired a National Academy of Sciences study on Mid-size facilities for materials research.

Prior to joining Stanford, he was a postdoctoral researcher at the University of California, Berkeley. He obtained all his degrees in materials science from Cambridge University, UK. His research focuses on the investigation of materials for semiconductor devices and computer hard discs at the nano-scale using advanced electron microscopy techniques, and his group has pioneered the development of in situ high resolution electron microscopy.

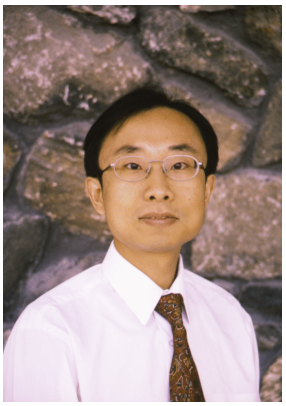
Session 1

Hideo OHNO
Professor
Laboratory for Nanoelectronics and Spintronics
Research Institute of Electrical Communication
Tohoku University

Spintronics is the field in which both charge and spin degrees of freedom are used to realize functions otherwise not accessible. A wide variety of research is being carried out from those that are more exploratory in nature to close to the real world applications, from novel ferromagnetic semiconductors and spin-based semiconductor devices to magnetic material-semiconductor hybrid structures for random access memory applications as well as for non-volatile logic applications. Here, I give an overview of recent developments and perspective; first focusing on metal-based spintronics and then on semiconductor spintronics.

Work at Tohoku University was partly supported by the IT-Program of RR2002 by MEXT.

Session 1



H.-S. Philip WONG

Professor of Electrical Engineering
Stanford University

H.-S. Philip Wong received the B.Sc. (Hons.) in 1982 from the University of Hong Kong, the M.S. in 1983 from the State University of New York at Stony Brook, and the Ph.D. in 1988 from Lehigh University, all in electrical engineering. He joined the IBM T. J. Watson Research Center, Yorktown Heights, New York, in 1988. In September, 2004, he joined Stanford University as Professor of Electrical Engineering.

While at IBM, he worked on CCD and CMOS image sensors, double-gate/multi-gate MOSFET, device simulations for advanced/novel MOSFET, strained silicon, wafer bonding, ultra-thin body SOI, extremely short gate FET, germanium MOSFET, carbon nanotube FET, and phase change memory. He held various positions from Research Staff Member to Manager, and Senior Manager. While he was Senior Manager, he had the responsibility of shaping and executing IBM's strategy on nanoscale science and technology as well as exploratory silicon devices and semiconductor technology.

His research interests are in nanoscale science and technology, semiconductor technology, solid state devices, and electronic imaging. He is interested in exploring new materials, novel fabrication techniques, and novel device concepts for future nanoelectronics systems. Novel devices often require new concepts in circuit and system designs. His research also includes explorations into circuits and systems that are device-driven. His present research covers a broad range of topics including carbon nanotubes, semiconductor nanowires, self-assembly, exploratory logic devices, and novel memory devices.

He is a Fellow of the IEEE and serves on the IEEE Electron Devices Society (EDS) as elected AdCom member. He serves on the IEDM committee from 1998 to 2006 and is the Technical Program Chair in 2006. He served on the ISSCC program committee from 1998 – 2004, and was the Chair of the Image Sensors, Displays, and MEMS subcommittee from 2003-2004. He is the Editor-in-Chief of the IEEE Transactions on Nanotechnology. He is a Distinguished Lecturer of the IEEE EDS and Solid-State Circuit Society. He has taught several short courses at the IEDM, ISSCC, Symp. VLSI Technology, SOI conference, ESSDERC, and SPIE conferences. He is a member of the Emerging Research Devices Working Group of the International Technology Roadmap for Semiconductors (ITRS).

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Session 1

Takashi YOKOYAMA
Associate Professor
International Graduate School of Arts and Sciences
Yokohama City University

The realization of molecular-based nanodevices with advanced functions requires the development of new and efficient approaches for assembling molecular building blocks into desired functional structures. Supramolecular chemistry has used selective and directional non-covalent intermolecular interactions to spontaneously combine individual building blocks, although it has been studied mainly in solution.

In this study, we report on the self-assembly of adsorbed molecules into larger structures directed by controlling selective intermolecular interactions. We have obtained surface-supported molecular nanostructures whose size and aggregation patterns are rationally controlled by tuning the non-covalent interactions. Using low-temperature scanning tunneling microscopy (STM), we show that substituted porphyrin molecules adsorbed on a gold surface form monomers, trimers, tetramers, or extended wire-like structures, corresponding in a predictable fashion. These selective aggregations of the porphyrin molecules result from the characteristic intermolecular interactions of substituent groups. In principle, these systems should be capable of exhibiting useful electronic and optical functions.

Session 1

David LUNDBERG

Director of International Strategic Alliances Office of External Affairs
International Rep. for California NanoSystems Institute

David Lundberg received a PhD from the University of California, Berkeley, in 1975. In 1982 he joined the faculty at Tufts University, and was made Associate Dean for Faculty Development in 1988. He also served as co-director of an exchange program with Fudan University in Shanghai, funded by USIA. He was appointed a dean at MIT in 1988, and while there traveled extensively in Asia, becoming the Institute's designated representative in Southeast Asia. He was responsible, either directly or indirectly, for over $10 million in gifts or contracts from MIT alumni or other Asian sources.

Dr. Lundberg joined the Office of External Affairs at UCLA in 1994, becoming Director of Development for the Basic Sciences and later Deputy Vice Provost in the College of Letters & Science. He presently holds the title of Executive Director, International Strategic Alliances. He oversees all of UCLA's relations with Asia and in this role negotiated MOUs with the National University of Singapore and Nanyang Technological University. He recently completed an MOU for biotech research with Technology Park Malaysia in Kula Lumpur. Currently he is the international representative for the California NanoSystems Institute, a $300 million project funded by the state of California which will occupy an 185,000 square foot building on the UCLA campus devoted exclusively to research into nanotechnology and and nanoscience.

Dr. Lundberg represents the UCLA Office of Intellectual Property, and directs efforts to market University IP in Asia.

In addition to his international activities, Lundberg founded and now manages two Silicon Valley venture capital funds for UCLA. He also administers an internal investment program funded by three venture capital firms (DraperFisherJurvetson, Zone Ventures, Cycad Ventures) which facilitates the commercialization of faculty research.

Session 2

Hirochika NAKAJIMA
Professor
Graduate School of Science and Engineering
Waseda University

LiNbO3 and/or LiTaO3 are the most useful ferroelectric single crystals with high electro-optic coefficients and nonlinearities. They were founded in 1960s and introduced to practical photonic applications in 1990s. For example, high speed external Mach-Zehnder modulators are essential components of long distance telecommunication systems and internet networks.

Ti:LiNbO3 waveguide circuits are still developed for 40Gbps cording and other applications. Not only communication oriented but also non-telecom oriented applications expect their potential such as wide band wavelength conversion for medical and environmental uses.

Recently, stoichiometric compositon of Li/Nb or Li/Ta single crystals are available by the double crucible CZ method. Stoichiometric defects and composition dependent characteristics deference are interesting and important issues for practical applications.

In my talk, another side of nano-materials aspect will be covered as follows:

- Periodic domain reversal physics and technology for quasi phase matching
- Doped LiNbO3 and properties
- Er:LiNb3 and amplification properties with functional applications

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Session 2

Atsushi TAKAHARA

Professor
Department of Applied Molecular Chemistry
Institute for Materials Chemistry and Engineering
Kyushu University

Atsushi Takahara received his D. Eng in 1983 from Kyushu University, JAPAN. In 1999, he was appointed as a professor of Kyushu University and from 2003, he is a professor of Institute for Materials Chemistry and Engineering, Kyushu University. Since 2004, he is a program officer of JSPS(until March 2007), and from 2005, he is a member of the Science Council of Japan(SCJ). He received several awards including the Rheology Award from the Society of Rheology, Japan (1995), the Fiber Science Award from the Society of Fiber Science and Technology. Japan (1999), the Polymer Science Award from the Society of Polymer Science, Japan(2003). His research interests include physical properties of polymer thin films, surface/interface science of organic solids, and polymer hybrids.

Surface Nanostructure Control of Polymeric Solids

Surface nanostructure of polymeric solids controls various functional properties such as wetting, adhesion, biocompatibility, tribology and electrical properties. However, the relationships between surface nanostructure and surface functional properties have not been clarified yet. In this presentation, the precise surface nanofabrication methods accompanying surface-nanolayer chemical modification of polymeric solids and inorganic substrate surface will be introduced. Novel surface nanostructure characterization methods utilizing surface X-ray diffraction and scanning force microscopy are applied for these nanofabricated surfaces. On the basis of the characterization data, the surface structure and surface functional properties relationships of polymeric solids will be discussed.

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Session 2

Tomoji KAWAI

Professor, Director
Institute of Scientific and Industrial Research (ISIR)
Osaka University

"The idea that DNA and other molecules could naturally form circuits when placed on substrates" is a dream whose realization would be truly revolutionary. One of the efforts being taken in this direction is the development of methods to align and control bio-molecules with the accuracy of nano-scale, taking advantages of "programmed self-assembly" based on DNA sequences.

"Bottom-up nanotechnology" is the key technology of manipulating and constructing molecular components with nanometer size. A good example is the human body, whose highly advanced parts are assembled from nanometer components such as DNA and proteins. Using "program" as a keyword, we have developed high resolution STM imaging of DNA and related molecules, and formation of DNA circuits that are constructed through programmed self-assembly combined with top-down method.

In this presentation, I will briefly discuss following topics.

1. Bottom-up nanotechnology and DNA
2. High resolution imaging of DNA nanostructures
3. Electronic properties of DNA: XPS, XAS, resonant photoemission, resonant Auger and Raman spectroscopy
4. Formation of DNA-based molecular devices made by programmed self-organization processes
5. DNA and protein sensors made by nano-scale patterning
6. Future DNA based devices

Session 2

Yasuo SUDA
Professor of Dept. of Nanostructure and Advanced Materials, Graduate School of Science and Engineering
Kagoshima University
President & CSO, SUDx-Biotec Corporation

Sugar-chains containing 2 to 10 sugar moieties are responsible for many biological functions and play crucial roles in cellular binding and signaling. Specific structural attributes of the sugar-chains determine their biological functions, through distinct binding interactions with proteins, cells, or viruses. We developed sugar-chain immobilized gold-coated chip (named Sugar Chip) for the sensor chip of Surface Plasmon Resonance (SPR) apparatus. SPR is a very powerful tool for the real-time study of the specific interactions between biological molecules, since the experiment can be done without any labeling of targets. The combined method with Sugar Chip and SPR would possess high potency for a high-throughput screening of new drug discovery or for a novel diagnosis. Various sugar-chains were immobilized on chips and their interactions with proteins were systematically evaluated. The bound proteins on the Sugar Chips were further analyzed with MALDI-TOF/MS. Also, the Sugar Chips were able to use for sorting cells or profiling influenza viruses.

Even though SPR is very powerful analytical method, it can hardly be performed on-site, such as a patient's bedside in the hospital or out-door like at farm. To establish an on-site analysis, we applied our immobilization method to gold nano-particles (GNP) to prepare sugar-immobilized gold nano-particles (SGNP).