

MANA Progress Report

Management 2009



World Premier International (WPI) Research Center
International Center for
Materials Nanoarchitectonics (MANA)



National Institute for Materials Science (NIMS)

Preface

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Two and a half years have passed since our International Center for Materials Nanoarchitectonics (MANA) was founded in the National Institute for Materials Science (NIMS) in October 2007 as one of five research centers approved/supported by the World Premier International Research Center Initiative (WPI Program) of the Ministry of Education, Culture, Science and Technology (MEXT). Thankfully, MANA has got off to a good start in both scientific research and administrative operation.

The aim of MANA is to carry out world topnotch research for the creation of novel materials necessary for the development of innovative technologies that are inevitable for the realization of the sustainable society in the 21st century. We are going to attain this goal on the basis of our new technology system referred to as ‘Materials Nanoarchitectonics’. The research in MANA is grouped into four fields, i.e., Nano-Materials, Nano-System, Nano-Green and Nano-Bio, although close collaboration among the four fields is regarded as most important.

For our readers’ convenience, the MANA Progress Report consists of two booklets named “Management 2009” and “Research Digest 2009”. This booklet, which is the part “Management 2009”, serves as a summary to highlight the progress of the MANA project in 2009. The other booklet “Research Digest 2009” contains an overview of MANA research activities in the calendar year 2009.

Lastly, on behalf of MANA, I would like to ask you for your continued understanding and support to MANA.

MANA Progress Report

Management 2009

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1. Summary of MANA Center Project Program 2009

● Workforce

As of November 2009, MANA now employs 220 staff. Of this number, 186 are researchers. There are 99 foreign researchers, or 53% of the total, and the 23 female researchers constitute 12.4% of the total.

In January 2010, the total number of Principle Investigators will stand at 30 (21 from NIMS and 9 at the Satellites) with 10 in Nano-Materials, 11 in Nano-System, 7 in Nano-Green and 2 in Nano-Bio. In order to strengthen Nano-Green field, two PIs will be added and the Nano-Interface Group was established as part of Nano-Green and a faculty member from Hokkaido University was hired as a MANA Scientist.

● Research

Among MANA's research topics, research on nano-sheets and atom switches has especially gained prominence. MANA anticipates practical applications for this output in the near future, and MANA will further promote cooperation in this field of research. Additionally, MANA feels it is crucial for young researchers from various disciplines to conduct joint research in order to create new research seeds via fusion research. Starting this fiscal year MANA adopted a fusion research subsidy system and launched 6 projects.

● Management

MANA Administrative Section has provided all researchers with quick-acting, far-reaching, Japanese-style service regardless of nationality and thus realized its mission of "providing an environment in which researchers can devote themselves to their research by reducing non-research work".

● Satellites

MANA has actively engaged in research exchange with satellites, holding joint workshops with Cambridge and CNRS this fiscal year. The satellites also play important roles in cultivating young researchers. MANA holds summer school programs annually with Cambridge and UCLA, and the PI at Georgia Tech is serving as a mentor for an Independent Scientist at MANA. Said Independent Scientist has visited Atlanta 4 times to conduct research.

● Collaboration with Universities

To strengthen ties with universities, MANA has held or will hold workshops with 6 overseas and domestic universities. Furthermore, 17 researchers at MANA hold teaching positions and are supervising the research of 22 PhD students in the NIMS Graduate Schools that includes the University of Tsukuba, Hokkaido University, and Waseda University. In addition, MANA has accepted 13 students from 6 foreign universities with which NIMS has concluded International Joint Graduate School Agreements. MANA has also accepted 32 interns of which 30 have been foreigners.

● Scientists Exchange

Since the 3D System is extremely effective for cultivating a wide array of young researchers with global perspectives, MANA decided to expand the system to also cover some post-doc researchers starting this fiscal year. Thus far in FY2009 there are 7 researchers on this system. On the other hand, using both NIMS and MANA systems, MANA invited a total of 55 senior researchers and young researchers from around the globe thus far.

● Indicators and Methods for Assessing MANA's Level in the World

According to the ESI Database as of November 1st, 2009, NIMS ranked 3rd in the world for the number of citations in the materials science field over the last 5 years (January 2005 to December 2009). MANA has cleared one of its 5-year mid-term objectives of ranking within the top 5 in the world. 47% of the NIMS citations are from articles written by researchers affiliated to MANA. Given the ratio of MANA-affiliated researchers in NIMS (18%), one can see that MANA's contribution is great.

2. WPI Program and MANA

2.1 What is WPI Program ?

The WPI Program (World Premier International Research Center Initiative Program) by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) provides concentrated support for projects to establish and operate research centers that have at their core a group of very high-level investigators. These centers are to create a research environment of a sufficiently high standard to give them a highly visible presence within the global scientific community – that is, to create a vibrant environment that will be of strong incentive to frontline researchers around the world to want to come and work at these centers.

As summarized in Table 2-1, in 2007 NIMS and four national universities were selected for grants, and the International Center for Material Nanoarchitectonics (MANA) was launched on October 1st, 2007.

Table 2-1: The five WPI Research Centers.

Host Institution	WPI Research Center	Research Field
Tohoku University	Advanced Institute for Materials Research (AIMR)	Materials Science
University of Tokyo	Institute for the Physics and Mathematics of the Universe (IPMU)	Astrophysics
Kyoto University	Institute for Integrated Cell-Material Sciences (iCeMS)	Meso-Control Stem Cells
Osaka University	Immunology Frontier Research Center (IFReC)	Immunology
National Institute for Materials Science	International Center for Materials Nanoarchitectonics (MANA)	Nanotechnology & Materials Science

- **Aiming to be highly visible research centers**

The WPI Program has four basic objectives: advancing leading edge research, creating interdisciplinary domains, establishing international research environment and reform research organizations.

To achieve these objectives, WPI research centers are required to tackle the following challenges:

- **Critical mass of outstanding researchers**

- Bringing together top-level researchers within a host research institution
- Inviting top-notch researchers from around the world

- **Attractive research hand living environment of top international standard**

- Strong leadership of center director
- English as the primary language
- Rigorous system for evaluating research system of merit-based compensation
- Strong support function
- Facilities and equipment appropriate for a top world-level research center
- Housing and support for child education and daily living

To assist the WPI research centers in carrying out this mandate, the Japanese government provides them with long-term, large-scale financial support.

- **Long-run financial support from the government**

- Annual average of 1.4 billion JPY per center
- 10-15 years of financial support

2.2 Mission and Research Target of MANA

● What is MANA?

Materials nanoarchitectonics is a new research paradigm of materials development, which attempts to extract and use the ultimate functions of materials based on a profound understanding of the mutual interaction between individual nanostructures and arbitrary arrangement of those nanostructures.

● Mission of MANA

To achieve goals of the WPI program, MANA aims to develop innovative materials by using nano-technology as a fundamental research center, especially for next-generation nano-science and technology.

- To promote interdisciplinary research by materials nanoarchitectonics
- To serve as a “Melting Pot”, where top-level researchers gather from all over the world
- To secure and cultivate outstanding, innovative young scientists
- To construct a network of nanotechnology centers throughout the world

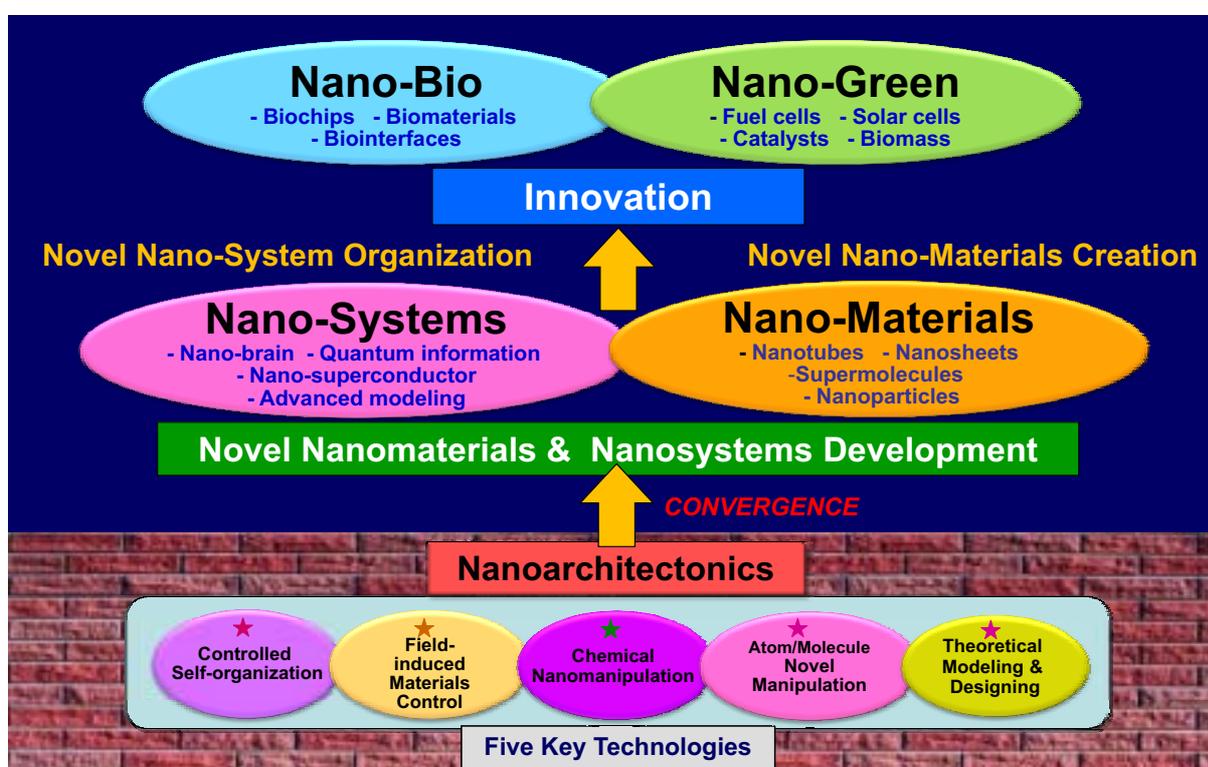


Fig. 2-1: Research Directions of MANA.

● Research Target of MANA

As illustrated in Fig. 2-1, Materials Nanoarchitectonics uses five key technologies. By converging these five key technologies, MANA focuses on the four research fields Nano-Materials, Nano-System, Nano-Green and Nano-Bio to develop novel materials and systems at the nanometer scale and to create epoch-making innovations in materials science and technologies. This contributes to the development of various new technologies that are necessary for the realization of a sustainable society. MANA aims to become a unique hub of materials nano-science and nano-technology.

Detailed research objectives for each field are as follows:

Nano-Materials Field:

By utilizing various new synthetic methods, novel nanoscale materials such as nanotubes/nanowires (1D), nanosheets (2D), nanoparticles (0D) and supermolecules in inorganic/organic/metal systems will be explored and then artificially assembled to produce new innovative functions for energy and environment applications.

Nano-System Field:

In order to create novel functionality as a system through systematic organization of nanostructures, various novel methods for fabrication/organization, property measurement, and theoretical modeling will be developed and utilized practically.

Nano-Green Field:

Highly efficient energy conversion systems from solar energy to electricity and chemical fuel, i.e., hydrogen, from fuel to electricity, and from biomass to fuel, which are essential for sustainable society, will be developed by controlled arrangement of atom and molecules based on rational design, i.e., nanoarchitecture.

Nano-Bio Field:

By integrating materials science and biological science, an interdisciplinary area is explored and developed. Novel bio-compatible materials and functional bio-devices are developed for regenerative medicine, cell therapy, minimum-invasive surgery and clinical diagnostics.

3. MANA Organization, Management and Evaluation

3.1 Organization and Members

In order to realize the MANA concept, it is extremely important to establish efficient organizational operation. An overview of the MANA organization is shown in Fig. 3-1. The role of MANA members are explained in Table 3-1.

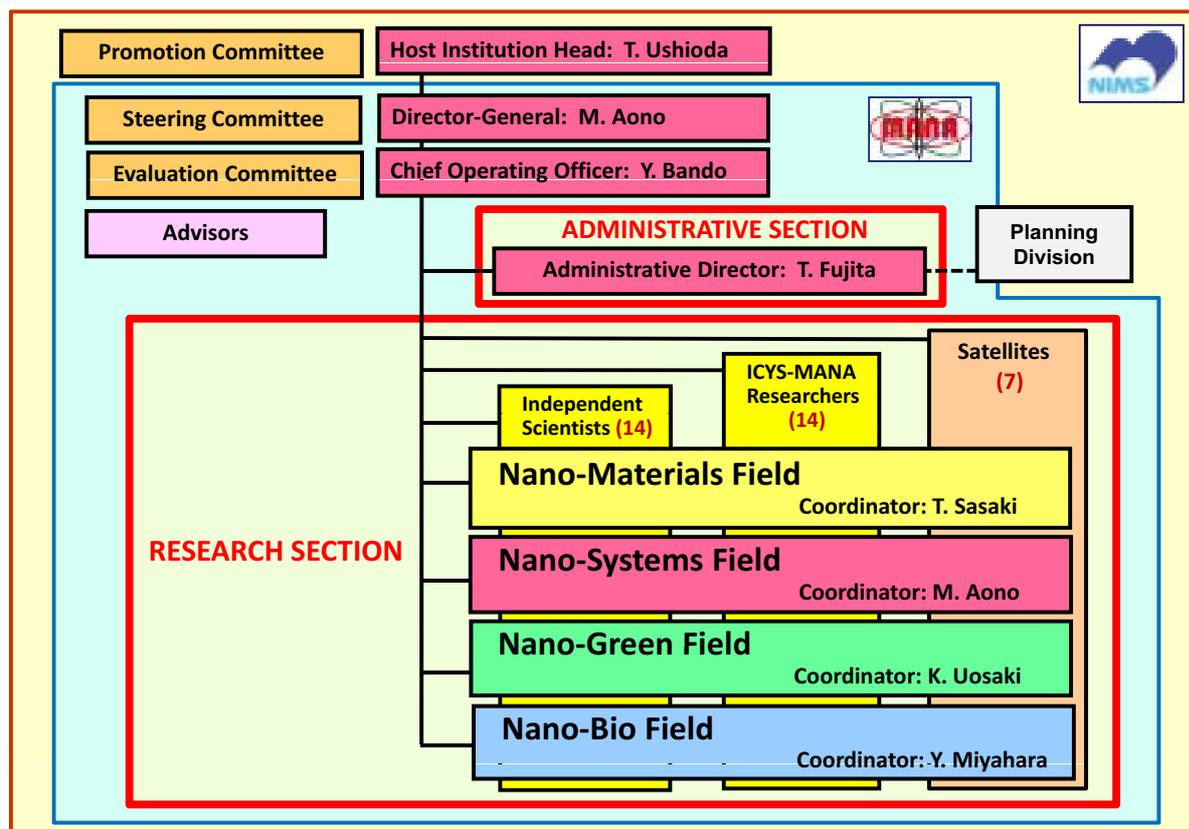


Fig. 3-1: Organization Chart of MANA.

Table 3-1: MANA Members and Duties.

Director-General:	Center oversight
Chief Operating Officer:	Assists the Director-General and supervises research
Administrative Director:	Takes orders from the Director-General and supervises clerical and administrative duties
Principal Investigators (PI):	Researchers responsible for MANA research fields
MANA Scientists:	Permanent researchers that conduct research under the supervision of the PIs
MANA Independent Scientists:	Young permanent researchers that conduct research independent from the PIs
ICYS-MANA Researchers:	Postdoctoral researchers that conduct research independent from the PIs
MANA Research Associates:	Postdoctoral researchers that conduct research under the supervision of the PIs and MANA Independent Scientists
Graduate Students:	Graduate student researchers that conduct researcher in partner graduate school programs
Research Support Staff:	Technicians that support research work
Administrative Staff:	Staff that supports administrative duties

As of January 1, 2010, MANA employs 220 staff (see Fig. 3-2). Of this number, 186 are researchers. There are 99 foreign researchers, or 53% of the total, and the 23 female researchers constitute 12.4% of the total. MANA has developed a multinational work force with foreigners from 15 different countries (see Fig. 3-3). Foreign and female researcher numbers have increased steadily, but given the size of the Center, we feel these are appropriate levels and will continue to maintain them going forward.

Appendix 8.1: MANA Top Management
 Appendix 8.2: MANA Research Staff

As of January 1, 2010				
Classification	Number	Foreigner	Female	
Principal Investigator (NIMS)	21	30	4	1
Principal Investigator (Satellite)	9		5	0
MANA Scientist	44	156	8	5
Independent Scientist	14		3	2
ICYS-MANA Researcher (Postdoc)	14		10	1
MANA Research Associate (Postdoc)	62		51	11
Junior Researcher (Graduate Student)	22		18	3
Technical Staff	17	34	1	8
Administrative Staff	17		1	11
Total	220		101	42

Proportion of foreign Researchers: 53% (99/186)
Numbers of female researchers: 23
(7.9% in FY2008 to 12.4% in FY2009)

Fig. 3-2: Workforce of MANA.

As of January 1, 2010									
Region	Country	PI	MANA Scientist	Independent Scientist	ICYS-MANA Researcher	Research Associate	Graduate student	Staff	Total
Asia	Bangladesh		1						1
	China	3	4		4	33	14		58
	India			1	2	10	2		15
	Iran					1	2		3
	Singapore							1	1
Oceania	Australia					1			1
Europe	France	1		1					2
	Germany					1			1
	Italy	1	2			3			6
	Russia	1		1		1			3
	Spain				1				1
	Sweden				1				1
	Switzerland							1	1
United Kingdom	1	1				1		3	
America	United States	2			2				4
Subtotal		9	8	3	10	51	18	2	101

from 15 countries

Fig. 3-3: Foreign Staff of MANA.

3.2 Management

● Allocation of authority between NIMS and MANA

The NIMS president, as the responsible person of the host institute, supports the operation of the MANA center to the fullest extent, while respecting the authority of the MANA Director-General the operation of MANA. On July 1st, 2009 the presidency of the host institution NIMS changed hands from Dr. Teruo Kishi to Dr. Sukekatsu Ushioda.

The Director-General of MANA has authority over the center's operation in general. This includes employment and renewal of contracts for researchers and administrative staff members of the MANA center, except for those who are enrolled in the main body of NIMS. Regarding MANA personnel appointments, NIMS and MANA confer on tenured staff while MANA has sole discretion over fixed-term staff. Between April and December 2009, MANA has hired 8 tenured staff and 23 fixed-term staff.

● Decision-making system

The MANA center, as its basic principle, intends to establish a decision-making system that can support strong leadership of the MANA-Director General. In addition, MANA intends to minimize the number of meetings in its operation so that the researchers can devote themselves to their studies.

On October 1st, 2008 a Chief Operating Officer (COO) position was created under the Director-General, and management operations have functioned as intended under the direction of 3 executives: the Director-General, the COO and the Administrative Director. By reducing the management burden on the Director-General who is also a PI, the time he has been able to devote to research has significantly increased. Since a system is in place in which the 3 executives confer as needed to make snap decisions on issues, MANA has been able to streamline and speed-up center management.

The Administrative Director serves concurrently as the Head of the Planning Division at NIMS and attends the weekly NIMS Board Meeting thus promoting communication between NIMS and MANA and maintaining NIMS' commitment as the host institution.

A Principal investigators meeting is held on a regular basis. Matters concerning center operation in general will be discussed and reported under the full leadership of the Director-General. Also, the principal investigators must clearly communicate the intentions of the center director to all the young researchers and graduate students.

MANA Advisors are knowledgeable outsiders who provide advice to MANA on the management and other issues. Dr. Teruo Kishi, former President of NIMS, has been appointed as 5th MANA Advisor.

[Appendix 8.3: MANA Advisors](#)

● MANA Administration

In October 2008, the MANA Administrative Section was divided into 3 teams, Planning, Administration and Technical Support, for efficient operation with the use of English as the official language. MANA Administration is providing all researchers with quick-acting, far-reaching, Japanese-style service regardless of nationality and thus realized its mission of "providing an environment in which researchers can devote themselves to their research by reducing non-research work". All the documents regarding, for example, office routine regulations, purchase of items, and official trips are today already available both in Japanese and English.

3.3 Committee Evaluation

● WPI Program Committee

The Evaluation of MANA by the WPI Program Committee consists of an annual Site-Visit at MANA and an annual Follow-Up Meeting. Primary Evaluation criteria are the Achievements of Science as well as the Implementation as a WPI Research Center. After the second Follow-Up Meeting, held on March 17, 2009, the WPI program committee issued the comments shown in Appendix 8.4.

The third Site-Visit at MANA was held on January 7-8, 2010 (see Figs. 3-4 and 3-5). Visiting members of the WPI Program Committee were

Prof. Toshio Kuroki	Program Director (PD)
Prof. Gunzi Saito	Program Officer (PO), NIMS
Prof. Yoshihito Osada	Program Officer (PO), Tohoku University
Prof. Yoshinobu Aoyagi	Working Group Member

Prof. Takehiko Ishiguro	Working Group Member
Prof. Hiroshi Yoshida	Working Group Member
Prof. Dave L. Allara	Working Group Member
Prof. Klaus von Klitzing	Working Group Member

The MANA Progress Report 2009 was presented by MANA Director-General Prof. Masakazu Aono (entitled: “Research: Recent Results and Future Goals”) and by MANA Chief Operating Officer Prof. Yoshio Bando (entitled: Operation: Present Status and Future Plans). Afterwards 9 MANA Principal Investigators held 20 minutes presentations about “Research Activities and Achievements”. The schedule also included “Overall discussions”, “Interviews” and “Observation of MANA research facilities”.

Appendix 8.4: Comments of WPI Program Committee



Fig. 3-4: WPI Program Director Prof. Toshio Kuroki (left) and WPI Program Officer Prof. Gunji Saito (middle) at the third MANA Site-Visit (January 7-8, 2010).



Fig. 3-5: WPI Program Committee members at the third MANA Site-Visit (January 7-8, 2010). From left to right: Prof. Hiroshi Yoshida, Prof. Dave L. Allara, Prof. Yoshihito Osada, Prof. Yoshinobu Aoyagi, Prof. Klaus von Klitzing, Prof. Takehiko Ishiguro.

● MANA Evaluation Committee

An Evaluation Committee consisting of 10 experts from foreign and Japanese institutions (see Appendix 8.5) provides critical comments and expert recommendations on the operation and research strategy of the MANA project. The second MANA Evaluation Committee Meeting was held in Tsukuba on March 5, 2010 (see Fig. 3-6).

Participants from MANA Evaluation Committee:

Prof. Anthony Cheetham (Chair)	University of Cambridge, UK
Prof. Morinobu Endoh	Shinshu University, Japan
Prof. Horst Hahn	Karlsruhe Institute of Technology, Germany
Prof. Yoshio Nishi	Stanford University, USA
Prof. Manfred Rühle	Max-Planck Institute of Metals Research
Prof. Louis Schlapbach	Former Director of EMPA, Switzerland

Participants from NIMS/MANA:

Prof. Sukekatsu Ushioda	NIMS Preseident
Prof. Yukichi Umakoshi	NIMS Vice-President
Prof. Masakazu Aono	MANA Director-General
Prof. Yoshio Bando	MANA Chief Operating Officer
Dr. Takahiro Fujita	MANA Administrative Director

The presentation of the MANA Progress Report 2009 by MANA Director-General Prof. Masakazu Aono and MANA Chief Operating Officer Prof. Yoshio Bando was followed by a longer discussion and comments from the Evaluation Committee members.

[Appendix 8.5: MANA Evaluation Committee](#)



Fig. 3-6: Participants of the second MANA Evaluation Committee meeting on March 5, 2010.

4. Attractive International Research Environment

MANA is one of the most internationalized research centers in Japan. MANA is firmly advancing the development of an outstanding international research environment in an effort to create a “highly visible research center”.

4.1 Melting Pot

Multinational researchers from different fields and with different cultural backgrounds all gather at MANA to create a melting pot environment. Diverse research fields come together in the melting pot to breed new research seeds for innovation. As of January 1, 2010, 99 of MANA's 186 researchers, or 53%, are foreign nationals hailing from 13 different countries. MANA has already cleared the “30% foreign researcher threshold” – one of the conditions for WPI centers.

As part of the Melting Pot activity, researchers from MANA are requested to present their research field at the MANA Seminars. When renowned researchers visit MANA, they held seminars to introduce their research projects to stimulate MANA researchers and promote interdisciplinary synergies. In 2009 MANA seminars were conducted with 35 speakers from MANA and 66 invited renowned researchers from around Japan and the world (total 101 speakers).

[Appendix 8.6: MANA Seminars](#)



Fig. 4-1: Melting Pot Café. In 2009 MANA renovated the cafeteria, presentation and discussion corner in the corridor of the 5th floor of the MANA Building.

4.2 Environment in which Researchers can Focus on Research

MANA employs experienced staff who are fluent in English and has a wide variety of administrative support systems in place to ensure that researchers of all nationalities can focus on their research without difficulty.

The official Language of MANA is English. Seminars and meetings are held in English, and all e-mail communication, intranet content, research plans and administration documentation are in English, thus allowing all researchers – foreign nationals and Japanese alike – to devote themselves to their research.



Fig. 4-2: Left: Full Support for researchers of all nationalities. Right: Yukata (Japanese summer kimono) class for foreign researchers.

4.3 Throughout Support for Foreign Researchers

MANA provides throughout assistance to foreign researchers for matters such as registration procedures, finding housing, and emergencies to get them established in Japan. MANA also offers regular Japanese culture and Japanese language classes for foreign researchers. In 2009, 146 participants joined the Culture Classes and 128 participants attended the Language Classes. There are also public accommodation facilities nearby for foreign researchers who work at MANA, making for an ideal environment.

[Appendix 8.7: Japanese Culture and Language Classes](#)

4.4 Fostering Young Researchers

Young researchers at MANA are encouraged to work under the tutelage of external non-NIMS members, some of whom are stationed overseas. Young researchers typically have 2 mentors (Double-mentor), are affiliated to 2 research institutions (Double affiliation) and perform research in 2 fields (Double-discipline). This is called the 3D, or Triple Doubles System.

Many young researchers spend some time of the year working with their overseas mentors. This encourages them to undertake discipline-integrated research and serves to cultivate a global perspective in them.

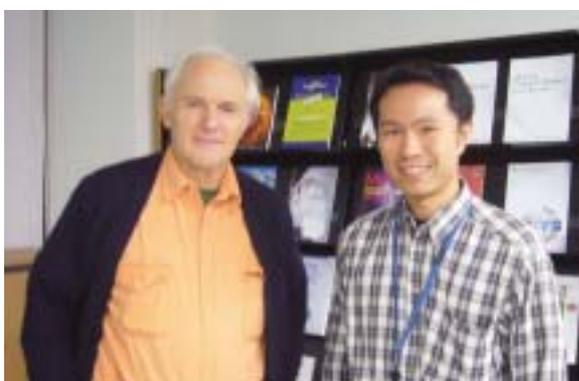


Fig. 4-3: Professor Kroto, winner of the Nobel Prize in Chemistry offers one-on-one supervision of young MANA Independent Scientists Dr. Jun Nakanishi (left) and Dr. Chiaki Yoshikawa (right).

4.5 Access to Cutting-Edge Research Facilities

MANA has established a system where researchers can use freely the latest large-scale international level research equipment owned by NIMS (High Voltage Electron Microscopy, High Magnetic Field Magnet, Spring-8 dedicated beam line and Nano Foundry) for their research, by provision of sufficient technical staff. Furthermore, MANA promotes shared use of other advanced equipment by providing researchers with sufficient assistance, such as research assistants, who will undertake routine experimental procedures. In 2009 MANA has purchased new high-quality equipment worth 2.2. Million US Dollars, which includes Electron Spin Resonance (ESR), High Speed & High Precision Mapping Photo Luminescence and Color 3D Laser Scanning Microscope.



Courtesy of Spring-8

Fig. 4-4: Cutting-Edge Research Facilities at NIMS. 930 MHz NMR magnet (left), Transmission Electron Microscope (middle) and Dedicated beamline at Spring-8 synchrotron radiation facility (right).

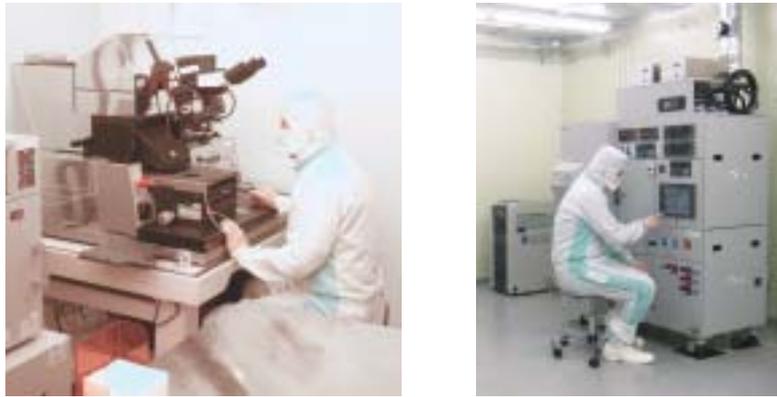


Fig. 4-5: MANA Foundry. Both sides mask aligner (left) and Sputtering machine (right).

4.6 Research Support

● Startup Research Funding

In principle MANA researchers are expected to secure external funding for their research, but MANA provides start-up research funds to researchers invited from external organizations so that they can launch their own laboratories immediately.

● Technical Support for Research

The Technical Support Team of the Administration Section currently employs 4 staff to provide assistance with experiments and device maintenance. Three of the 4 staff are retired NIMS researchers who are extremely well-versed and fluent in English. They serve as excellent advisors to all young foreign and Japanese researchers.

● Patent Application Assistance

MANA employs a part-time patent specialist who is fluent in English. He is working to turn MANA research output into protected intellectual property.

● Orientations

NIMS conducts initial training in English for newly hired foreign researchers and holds orientations and lab tours for new researchers and graduate students.

4.7 New MANA Building

A new MANA Building (see Fig. 4-6) is planned to be constructed in 2010 and 2011. It will connect the existing MANA Building and the new Environmental Research Building. It will also accommodate an interaction space including a conference room, a cafeteria, foyers and terraces.

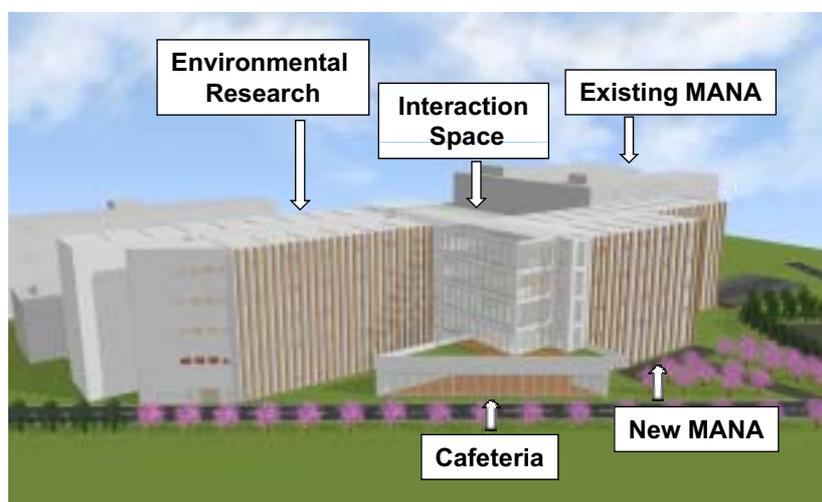


Fig. 4-6: Schematic view of planned new MANA Building.

5. Research Activities and Output

5.1 Research Activities

- **Research Digest**

For an overview of MANA research activities in the calendar year 2009, please refer to the booklet “**Research Digest 2009**”, which is part of the MANA Progress Report. Among MANA’s research topics, research on nano-sheets and atomic switches has especially gained prominence.

- **Reinforcement of Nano-Green and Nano-Bio Fields**

In 2009 MANA started an effort to strengthen the research fields Nano-Green and Nano-Bio.

Nano-Green Field

- “Nano- Interface Group” was newly organized in November 2009. Prof. Kohei Uosaki (MANA Principal Investigator) changed to full-time appointment.
- Two PIs were added in January 2010.
- Prof. Yaghi: Transfer from Nano-Materials Area.
Dr. Takada: Newly appointed to organize “Rechargeable Battery Materials Group”.
- Directions of Future Research
Present status: Solar, fuel and rechargeable batteries and catalysts.
Important future direction: Nanoarchitectonics for ultimate control of interfaces for the realization of revolutionary batteries and catalysts.
Interdisciplinary Research between Electrochemistry and Nanoarchitectonics.

Nano-Bio Field

- Recruitment of new PIs.
Public and personal announcements (journals, e-mails, letters, etc.)
In the process of selection from several applications.
- A female scientist in the field of optical biosensing was appointed as a MANA Independent Scientist in November 2009. Dr. Eriko Watanabe: Moved from Japan Women’s University.
- Directions of Future Research
Present status: Biosensing devices and biocompatible materials.
Important future direction: Development of ultimate biosensing methods combined with MANA’s excellent nanotechnology techniques.
Interdisciplinary Research between Biosensing and Nanotech.

- **Fusion Research**

MANA feels it is crucial for young researchers from various disciplines to conduct joint interdisciplinary in order to create new research seeds via fusion research. In 2009 MANA adopted a fusion research subsidy system, called MANA’s Fusion Research Fund (MFRF), see Table 5-1, and launched the 6 projects listed in Table 5-2.

Table 5-1: MANA’s Fusion Research Fund (MFRF).

Objective:	MANA’s Fusion Research Fund is a special financial support to encourage interdisciplinary research with the potential to establish an unexplored new research field.
Eligible Researchers:	Young Researchers of MANA (except Principal Investigators).
Amount of Funding:	Several Awards of a total amount of up to \10 million for FY 2009 and FY 2010 each are available.
Received Applications:	In 2009, MANA received 18 applications (8 from MANA Scientists, 4 from MANA Independent Scientists, 6 from ICYS-MANA Researchers).

Table 5-2: List of MFRF projects approved in 2009.

	Name	Collaborators	Research Title
1	Yusuke Yamauchi Naoki Fukata	Chisato Niikura (Advanced Photovoltaics Center, NIMS)	Formation of energy conversion Si materials using self-organization process
2	Satoshi Moriyama	Masayoshi Higuchi (MANA)	Structure and property control of grapheme by integration of fabrications and organic synthesis
3	Daniele Pergolesi	Toshihide Nabatame (MANA Foundry) Emiliana Fabbri (MANA) Akira Toriumi (Professor, Univ. of Tokyo)	Non-Volatile Memory FET based on Proton Conducting Oxide
4	Genki Yoshikawa	Pavuluri Srinivasu (ICYS-MANA)	Development of Nano-Sieve Cantilever Array Sensors
5	Pavuluri Srinivasu	Yuji Miyahara (MANA)	Novel Three-dimensional Functional Nanoporous Materials for Efficient Drug Delivery Systems and Bone Tissue Engineering
6	Jun Nakanishi	Yoshitaka Yoshitaka (MANA) Shunsuke Tsuda (MANA)	Understanding of photocleavage reaction at solid surface and development of new biointerfaces

● **Invitation of Foreign Researchers**

MANA has 3 researcher invitation programs to ensure that MANA is a research center that attracts all levels of researchers from around the world.

MANA Short-Term Research Program

In 2009 MANA has established a new Invitation Program to facilitate the visit of young tenured faculty members (Professors, Associate Professors) from foreign research institutes and universities to conduct joint research with MANA researchers for one to three months. From April to December 2009, 12 researchers have been invited to MANA by this program.

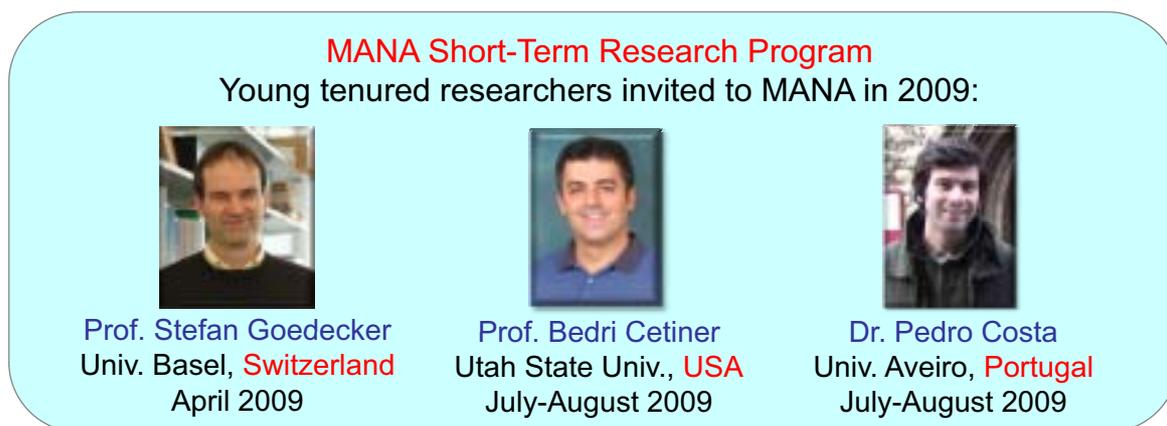


Fig. 5-1: Young Researchers invited to MANA within the Short-Term Research Program.

JSPS Invitation Program

This program is funded by a supplementary budget and has been held in the fiscal year from April 2009 to March 2010 only. 7 renowned globally-active scientists and 11 young researchers have been invited to MANA in the first quarter of 2010. The invitees and scientists from MANA/NIMS gathered at a 3 days-workshop held in Gora Seiunso, Hakone, on March 24-26, 2010.

NIMS Open Research Institute Program

This Invitation program is run by NIMS and brings together all levels of researchers from young researchers to highly regarded scientists. From April to December 2009, 43 researchers have been invited to MANA by this program.

5.2 Research Output

● Research Papers

Research Papers from MANA strongly increased by more than 40% from about 390 papers in 2008 to about 560 papers in 2009. The list of research papers 2009 shown in Appendix 8.8 includes top-notch journals as Nature Physics, Nature Nanotechnology, Journal of the American Chemical Society, Physical Review Letters and Nano Letters.

[Appendix 8.8: Research Papers](#)

● Citation Ranking

According to the ESI Database, NIMS is ranked third in the world for the number of citations in the materials science field (see Fig. 5-2) over the last 5 years (January 2005 to December 2009). MANA has cleared one of its 5-year mid-term objectives of ranking within the top 5 in the world. MANA's contribution to this ranking is significant, since 47% of the NIMS citations are from articles written by researchers affiliated to MANA.

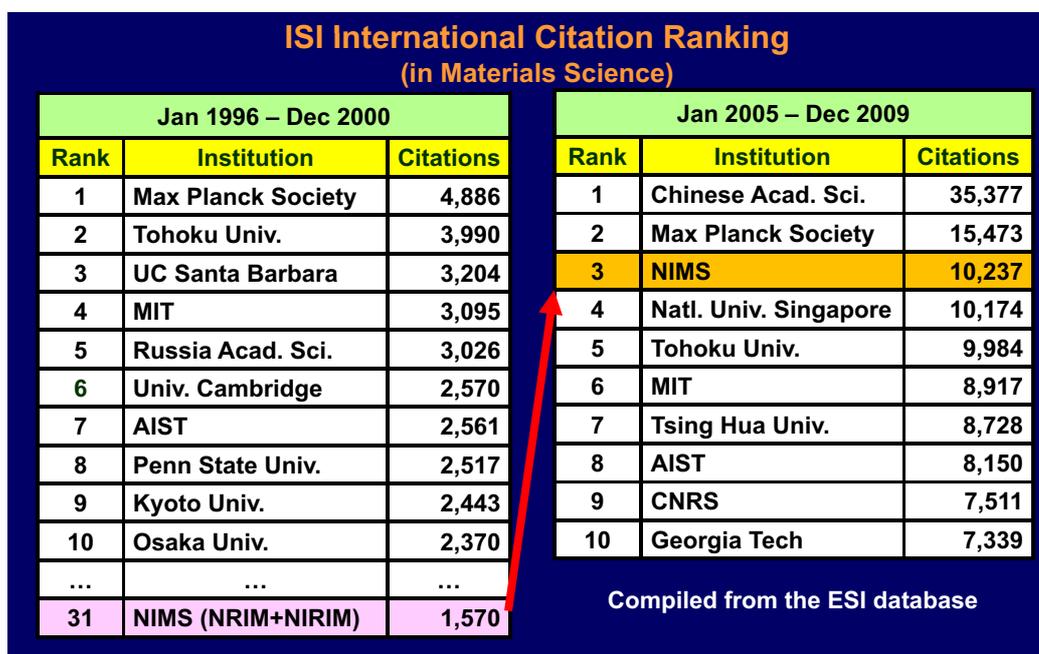


Fig. 5-2: ISI International Citation Ranking in Materials Science.

● Patents

In addition to writing research papers, MANA members actively apply for patents. The list of Patents shown in Appendix 8.9 contains more than 100 applications for Japanese patents and more than 15 applications for International patents.

[Appendix 8.9: Patents](#)

● Commendations

MANA's renowned researchers have won again many awards in 2009. PI Dr. Hono received the 2009 Honda Frontier Award. PI Dr. Ohashi won the Richard M. Fulrath Award from the American Ceramic Society. PI Prof. Uosaki was elected Electrochemical Society Fellow. MANA Scientist Dr. Osada received the Young Scientists Prize of MEXT. A list of Commendations between Oct 2007 and Dec 2009 can be found in Appendix 8.10.

[Appendix 8.10: Commendations](#)

6. Global Network

6.1 MANA Satellites

MANA has established satellite institutes in research centers to which external Principal Investigators are affiliated. As shown in Fig. 6-1, there are currently 7 MANA satellites, 3 in Japan, 2 in USA and 2 in Europe. MANA has actively engaged in research exchange with satellites (see Fig. 6-2), holding joint workshops with Cambridge and CNRS in 2009. The satellites also play important roles in cultivating young researchers. MANA holds summer school program annually with Cambridge and UCLA, and the PI at Georgia Tech is serving as a mentor for an Independent Scientist at MANA. Said Independent Scientist has visited Atlanta 4 times to conduct research.

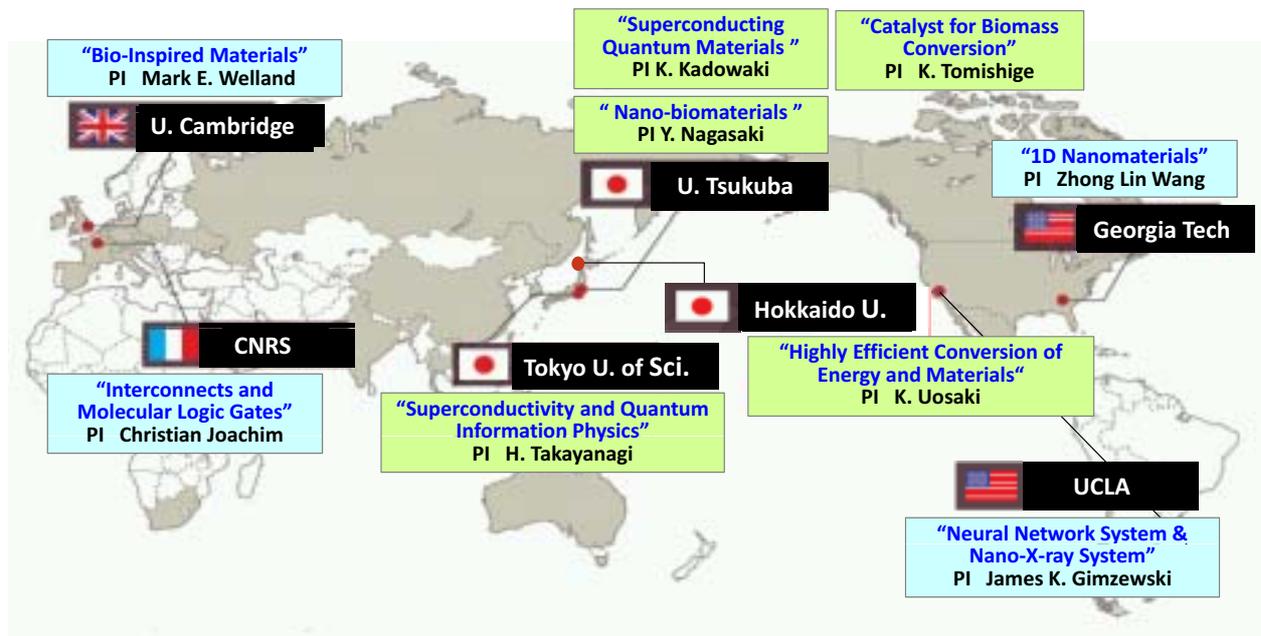


Fig. 6-1: The seven MANA Satellites.

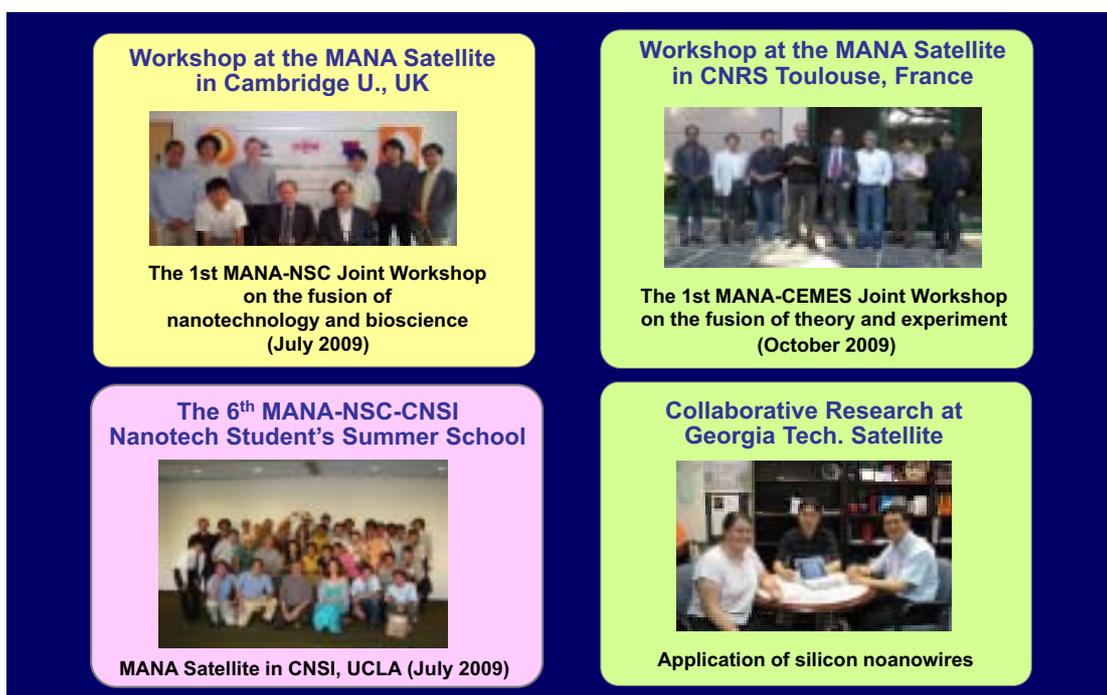


Fig. 6-2: Workshops at the foreign MANA Satellites.

1. University of Tsukuba (Japan)



Located adjacent to NIMS, this satellite engages in frequent mutual exchange with MANA in conducting research, joint intake of American students and joint seminars. In October 2009, a symposium on advanced materials science and technology was held jointly with Taiwan's National Tsing Hua University. The details of the 3 PIs' research are as follows.

- **Professor Kazuo Kadowaki**, *Graduate School of Pure and Applied Sciences*

In the Nano-System Field, Professor Kadowaki conducts cutting-edge research on quantum nanoscience that uses high temperature superconductivity.

- **Professor Yasuo Nagasaki**, *Graduate School of Pure and Applied Sciences*

In the Nano-Bio Field, Professor Nagasaki researches new nanobioimaging and materials design for nanodiagnoses and treatment and evaluates of the attributes of these materials with the aim of creating novel biotools.

- **Associate Professor Keiichi Tomishige**, *Graduate School of Pure and Applied Sciences*

In the Nano-Green Field, Associate Professor Tomishige conducts research on renewable, carbon-neutral biomass fuels and catalysts for converting biomass into chemical products.

2. Tokyo University of Science (Japan)



- **Professor Hideaki Takayanagi**, *Department of Applied Physics*

In the Nano-System Field, Professor Takayanagi developed the nano-SQUID, or nano superconducting quantum interferometer, and conducts research on new superconducting devices. With a room and research space at MANA, PI Takayanagi works with 3 MANA Research Associates (post-doc) and 2 Assistant Professors from Tokyo University of Science to create nano-devices and elucidate their properties in super-low temperatures.

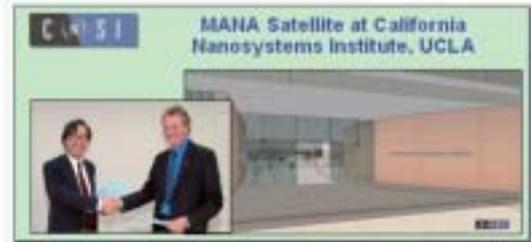
3. Hokkaido University (Japan)



- **Professor Kohei Uosaki**, *Graduate School of Science, Division of Chemistry*

In the Nano-Green Field, Professor Uosaki conducts research on establishing methods to align highly controlled atoms and molecules on solid surfaces aiming to realize energy and highly-efficient conversion processes for materials in interfaces, especially solid-liquid interfaces. To further strengthen effective cooperation with MANA, MANA established the Nano-Interface Group at MANA in November 2009 together with PI Uosaki's lab. Hokkaido University Assistant Professor Hidenori Noguchi was appointed to MANA for this reason.

4. UCLA (United States)



- **Professor James K. Gimzewski**, *Director of Nano/Pico Characterization Laboratory*

In the Nano-System Field, Professor Gimzewski conducts research on the design and creation of neural networks that simulate brain function and on X-rays. In July 2009 the Japan-UK-US Nanotechnology Summer School was held at UCLA and 29 students, including students from UCLA, MANA and the University of Cambridge satellite, conducted 5 days of research presentations and discussions. PI Gimzewski is slated to spend January and February 2010 conducting joint research at MANA. This joint research pertains to new neurocomputation circuits that use the learning functions of atomic switches.

5. Georgia Institute of Technology (United States)



- **Professor Zhong Lin Wang**, *Director of Center for Nanostructure Characterization*

In the Nano-Materials Field, Professor Wang conducts research on crating and evaluating the qualities of one-dimensional nano-scale materials which are expected to increase solar cell efficiency. PI Wang also serves as mentor to a MANA Independent Researcher who frequently visits the satellite to conduct joint research on nano-devices.

6. CNRS (France)



- **Professor Christian Joachim**,

Center for Material Elaboration & Structural Studies (CEMES) at CNRS, Toulouse, France

In the Nano-System Field, Professor Joachim conducts research on developing materials for next generation nano-electronics, spintronics devices and brain-like computers. In October 2009 CEMES and MANA held a joint workshop at CEMES and successfully brought together theoretical and experimental scientists. One graduate student from this satellite came to MANA between August and October 2009 to conduct research under the supervision of MANA scientists.

7. University of Cambridge (United Kingdom)



- **Professor Mark E. Welland**, *Director of Cambridge Nanoscience Centre*

In the Nano-System Field, Professor Welland conducts research on the creation of materials triggered by the functions of biosystems (bio-inspired energy efficient materials). His research is divided into lab work and computation with each section handled respectively by the University of Cambridge and the University of London. In July 2009 the University of Cambridge and MANA held a joint workshop, and 3 graduate students from this satellite will come to MANA in November and December 2009 to conduct research under the supervision of MANA scientists.

6.2 Enhancement of Partnerships with Universities

As a result of a comment from the WPI Program Committee MANA has enhanced collaborations with overseas and domestic universities.

- **Joint Workshops with overseas and domestic Universities**

Xi'an Jiaotong University, China

The “XJTU-NIMS/MANA Workshop on Materials Science 2009” was held Xi'an Jiaotong University on September 20-22, 2009 (see Fig. 6-3).

National Tsing Hua University, Taiwan and University of Tsukuba, Japan

The “2nd Tsukuba-Shinchi Bilateral Symposium on Advanced Materials Science and Technology (TSAMS 2009)” was held in Tsukuba on October 10-12, 2009. It was a joint symposium between MANA, University of Tsukuba and National Tsing Hua University.

University Rome Tor Vergata, Italy

The MANA-URTV Joint Workshop on “Nanostructured Materials for Sustainable Development” was held at Villa Mondragone, University of Rome Tor Vergata (URTV) on October 13, 2009 (see Fig. 6-3).

Nanjing University, China

“The 5th Nanjing University-Anhui Normal University-Hokkaido University-MANA Joint Symposium” was held at Nanjing University on November 10, 2009.

Osaka University, Japan

The Osaka University-MANA/NIMS Joint Symposium on “Advanced Structural and Functional Materials Design” was held at Osaka University on December 10, 2009 (see Fig. 6-4).

Waseda University, Japan

A joint symposium of MANA and Waseda University on “Advanced materials design at nano- and meso-scales toward practical chemical wisdom” was held at Waseda University on January 14, 2010. It was the 4th Global COE International Symposium on “Practical Chemical Wisdom” at Waseda University (see Fig. 6-4).



Fig. 6-3: Joint Workshop of MANA with University of Rome Tor Vergata, Italy (left) and Xi'an Jiaotong University, China (right).



Fig. 6-4: Joint Workshop of MANA with Osaka University (left) and Waseda University (right).

● **NIMS Graduate Schools**

NIMS operates the “NIMS Graduate Schools” having concluded agreements with the University of Tsukuba, Hokkaido University, Waseda University and Kyushu University, and graduate students are taught advanced research by NIMS researchers on the frontlines of their fields. As of November 2009, 17 scientists at MANA are teaching in the NIMS Graduate Schools. Students in the NIMS Graduate Schools who possess especially outstanding skills are appointed as Junior Researchers and are paid a salary for their contribution to NIMS research. As of November 2009, there are 22 Junior Researchers working at MANA, of which 18 are foreigners (see Table 6-1).

Table 6-1: Number of MANA members at the NIMS Graduate Schools.

School	No. of Faculties	No. of Students
University of Tsukuba	9	10
Hokkaido University	4	10
Waseda University	4	2

● **University of Tsukuba Graduate School**

In September 2009, the school established a Master’s curriculum in which students can take all of their required credits in English. The objective is to attract outstanding foreign students from the Master’s program to the NIMS Graduate Schools.

● **International Joint Graduate School**

Ph.D. students from renowned universities around the globe spend several months to one year at NIMS doing research under the supervision of MANA researchers (see Fig. 6-5). As of November 2009, MANA has brought in 13 students from Moscow State University (Russia), Charles University and the University of Pardubice (Czech Republic), Xian Jiaotong University (China), Yonsei University (Korea) and Anna University (India).



Fig. 6-5: International Graduate Schools with MANA participation.

● NIMS Internships

MANA accepts students from universities throughout Japan and the world and provides them with opportunities to partake in materials and nanotechnology research. In FY2009 MANA has accepted 32 interns, of which 30 have been foreigners. MANA has accepted 4 interns from the NSF Summer Institute, 1 from DAAD (German Academic Exchange Service), and 1 from the Winter Institute Program of the Japan-Korea Industrial Technology Co-Operation Foundation. MANA has also welcomed 5 US students for 11 weeks from the NSF's National Nanotechnology Infrastructure Network (NNIN) Research Experience for Undergraduates (REU) Program which is in its second year.



Fig. 6-6: Internship Program. Welcome Party (left) and US students with hosts (right).

7. Enhancement of International Recognition

7.1 MANA International Symposium

The MANA International Symposium is held every year with the purpose to promote and disseminate the research achievements of the MANA project. Renowned researchers from around Japan and the world are invited to participate in lectures and discussions with MANA PIs and other researchers. The First MANA International Symposium was held on March 10-13, 2008, with a total of 191 participants. The Second MANA International Symposium was held on February 25-27, 2009, with a total of 310 participants (Fig. 7-1). The Third MANA International Symposium was held on March 3-5, 2010, with a total of 351 participants (Fig. 7-2).



Fig. 7-1: Second MANA International Symposium 2009.



Fig. 7-2: Third MANA International Symposium 2010.

7.2 International Cooperation

To promote research cooperation exchange with overseas research institutions MANA has sealed a total of 18 Memorandum of Understanding (MOU) Agreements in 2008 and 2009.

[Appendix 8.11: International Cooperation](#)

7.3 Website

A few months after opening, in February 2008, MANA launched its official webpage at <http://www.nims.go.jp/mana/>. The website provides an overview of MANA, introduces projects, advertises for researchers, publicizes events and show-cases research output and recent news. In 2009 the MANA website has been improved. In 2 years, internet access from outside NIMS has increased by a factor 3.

7.4 Newsletter

The MANA newsletter named “CONVERGENCE” is published with separate English and Japanese versions three times per year and covers MANA research activities, output and special topics. It contains interviews with famous researchers (see Fig. 7-3) and articles about top-ranked institutions in Japan and the world with the aim of allowing even the casual reader to gain an affinity with MANA. In order to boost MANA’s global name recognition and contribute to expanding its global networks, approximately 3000 copies of the English and Japanese versions of CONVERGENCE are distributed to domestic and overseas researchers, institutions, government offices and private companies in 71 countries.



Fig. 7-3: First Issues of the MANA newsletter “Convergence”.

7.5 Media Coverage

As shown in Appendix 8.12 and Fig. 7-4, MANA has been featured in newspaper articles, on television and in international academic journals.

[Appendix 8.12: Media Coverage](#)

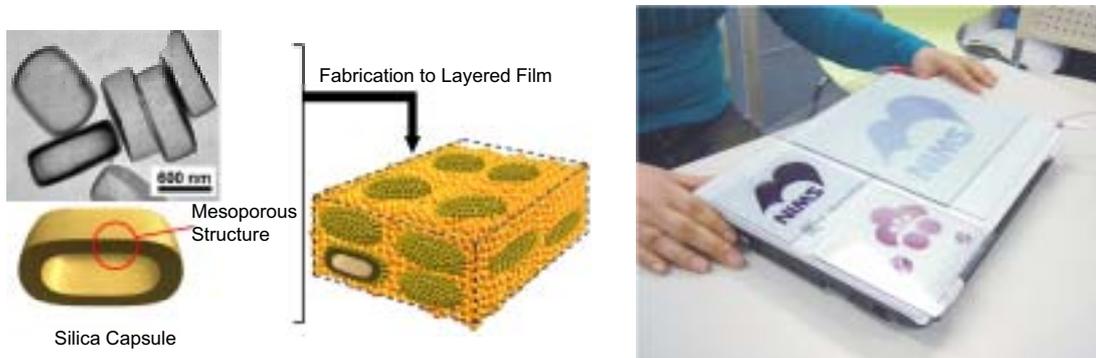


Fig. 7-4: (left): Dr. Katsuhiko Ariga was interviewed in Science News on his research of functional materials. (right): Dr. Masayoshi Higuchi explained in the Kyodo TV program “Lab Meister: In Search for Future of TV and PC” of Fuji TV about multi-color electronic paper.

7.6 Visitors at MANA

In 2009, 317 persons from around the world (104 from EU, 64 from USA, 107 from Asia and 42 from other regions) have visited MANA. The strong increase from 133 visitors in 2008 (April – December) to 317 in 2009 (January – December) is evidence for the sincere interest garnered by the Center overseas. Prominent MANA visitors in 2009 include Prof. Svante Lindqvist (Nobel Museum Director and Chair at the Royal Institute of Technology, Stockholm, Sweden, Fig. 7-5), Prof. Ayusman Sen (Head of Department of Chemistry, Pennsylvania State University, USA), Prof. Venkatesh Narayanamurti (Dean of Engineering and Applied Sciences, Harvard University, USA) and Prof. Norbert Kroó (Vice-President of Hungarian Academy of Sciences).

[Appendix 8.13: Visitors at MANA](#)



Fig. 7-5: MANA Visit of Prof. Lindqvist on October 2, 2009. Left Side: Masatoshi Okada, Edvard Fleetwood, Svante Lindqvist, Yoshio Bando and Kisaburo Kodama (from left to right). Right Side: MANA PIs Dr. Dmitri Golberg (top) and Dr. Yuji Miyahara (bottom) explain their research to the visitors.

7.7 MANA History

The MANA History between the inauguration in October 2007 and March 2010 can be found in Appendix 8.14.

[Appendix 8.14: MANA History](#)

Appendix 8.1: MANA Top Management



Sukekatsu USHIODA
NIMS President
MANA Chief Project Officer



Masakazu AONO
MANA Director-General



Yoshio BANDO
MANA Chief Operating Officer



Takahiro FUJITA
MANA Administrative Director

Appendix 8.2: MANA Research Staff

MANA Principal Investigators (30):

as of January 1, 2010

Nano-Materials Field (10)

Coordinator



Takayoshi SASAKI
NIMS



Katsuhiko ARIGA
NIMS



Yoshio BANDO
NIMS



Dmitri GOLBERG
NIMS



Kazuhiro HONO
NIMS



Kenji KITAMURA
NIMS



Naoki OHASHI
NIMS



Yoshio SAKKA
NIMS



**Eiji TAKAYAMA-
MUROMACHI**
NIMS



Zhong Lin WANG
Georgia Tech (Satellite)

Nano-System Field (11)

Coordinator



Masakazu AONO
NIMS



Daisuke FUJITA
NIMS



James K. GIMZEWSKI
UCLA (Satellite)



Tsuyoshi HASEGAWA
NIMS



Xiao HU
NIMS



Christian JOACHIM
CNRS (Satellite)



Kazuo KADOWAKI
Univ. Tsukuba (Satellite)



Tomonobu NAKAYAMA
NIMS



Hideaki TAKAYANAGI
Tokyo Univ. Sci. (Satellite)



Kazuhito TSUKAGOSHI
NIMS



Mark WELLAND
Univ. Cambridge (Satellite)

Nano-Green Field (7)

Coordinator



Kohei UOSAKI
Hokkaido Univ. (Satellite)



Liyuan HAN
NIMS



Kazunori TAKADA
NIMS



Keiichi TOMISHIGE
Univ. Tsukuba (Satellite)



Enrico TRAVERSA
NIMS



Omar YAGHI
UCLA



Jinhua YE
NIMS

Nano-Bio Field (2)

Coordinator



Yuji MIYAHARA
NIMS



Yukio NAGASAKI
Univ. Tsukuba (Satellite)

MANA Scientists (44):

Nano-Materials Field (11)



Yasuo
EBINA



Jonathan
HILL



Naoyuki
KAWAMOTO



Renzhi
MA



Masanori
MITOME



Takao
MORI



Minoru
OSADA



Tadashi
OZAWA



Ryutarō
SOUDA



Chengchun
TANG



Chunyi
ZHI

Nano-Systems Field (11)



Hideo
ARAKAWA



Masanori
KOHNO



Osamu
KUBO



Takeo
MINARI



Katsumi
NAGAOKA



Yuji
OKAWA



Makoto
SAKURAI



Yoshitaka
SHINGAYA



Kazuya
TERABE



Tohru
TSURUOKA



Takashi
UCHIHASHI

Nano-Green Field (9)



Emiliana
FABBRI



Ashraful
ISLAM



Jin
KAWAKITA



Hidenori
NOGUCHI



Tsuyoshi
OHNISHI



Daniele
PERGOLESI



Norifusa
SATOH



Kentaro
TASHIRO



Masatoshi
YANAGIDA

Nano-Bio Field (13)



Guoping
CHEN



Sachiko
HIROMOTO



Chiho
KATAOKA



Kohsaku
KAWAKAMI



Naoki
KAWAZOE



Masanori
KIKCHI



Norio
MARUYAMA



Junko
OKUDA



Yasushi
SUETSUGU



Tetsushi
TAGUCHI



Akiyoshi
TANIGUCHI



Akiko
YAMAMOTO



Tomohiko
YAMAZAKI

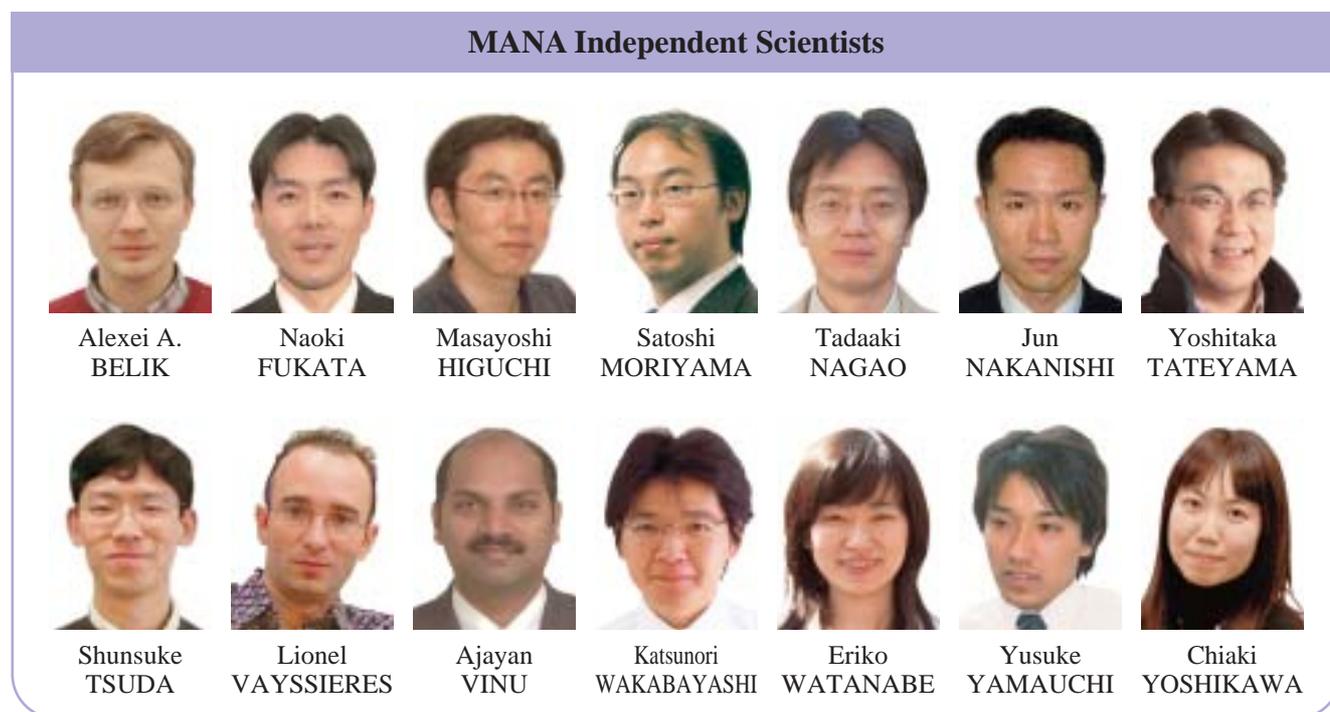


Martin
PUMERA*

*MANA Scientist until December 2009

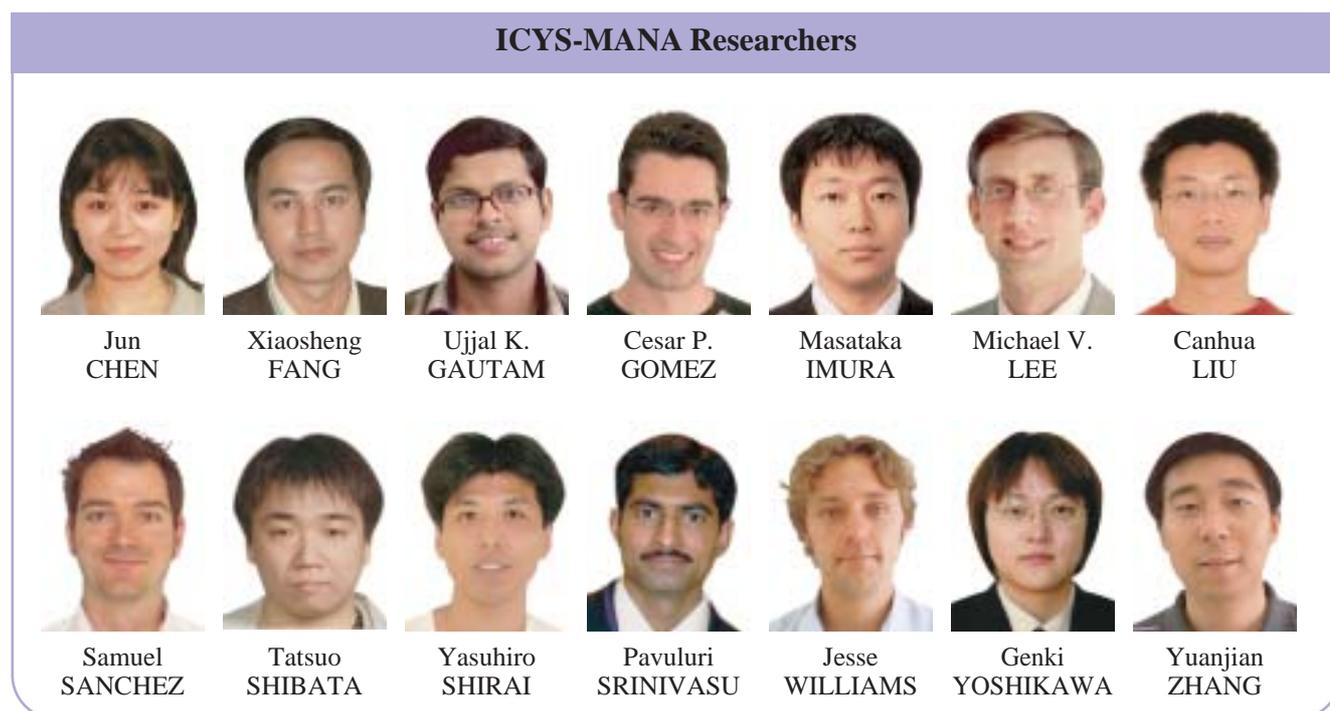
MANA Independent Scientists (14):

as of January 1, 2010



ICYS-MANA Researchers (14):

as of January 1, 2010



MANA Research Associates (62):

as of January 1, 2010

Nano-Materials Field (27)



Anasuya
BANDYOPADHYAY
India



Rajashree
CHAKRAVARTI
India



Parayalil
CHITHRA
India



Weihua
DI
China



Dominik
ENDERS
Germany



Yanfen
GUO
China



Chunfeng
HU
China



Baoping
JIA
China



Baoe
LI
China



Chun
LI
China



Jianyong
LI
China



Liang
LI
China



Chamini L.
MENDIS
Australia



Gopalan
RAGHAVAN
India



Gary
RICHARDS
UK



Dmitry
RUSAKOV
Russia



Vijay Karthik
SANKAR
India



Ulka Bhimrao
SURYAVANSHI
India



Norihiro
SUZUKI
Japan



Mingsheng
WANG
China



Xianlong
WEI
China



Xijin
XU
China



Zhi
XU
China



Haitao
ZHANG
China



Li
ZHANG
China



Shoubao
ZHANG
China



Yuhua
ZHEN
China

Nano-Bio Field (3)



Alessandra
BONANNI
Italy



Shingo
KANEKO
Japan



Kun
ZHANG
China

Nano-System Field (21)



Yasushi DODA Japan	Jianhua GAO China	Hongxuan GUO China	Shujun HU China	Sumi KIM China	Akichika KUMATANI Japan	Songlin LI China	Bin LIU China
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Kewei LIU China	Xubing LU China	Swapan K. MANDAL India	Puneet MISHRA India	Alpana NAYAK India	Nozomi NISHIZAWA Japan	Takeo OHNO Japan	Keisuke SATO Japan
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Hiroyuki TOMIMOTO Japan	Shouming WU China	Jianxun XU China	Shin YAGINUMA Japan	Yong YANG China
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Nano-Green Field (11)



Lei BI China	Yingpu BI China	Shang GAO China	Chunping HU China	Mohsen KHAJEH AMINIAN Iran	Edoardo MAGNONE Italy	Corrado MANDOLI Italy	Hua TONG China
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Hisanori UEKI Japan	Pothiappan VAIRAPRAKASH India	Keihi YOSHIMATSU Japan
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Appendix 8.3: MANA Advisors

Advisors such as Nobel Prize Winners and world prominent researchers, provide their experience and guide MANA researchers and scientists.

MANA Advisors (5):

as of January 1, 2010



Prof. Heinrich Rohrer
1986 Nobel Prize Winner in Physics
Switzerland



Prof. Sir Harry Kroto
1996 Nobel Prize Winner in Chemistry
Florida State University
USA



Prof. C.N.R. Rao
Honorary President of the
Jawaharlal Nehru Centre
for Advanced Scientific Research
India



Prof. Galen D. Stucky
University of California
Santa Barbara
USA



Prof. Teruo Kishi
Former President of NIMS
Japan

Appendix 8.4: Comments of WPI Program Committee

Part of the WPI Program FY2008 Follow-up Report *
By the World Premier International Research Center (WPI)
Initiative Program Committee
(May 2009)

*: Part of the Report, that concerns MANA



D. Summary of Comments Made by Follow-up Committee Members

(Comments are shown in italic)

D-5 MANA:

1. Achievements of Science

Research directions became clear by alignment into four research areas, but follow-up committee pointed out that their distinctiveness need to be strengthened.

- *The new research structure and focus provides greater clarity of the research directions and also how the impact will be achieved as well as a way of mapping out where the strengths and weaknesses are in the center.*
- *So far, the program appears on track, but the research agenda seems surprisingly modest. It will be good if MANA takes on some big research task(s) that are easy to understand for non-experts and that will be exciting to the research community as a whole.*
- *MANA needs to develop and highlight a distinctive research theme or approach that will develop a unity of purpose and sense of mission among all participants. The seeds are in the materials presented, but the distinctiveness needs to be highlighted.*

Built-up of researchers in the fields of nano-bio and nano-green is recommended.

- *MANA needs to strengthen nano-green and nano-bio groups. It is important that the MANA leaders address this, yet do so strategically, attracting international top researchers, and women when possible.*

2. Implementation as a WPI Research Center

MANA has been successful in internationalization; recruiting >50% of researchers and >80% of postdocs from abroad.

- *The center has made good efforts in restructuring overall organization. The current ratio of overseas researchers to total number of staff amounts to 52%, which is highly appreciated. The center has been somewhat successful in realizing internationalization.*
- *MANA is also very international as a WPI research center and their achievements should be shared with the other centers.*
- *The activity is international. Center director recruited several full-time PIs and many postdocs from abroad and has extensive collaborations with some US and European satellites. MANA's management is the best among the five WPI research centers. The overall status is satisfactory.*
- *MANA has done a great job in developing international contacts and in bringing in international researchers. The program with the satellites is impressive. It also appears that MANA and NIMS have listened carefully to previous feedback and are making sincere efforts to improve on weak points.*

Some advice is given on hiring of foreign, young and female scientists.

- *Although the center has been successful in internationalizing the organization, it is slightly biased towards Asia. This direction has to be improved so that the organization is able to have inputs from US and European countries.*
- *MANA needs to reshape its international profile so that there is more representation of international researchers from beyond Asia – this is a big challenge but it is one issue where the insights and lessons learnt by MANA will be enormously useful for the other WPI centers and also the institutions in Japan.*

- *More exchange of scientists, young and old, even for a short period, with programs abroad. This will create and be critical to building future networks for collaboration and global leadership.*
- *MANA should be commended for focusing on promoting independent research among the young scientists as well as giving them international exposure.*
- *Better progress in recruiting women scientists, especially from overseas. This is an area where more females are interested and good female scientists could be recruited.*

Questions are posed as to relationship between NIMS and MANA.

- *Research performance is excellent. However, MANA is still a part of NIMS, and not an independent WPI research center.*
- *Important point is: What is the relationship between MANA and NIMS. Then, the way of operation of MANA is to be different from that of NIMS. MANA is to be managed as flexibly as possible.*
- *It is strongly expected to open up a new way for Japanese governmental (independent administrative body) research organizations.*

Collaboration with universities is also an important issue for MANA.

- *Since NIMS is not a university, MANA should place special effort into bringing in (graduate) students in various ways. One not mentioned was (short-term) internships. The efforts to hold conferences at universities are good, and the special relationships with Waseda University, Tokyo University of Science, etc., are good efforts. I would recommend adding some open programs to which other universities and overseas students could also apply. This kind of program may help create excitement around the activities at MANA.*
- *It seems to me that collaboration with top Japanese universities is not enough. This point has to be taken into consideration in future.*

3. Points that need improvement:

According to the above comments as well as the site-visit report, the following points should be considered to meet the WPI Program objectives:

1. Making clear distinctiveness of science being pursued in MANA, if any
2. Reinforcement of nano-green and nano-bio fields
3. Collaboration with universities
4. Strategy for collaboration with oversea satellite institutions.

Appendix 8.5: MANA Evaluation Committee

Evaluation Committee members provide us their critical comments and expert recommendations on the operation and research strategy of the MANA project.

MANA Evaluation Committee members (10):

as of January 1, 2010

Chair



Anthony K. Cheetham
Professor
University of Cambridge,
UK



Takuzo Aida
Professor
University of Tokyo,
Japan



Morinobu Endo
Professor
Shinshu University,
Japan



Horst Hahn
Professor
Forschungszentrum Karlsruhe,
Germany



Kazuhito Hashimoto
Professor
University of Tokyo,
Japan



Yoshio Nishi
Professor
Stanford University,
USA



Manfred Rühle
Professor
Max Planck Institute,
Germany



Rodney S. Ruoff
Professor
The University of Texas,
USA



Louis Schlapbach
Professor
Former Director of EMPA
Switzerland



Kazunori Tanaka
Principal Fellow, JST
Center for Research and
Development Strategy
Japan

Appendix 8.6: MANA Seminars

List of MANA Seminars 2009:

Date (2009)	Speaker	Title
Jan 15	Prof. Thomas E. Mallouk Director, The Center for Nanoscale Science, Penn State University, USA	Nanostructural Design of Photocatalysts and Photoelectrochemical Cells
Jan 16	Dr. Kazuya Terabe MANA Scientist	Control of local ion transport to develop unique functional nanoionics devices
	Dr. Masanori Mitome MANA Scientist	Quantitatyness of phase measurement by transport intensity equation
Jan 23	Prof. Hisanori Shinohara Department of Chemistry, Nagoya University	Nano-Fabrication of Quantum Metallic Nanowires in Carbon Nanotubes
Jan 26	Dr. Qingsong Mei ICYS Researcher	Microstructure and property characteristics of Metallic materials in response to surface mechanical deformation
	Dr. Tatsuo Shibata ICYS-MANA Researcher	Oriented growth of oxide films promoted by one-nanometer-thick seed layer of nanosheets
Jan 29	Prof. Matthew R. Linford Brigham Young University, USA	Functionalization of Hydrogen/Deuterium-Terminated and Oxidized Diamond, and Layer-by-Layer Growth of Polymer/Nanodiamond Multilayers as Applied to Separation Science
	Prof. Robert C. Davis Brigham Young University, USA	Carbon Nanotube Infiltration: a Versatile Approach for Fabricating High Aspect Ratio Microstructures Using Carbon Nanotube Frameworks
Jan 30	Dr. Ajayan Vinu MANA Independent Scientist	Fabrication and Structural Control of Nanoporous Materials and their Applications
	Dr. Yuji Okawa MANA Scientist	Nanoscale control of chain polymerization for molecular nanowiring
Feb 3	Prof. Zhu-an Xu Department of Physics, Zhejiang University, China	Effect of substitution within FeAs layer in iron arsenide superconductors
Feb 6	Dr. Tsuyoshi Ohnishi MANA Scientist	Stoichiometry issues in pulsed laser deposition
	Prof. Neil Branda Simon Fraser University, Canada	On-Command Control of Molecular & Nanomaterials Using Molecular Switches
Feb 13	Dr. Jun Chen ICYS-MANA Researcher	Advanced Semiconductor Diagnosis by Multi-Dimensional Electron-Beam-Induced Current Technique
	Prof. Oleg Misochnko Institute for Solid State Physics, Russian Academy of Science, Russia	Swinging atoms or how can we visualize atomic motions?
Feb 17	Prof. Robert A. Wolkow National Institute for Nanotechnology in Edmonton, Canada	Controlled Coupling and Occupation of Silicon Atomic Quantum Dots
	Prof. Yuping Wu Fudan University, China	New structured anode materials and polymer electrolytes for lithium ion batteries

Feb 20	Dr. Akihiro Tanaka MANA Scientist	In search of curvature-induced quantum effects in graphene-related systems
	Prof. Yukio Nagasaki MANA PI, Graduate School of Pure and Applied Sciences, University of Tsukuba	pH-responsive Nanoparticles with Electron Paramagnetic Signals for Novel Polymeric Drug for Anti-oxidative Stress
Mar 6	Dr. Osamu Kubo MANA Scientist	Unique Electrical Transport in Nanomaterials Measured with Multiple-Scanning-Probe Microscopes
	Prof. Thomas Waitz University of Vienna, Austria	Phase transformations of NiTi shape memory alloys subjected to high pressure torsion
Mar 9	Prof. Chai-mei Yu The Chinese University of Hong Kong, China	Preparation of Nanomaterials for Energy and Environmental Applications
Mar 10	Dr. Bing Jun Gao Chinese Academy of Science, China	Generation of Higher Magnetic Field
Mar 13	Dr. Tadashi Ozawa MANA Scientist	Preparation and photoluminescence characterizations of Ln-photoactivated oxide nanosheets for new phosphor development
	Dr. Hiroshi Eisaki Nanoelectronics Research Institute (NeRI), AIST	Synthesis and Superconducting Properties of oxygen-deficient oxypnictide superconductors $LnFeAsO_{1-y}$
Mar 17	Dr. Nenad M. Markovic Principal Investigator, Argonne National Laboratory, USA	Electrocatalysis - past, present and future
Mar 19	Prof. Frank Marken Department of Chemistry, University of Bath, UK	Metal Oxide Nanoparticle Thin Film Voltammetry: From Mono- to Multi-Layer Systems and from Bulk- to Surface-Conductors
Mar 27	Dr. Pavuluri Srinivasu ICYS-MANA Researcher	Novel Approach for the Synthesis of Nanoporous Catalytic Materials
	Dr. Rudder Wu ICYS-SENGEN Researcher	High-temperature Degradation Mechanisms of Thermal Barrier Coatings
Apr 1	Prof. Seimei Shiratori Department of Applied Physics & Physico- Informatics, Keio University	Structural control of layer-by-layer deposited films and their applications
Apr 2	Prof. Gero Decher The Institute Charles Sadron, CNRS/University of Strasbourg, France	“Soft Matter Devices” (LbL assembly: A challenge to physics and a tool for chemistry and materials science)
Apr 3	Dr. Mathieu Grandcolas ICYS Researcher	Titania nanotube based nano/macro composites: synthesis and applications
	Dr. Emiliana Fabbri MANA Scientist	Tailoring Materials for Intermediate Temperature Solid Oxide Fuel Cells (IT-SOFCs) Based on Ceramic Proton Conducting Electrolyte
Apr 6	Prof. Dr. Sanjay Mathur University of Cologne Institute of Inorganic Chemistry, Germany	Chemically Engineered Nanoparticles, Nanowires and Nanocomposites: Processing, Applications and Devices

Apr 10	Dr. Motohiro Tagaya Biomaterials Center	In situ monitoring of multiple protein adsorption and initial cell adhesion onto hydroxyapatite nano-crystals by quartz crystal microbalance with dissipation technique
	Dr. Samuel Sanchez ICYS-MANA Scientist	Nanorobots: the ultimate wireless self-propulsed sensing and actuating devices
Apr 17	Prof. Stefan Goedecker Department of Physics and Astronomy, University of Basel, Switzerland	Global geometry optimization of clusters, nano-structures and biomolecules
Apr 24	Dr. Takeshi Noda Quantum Dot Research Center	Self-assembly of Quantum Dots by Droplet Epitaxy and Application to Solar Cells
	Dr. Vyacheslav Silkin Department of the Physics of Materials, University of Basque Country, Spain	Low-energy collective electronic excitations at metal surfaces
Apr 30	Prof. Frank Caruso Department of Chemical and Biomolecular Engineering, The University of Melbourne, Australia	Nanostructured Materials for Biomedicine Applications
May 15	Dr. Eric Fleury Korea Institute of Science & Technology, Center for Advanced Functional Metals, Korea	Compositional dependency of the mechanical behavior of Cu-Zr based metallic glasses
	Dr. Kazuhiro Hono Magnetic Materials center	Search for half-metallic Heusler alloys and their applications to magnetoresistive devices
May 21	Prof. Thomas J. McCarthy University of Massachusetts, USA	New Views of Wetting
May 22	Dr. Toshihide Nabatame Advanced Electronic Materials Center	Role of oxygen of high-k/SiO ₂ interface on VFB shift for CMOS with metal/high-k gate stacks
	Dr. Miyoko Tanaka Quantum Dot Research Center, High Voltage Electron Microscopy Station	Fabrication and Analysis of Metal Nano-Structures Using Ultra-High Vacuum Transmission Electron Microscopy
May 27	Prof. Mauro Boero The Institute of Physics and Chemistry of Materials of Strasbourg (IPCMS), CNRS, University of Louis Pasteur, Strasbourg, France	Charges in solution: Physics and Chemistry of a perturbed hydrogen bond network probed by first-principles molecular dynamics.
May 29	Dr. Kaneaki Tsuzaki Structural Metals Center	Stronger and Tougher Steels with Ultrafine Fibrous Grain Structure
	Dr. Ammanabroulu Rajanikanth ICYS Researcher	Development of highly-spin polarized Heusler alloys For spintronic devices
Jun 3	Dr. Jay Kikkawa Department of Physics and M-Astronomy, The University of Pennsylvania, USA	Optical and Magnetic Anisotropy in Graphene Oxide

Jun 5	Dr. Tsuyoshi Miyazaki Computational Materials Science Center	Developments and applications of a linear-scaling DFT code CONQUEST
	Dr. Akiko Yamamoto MANA Scientist	Investigation of degradation behavior of Magnesium alloys for their biomedical application
Jun 8	Dr. Masami Suganuma Chief, Cancer Prevention Group, Research Institute for Clinical Oncology, Saitama Cancer Center	Green Tea as Cancer Preventive Beverage: Development and Its Mechanism of Action
Jun 12	Dr. Genki Yoshikawa ICYS-MANA Researcher	Piezoresistive Cantilever Array Bio-Sensors for Medical Diagnostics, Genetic and Environmental Researches
	Dr. Antonio Sanchez Torralba ICYS Researcher	Hydrolysis of DNA by the metallic complex $[\text{Ru}(\text{bpy})_2(\text{BPG})]^{2+}$: Theoretical study of ligands and DNA binding mode
Jun 19	Dr. Ayako Hashimoto ICYS Researcher	Three-dimensional Imaging of Carbon Nanostructure by Confocal Scanning Electron Microscopy
	Prof. Xincheng Xie Department of Physics, Oklahoma State University, USA	Dephasing and disorder effects in quantum spin Hall effect
Jun 24	Dr. Peter Vettiger EPFL IMT & CSEM, Neuchatel, IBM Zurich Research Laboratory (Retired), Switzerland	Micro/Nanofabricated Functional Probe Arrays and their Applications in Data Storage and Life Sciences
Jun 26	Dr. Davide Uglietti ICYS Researcher	Development of high field superconducting magnets
	Dr. Akiyoshi Taniguchi MANA Scientist	Development of live cell-based sensor devices
Jul 2	Prof. Maria Jose Esplandiú Autonomous University of Barcelona, Spain	Carbon nanotubes as ultrasensitive detectors of electron transfer processes
Jul 3	Dr. Tsukasa Kiyoshi Magnet Development Group, Superconducting Materials Center	Magnetic Lens Using Bulk and/or Sheet Superconductors
	Dr. Guoping Chen MANA Scientist	Development of Functional Polymeric Porous Scaffolds for Tissue Engineering and Regenerative Medicine
Jun 7	Prof. Hiromitsu Maeda Institute of Science and Engineering, Ritsumeikan University	Charge-by-charge assemblies from p-conjugated acyclic anion receptors
	Prof. John Dayton Tovar Department of Chemistry, Johns Hopkins University, USA	Topological and supramolecular considerations for organic electronics: from unusual aromaticity to bioelectronic nanomaterials
Jun 10	Dr. Mitsuhiro Okuda Biomaterials Center	Development of aligned collagen using high magnetic field
	Dr. Yoshitaka Adachi Exploratory Materials Research Laboratories for Reliability and Safety	Interplay between 4D-EBSD and in situ neutron diffraction to unveil hierarchical microstructural labyrinth
Jul 14	Prof. Osamu Terasaki Professor, Head of Structural Chemistry, Arrhenius Laboratory, Stockholm University, Sweden	Structures of silica mesoporous crystals by EM

Jul 17	Dr. Kohsaku Kawakami MANA Scientist	Particle nanofabrication by spray-drying: Towards understanding dynamic interfacial phenomena during the drying process
	Dr. Yasuhiro Shirai ICYS-MANA Researcher	Templated synthesis and characterization of conductive polymeric nanowires
Jul 23	Prof. Marco Rolandi Department of Materials Science and Engineering, University of Washington, Seattle, WA, USA	Tip induced chemistries for nanoarchitectonics
	Dr. Pedro Costa CICECO, Department of Ceramics and Glass, University of Aveiro, Portugal	Nanomechanics of hybrid carbon nanotubes
Jul 24	Dr. Takeo Minari MANA Scientist	Selective molecular assembly for direct fabrication of organic thin-film transistors
	Dr. Daniele Pergolesi MANA Scientist	Low Temperature Miniaturized Solid Oxide Fuel Cells (SOFCs): Pulsed laser deposition of highly textured Y-doped BaZrO ₃ proton conducting electrolyte membranes
Jul 30	Prof. J. B. Xu Chinese University of Hong Kong, China	Investigation of Functional Oxides and Nanostructures by Scanning Probe Microscopy
	Prof. X. L. Guo Southeast University, China	Scanning tunneling microscopy-induced electroluminescence from organic molecules near metal surface
Jul 31	Dr. Tetsushi Taguchi MANA Scientist	Development of novel tissue adhesives for biomedical applications
	Prof. Iwao Matsuda The University of Tokyo Synchrotron Radiation Laboratory Affiliated to the ISSP	Regulating spin and Fermi surface topology of a quantum metal film by a surface (interface) monatomic layer
Aug 5	Prof. Kosmas Prassides Department of Chemistry, Durham University, UK	Interplay between structure and superconductivity in Fe-based superconductors at ambient and high pressures
Aug 6	Prof. Bedri Cetiner Utah State University, Electrical and Computer Engineering Department, USA	NEMs Integrated Antennas for Cognitive Wireless Communications
	Prof. Guy Le Lay CINaM-CNRS, Campus of Luminy, and University of Provence, France	Physics and chemistry of silicene nano-ribbons
Aug 28	Prof. Yuri M. Lvov Institute for Micromanufacturing, Louisiana Tech University, USA	Clay Nanotubes for Controlled Release of Corrosion Protective Chemicals
	Dr. Junwang Tang Department of Chemical Engineering, University College London, UK	Mechanism of Water Splitting for Solar Hydrogen Production on Nanostructured TiO ₂ Film
Sep 1	Dr. A. E. Koshelev Materials Science Division, Argonne National Laboratory, USA	Generation of electromagnetic waves using intrinsic Josephson Junctions

Sep 4	Dr. Vaishali Shinde ICYS Researcher	Hierarchical porous NiO nano/micro superstructures for electro-chemical applications
	Dr. Cesar Gomez ICYS-MANA Researcher	Chemical and Short-range order in RE-Mg-Cd quasicrystal approximants
Sep 11	Prof. Yuval Golan Chairman of Undergraduate Studies, Department of Materials Engineering Ben-Gurion University of the Negev, Israel	The role of the structure and reactivity of alkylamine surfactants in the synthesis and assembly of ultranarrow ZnS nanoparticles
	Prof. Norbert Kroó Vice-President of Hungarian Academy of Sciences, Hungary	The new world of surface plasmons
Sep 18	Dr. Yufang Zhu ICYS Researcher	Fe ₃ O ₄ @SiO ₂ Hollow Mesoporous Spheres as Carriers for Drug Delivery
	Dr. Michael Lee ICYS-MANA Researcher	Templated Self-assembling Polymer Structures
Sep 24	Prof. Patrik Schmuki Department of Materials Science and Engineering, University of Erlangen-Nürnberg, Germany	Self-Organized Titanium Oxide Nanotube-Layers: Formation and Application in Photocatalysis and Dye Sensitized Solar Cells
Sep 25	Prof. Omar Yaghi MANA Reticular Materials Group PI & Dept. of Chem. and Biochem, UCLA, USA	A new era for mofs: borgs and mtv-mofs
	Prof. Tomoyuki Kakeshita Division of Materials and Manufacturing Science, Graduate School of Engineering, Osaka University	Giant strain in some ferromagnetic shape memory alloys and Kinetics and precursor phenomena of martensitic transformation
Sep 28	Prof. Hideomi Koinuma NIMS Senior Advisor Emeritus	Briefing of Grant-in-Aid of Scientific Research "Kaken-Hi" <ul style="list-style-type: none"> • Strategy to Get KAKENHI • Keys to the Scientific Research (S) • Keys to the Grant-in-Aid for Young Scientists • Questions and answers
	Dr. Naoki Ohashi MANA PI	
	Dr. Kenataro Tashiro MANA Scientist	
Oct 2	Dr. Veronika Brazdova Postdoctoral Researcher London Centre for Nanotechnology Univ. College of London, UK	Si atom adsorption and diffusion on (1X1) and (2X1) Si(110) surface
	Prof. Silviya Gradecak Department of Materials Science and Engineering, Massachusetts Institute of Technology, USA	Semiconductor Nanowires: Growth, Properties, and Applications
Oct 7	Prof. J. Georg Bednorz 1987 Nobel Prize Winner, IBM Fellow, Germany	Perovskite-based nonvolatile memory
Oct 9	Prof. Ying Ma Institute of Chemistry, Chinese Academy of Science, China	Simple methods to prepare hollow nanostructures
	Dr. Eiji Muromachi Group MANA PI	On the research of the Superconducting Materials Group, MANA

Oct 16	Dr. Masataka Imura ICYS-MANA Researcher	AlN Hetero-Epitaxial Growth on Diamond Substrates by Metal-Organic Vapor Phase Epitaxy
	Prof. Jurgen Michel Principal Research Associate, Microphotonics Center, Massachusetts Institute of Technology, USA	Ge Optoelectronic Devices for Silicon Photonics
Oct 26	Prof. Prashant V. Kamat Department of Chemical & Biomolecular Engineering, University of Notre Dame, USA	Solar Cells by Design. Harvesting Light Energy with Nanostructure Assemblies
	Prof. Ayusman Sen Head of Department of Chemistry, Pennsylvania State University, USA	Chemo and Phototactic Nano/Microbots
Oct 30	Dr. Peter Werner Max-Planck Institute of Microstructure Physics, Germany	Some Aspects of Si- and SiGe Nanowires: Formation Methods and Doping
	Prof. V. Renugopalakrishnan Dept. of Chemistry and Chemical Biology, Northeastern University, Boston, USA	Implantable Bio-fuel Cells - Cross-linked Enzyme Clusters
Nov 6	Dr. Canhua Liu ICYS-MANA Researcher	Phase decoupling of charge density waves and periodic lattice distortion visualized on an array of indium atomic wires
	Dr. Mathieu Grandcolas ICYS Researcher	Titania based 1D nanomaterials: doping, composites and visi- ble light photocatalytic activities
Nov 13	Dr. Jianlin Shi ICYS Visiting Researcher	Inorganic Mesoporous Drug Carriers-Synthesis and Properties
	Dr. Dongsheng Xu ICYS Visiting Researcher	Multi-scale simulation of titanium based materials
Nov 16	Dr. Maurice S. Skolnick ICYS Visiting Researcher	Ultrafast optical control with single self-assembled quantum dots
Nov 20	Dr. Jesse Williams ICYS-MANA Researcher	Nano-Dispersion Strengthened Gold Films for MEMS Electrical Contacts
	Dr. Qingsong Mei ICYS Researcher	Microstructure and property of NiTi alloy in response to surface mechanical attrition treatment (SMAT)
Nov 25	Dr. Binghai Yan (ICYS Visiting Researcher) University of Bremen, Germany	Electronic and structural properties of the Ge (001) surfaces with impurity dimers: first-principles study
Nov 27	Dr. Enrico Traversa Group MANA PI	Nanostructured Materials for Miniaturized Solid Oxide Fuel Cells and Sustainable Development
Dec 4	Dr. Rudder Wu ICYS Researcher	High-temperature Degradation Mechanisms of High Temperature Coatings and Life Extension Methods
	Dr. Tatsuo Shibata ICYS-MANA Researcher	Development of novel surface modification using two-dimen- sional nanosheets for thin film deposition
Dec 14	Prof. Somnath Bhattacharyya School of Physics and DST/NRF, Centre of Excellence in Strong Materials, University of the Witwatersrand, South Africa	Quantum transport in low-dimensional disordered carbon films

Dec 15	Prof. Kannan Krishnan Department of Materials Science and Engineering, University of Washington, USA	Biomedical nanomagnetism: a spin on new possibilities
Dec 18	Dr. Xiaosheng Fang ICYS-MANA Researcher	One-dimensional (1D) ZnS Nanostructures: From Synthesis to Application
	Dr. Xudong Yang ICYS Researcher	Dynamics of excited states in "Low Cost Solar Cell"
Dec 25	Dr. Valerii M. Vinokur Director of Materials Theory Institute and Senior Scientist at Materials Science Division, Argonne National Laboratory, USA	Advance in quantum kinetic theory: Low-temperature transport in mesoscopic tunnel junctions
	Prof. Pulickel M. Ajayan Department of Mechanical Engineering & Materials Science, Rice University, USA	Engineering at the Nanoscale: Future and Challenges

Appendix 8.7: Japanese Culture and Language Classes

Schedule of Japanese Culture Classes 2009:

Date	Class Name	Number of Participants
Jan 30	Kimono	11
Feb 6	Two Aspects of the Japanese Language	10
May 22	Japanese Herbal Medicine & Spring Purification Festival	20
Jul 3	Tea Ceremony	9
Jul 31	Yukata Dress	16
Aug 17	Japanese Drums	12
Aug 19	Japanese Drums	12
Sep 25	Seal Carving	16
Oct 23	Japanese Ink Drawing	13
Nov 20	Japanese Style X'mas & New Year's Greeting Card	11
Dec 11	Flower Arrangement	16

Participants of Japanese Language Classes 2009:

Namiki Site	Number of Participants		
	Jan ~ Mar	May ~ Jul	Sep ~ Dec
Introductory Level	7	6	14
Beginner Level	11	16	10

Sengen Site	Number of Participants		
	Jan ~ Mar	May ~ Jul	Sep ~ Dec
Introductory Level	11	9	10
Beginner Level	5	14	15

Appendix 8.8: Research Papers

List of Research Papers 2009:

1	S. Acharya, J.P. Hill, K. Ariga, <i>Soft Langmuir-Blodgett Technique for Hard Nanomaterials</i> , Adv. Mater. 21 , 2959 (2009).
2	S. Acharya, S. Kundu, J.P. Hill, G.J. Richards, K. Ariga, <i>Ultrasmall ZnS Nanorod-Nematic Liquid Crystal Blend for Polarization-Tailored Electrooptic Devices</i> , Adv. Mater. 21 , 989 (2009).
3	S. Acharya, D.D. Sarma, Y. Golan, S. Sengupta, K. Ariga, <i>Shape Dependent Confinement in Ultrasmall Zero, One, and Two Dimensional PbS Nanostructures</i> , J. Am. Chem. Soc. 131 , 11282 (2009).
4	S. Acharaya, A. Shundo, J.P. Hill, K. Ariga, <i>Langmuir Films of Unusual Components</i> , J. Nanosci. Nanotechnol. 9 , 3 (2009).
5	Z. Ahmed, B.R. Matos, D.Z. de Florio, S. Licocchia, E. Traversa, V. Esposito, E.I. Santiago, F.C. Fonseca, <i>Nafion-Mesoporous Silica as Electrolyte for Ethanol Fuel Cells</i> , ECS Trans. 25 , 853 (2009).
6	J.S. Ahn, D. Pergolesi, M.A. Camaratta, H. Yoon, B.W. Lee, K.T. Lee, D.W. Jung, E. Traversa, E.D. Wachsman, <i>High-Performance Bilayered Electrolyte Intermediate Temperature Solid Oxide Fuel Cells</i> , Electrochem. Comm. 11 , 1504 (2009).
7	K. Akatsuka, M. Haga, Y. Ebina, M. Osada, K. Fukuda, T. Sasaki, <i>Construction of Highly Ordered Lamellar Nanostructures through Langmuir-Blodgett Deposition of Molecularly Thin Titania Nanosheets Tens of Micrometers Wide and Their Excellent Dielectric Properties</i> , ACS Nano 3 , 1097 (2009).
8	T. Akazaki, H. Hashiba, M. Yamaguchi, K. Tsumura, S. Nomura, H. Takayanagi, <i>Interplay between Negative Photoconductivity and Enhanced Andreev Reflection in InGaAs-based S-Sm-S Junctions when Exposed to Infrared Light</i> , J. Phys.: Conf. Ser. 150 , 052004 (2009).
9	T. Akazaki, Y. Sawa, T. Yokoyama, Y. Tanaka, A.A. Golubov, H. Munekata, N. Nishizawa, H. Takayanagi, <i>Spin-polarized Carrier Injection Effect in Ferromagnetic Semiconductor/Diffusive Semiconductor/Superconductor Junctions</i> , J. Phys.: Conf. Ser. 150 , 022085 (2009).
10	S. Alam, C. Anand, K. Ariga, T. Mori, A. Vinu, <i>Size Controlled Iron Oxide Nanoparticles Grown in Nanoporous Matrix with Tunable Pores and their Unusual Magnetic Properties</i> , Angew. Chemie Inter. Ed. 48 , 7358 (2009).
11	S. Alam, C. Anand, R. Logudurai, V.V. Balasubramanian, K. Ariga, A. Chandra Bose, T. Mori, P. Srinivasu, A. Vinu, <i>Comparative study on the magnetic properties of iron oxide nanoparticles loaded on mesoporous silica and carbon materials with different structure</i> , Micropor. Mesopor. Mater. 121 , 178 (2009).
12	S. Alam, R. Logudurai, V.V. Balasubramanian, P. Srinivasu, K. Ariga, A. Vinu, <i>Comparative Study on the Magnetic Properties of Iron Oxide Nanoparticles Loaded on Mesoporous Silica and Carbon Materials with Different Structure</i> , Micropor. Mesopor. Mater. 121 , 178 (2009).
13	J. Alvarez, M.Y. Liao, J.P. Kleider, Y. Koide, M. Imura, <i>Ultraviolet Detectors Based on Ultraviolet-Ozone Modified Hydrogenated Surfaces</i> , Appl. Phys. Express 2 , 065501 (2009).
14	M.K. Aminian, N. Taghavinia, A. Irajizad, S.M. Mahdavi, J. Ye, M. Chavoshi, Z. Vashaei, <i>Two dimensional clustering of nanoparticles on the surface of cellulose fibers</i> , J. Phys. Chem. C 113 , 12022 (2009).
15	N. Ananthi, U. Balakrishnan, A. Vinu, K. Ariga, S. Velmathi, <i>Chiral amide from (1S, 2R)-(+)-norephedrine alkaloid in the enantioselective addition of diethylzinc to aryl and heteroaryl aldehydes</i> , Tetrahedron: Asymmetry 20 , 1731 (2009).
16	G.R. Aranda, O. Chubykalo-Fesenko, R. Yanes, J. Gonzalez, J.J. del Val, R. W. Chantrell, Y.K. Takahashi, K. Hono, <i>Coercive field and energy barriers in partially disordered FePt nanoparticles</i> , J. Appl. Phys. 105 , 07B514 (2009).
17	K. Ariga, <i>Kenkyu-sha Note Ariga ryu! Kokusai gakkai no aruki-kata</i> , Kagaku 64 , 18 (2009), in Japanese.
18	K. Ariga, <i>Kenkyu-sha Note Yaku ni tatanai kenkyu wa yaku ni tatanai ka?</i> , Kagaku 64 , 36 (2009), in Japanese.
19	K. Ariga, <i>Kenkyu-sha Note Kokken to iu sentaku-shi</i> , Kagaku 64 , 40 (2009), in Japanese.

20	K. Ariga, <i>Kenkyu-sha Note Sendachi ni manabu ronbun shippitsu jyutsu</i> , Kagaku 64 , 44 (2009), in Japanese.
21	K. Ariga, <i>Macro de saguru nano tec: Te de bunshi wo tsukamaeru niwa?</i> , Kagaku 79 , 141 (2009), in Japanese.
22	K. Ariga, <i>Iryo genba de cho-bunshi wa kashiko-ku hatarakeru ka</i> , Kagaku 79 , 362 (2009), in Japanese.
23	K. Ariga, <i>Kankyo ni yasashii cho-bunshi: Doku wo torinozoku</i> , Kagaku 79 , 594 (2009), in Japanese.
24	K. Ariga, <i>Me de miru cho-bunshi sayo: Kuttсутari – Hanaretari to Katachi wo shizen ni miwakeru</i> , Kagaku 79 , 829 (2009), in Japanese.
25	K. Ariga, <i>Gendai kaimen chorioid kagaku no kiso 7-5 Nano-pore zairyo no sakusei-ho to kinoh</i> , Maruzen, Nihon kagakukai hen 326 (2009), in Japanese.
26	K. Ariga, <i>Topology designing: Atarashii kikagaku kara hajimeru busshitsu-zairyo sekkei 1-2 NIMS ni okeru Topology designing</i> , NTS 23 (2009), in Japanese.
27	K. Ariga, <i>Cho-bunshi science & technology 3.2.7 Tan-bunshi-maku actuator</i> , NTS 593 (2009), in Japanese.
28	K. Ariga, J.P. Hill, J. Labuta, <i>Bottom-Up Nanofabrication through Self-Assembly of Lipids, Peptides, and Related Molecules for Preparation of Nano- and Micro-Objects</i> , BOTTOM-UP NANOFABRICATION: Supramolecules, Self-Assemblies, and Organized Films, Editor: K. Ariga and H. S. Nalwa, Publisher: American Scientific Publishers, Los Angeles, Volume 3 , Chapter 7, p. 171 (2009).
29	K. Ariga, J.P. Hill, Y. Wakayama, <i>Jisedai kyoyaku polymer no cho-kaiso-seigyō to kakushin kinoh IV-6 Porphyrin bunshi array: kyoyaku-kei oligomer no cho-bunshi hairitsu wo mochiita kakushin-teki nano-lithography-ho no kaihatsu wo mezashite</i> , JMC Shuppan, 379 (2009), in Japanese.
30	K. Ariga, J.P. Hill, Y. Wakayama, M. Akada, <i>New Aspects of Porphyrins and Related Compounds: Self-Assembled Structures in Two-Dimensional Molecular Arrays</i> , J. Porphyrins Phthalocyanines 13 , 22 (2009).
31	K. Ariga, Q. Ji, J.P. Hill, N. Kawazoe, G. Chen, <i>Supramolecular Approaches to Biological Therapy</i> , Expert Opin. Biol. Ther. 9 , 307 (2009).
32	K. Ariga, Q. Ji, J.P. Hill, A. Vinu, <i>Coupling of soft technology (layer-by-layer assembly) with hard materials (mesoporous solids) to give hierarchic functional structures</i> , Soft Matter 5 , 3562 (2009).
33	K. Ariga, M.V. Lee, J. Labuta, K. Okamoto, J.P. Hill, <i>Studies on Langmuir Monolayers of Polyphenyl Phosphates towards a Possible Scenario for Origin of Life</i> , Colloids and Surfaces B: Biointerfaces, 74 , 426 (2009).
34	K. Ariga, T. Nakanishi, T. Michinobu, <i>Dynamic Functions at Molecularly-Assembled Films</i> , Soft Nanomaterials, Editor: H. S. Nalwa, Publisher: American Scientific Publishers, Los Angeles, Volume 1, Chapter 3, p. 109 (2009).
35	K. Ariga, T. Nakanishi, M. Miyahara, <i>Two-Dimensional Supramolecular Chemistry at the Air-Water Interface: Molecular Recognition, Patterning, and Related Functions</i> , BOTTOM-UP NANOFABRICATION: Supramolecules, Self-Assemblies, and Organized Films, Editor: K. Ariga and H. S. Nalwa, Publisher: American Scientific Publishers, Los Angeles, Volume 1 , Chapter 16, p. 435 (2009).
36	K. Ariga, A. Vinu, <i>Nanospace Materials: Fundamentals and Applications</i> , Carbon Nanospace 59 (2009).
37	K. Ariga, A. Vinu, <i>Mesoporous Materials: Designs, Syntheses, and Novel Functions</i> , Chemistry and Application of Coordination Space, CMC Books 11 (2009).
38	K. Ariga, A. Vinu, <i>Nano kukan zairyo no sousei to ohyo tenkai 2-6 Carbon nano kukan</i> , Frontier shuppan 56 (2009), in Japanese.
39	K. Ariga, A. Vinu, <i>Haii kukan no kagaku 1-1 Meso-ko busshitsu: sekkei - gosei to atarashii kinoh</i> , JMC shuppan (2009), in Japanese.
40	K. Ariga, A. Vinu, J.P. Hill, P. Srinivasu, S. Acharya, A. Ji, <i>Supramolecular Structures and Functions with Inorganic Building Blocks</i> , Macromolecules Containing Metal and Metal-Like Elements, Volume 9 , Editor: Alaa S. Abd-El-Aziz, Charles E. Carraher, Jr., Charles U. Pittman, Jr., and Martel Zeldin, Publisher: John Wiley & Sons, Inc., Hoboken, 1 (2009).
41	Y. Asano, I. Suemune, H. Takayanagi, E. Hanamura, <i>Luminescence of a Cooper Pair</i> , Phys. Rev. Lett. 103 , 187001 (2009).

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552	T.Y. Zhai, X.S. Fang, Y. Bando, B. Dierre, B.D. Liu, H. Zeng, Y. Huang, X.J. Xu, X. Yuan, T. Sekiguchi, D. Golberg, <i>Characterization, cathodoluminescence and field-emission properties of morphology-tunable CdS micro/nanostructures</i> , Adv. Funct. Mater. 19 , 2423 (2009).
553	T.Y. Zhai, X.S. Fang, Y. Bando, Q. Liao, X.J. Xu, H. Zeng, Y. Ma, J.N. Yao, D. Golberg, <i>Morphology-dependent stimulated emission and field-emission of ordered CdS nanostructure arrays</i> , ASC Nano 3 , 949 (2009).
554	T.Y. Zhai, X.S. Fang, M.Y. Liao, X.J. Xu, H. Zeng, Y. Bando, D. Golberg, <i>A comprehensive review of one-dimensional metal-oxide nanostructure photodetectors</i> , Sensors 9 , 6504 (2009).
555	L. Zhao, T. Nakayama, H. Tomimoto, Y. Shingaya, H. Qing, <i>Functionalization of carbon nanotubes with a pH-responsive molecule to produce an pH sensor</i> , Nanotechnology 20 , 325501 (2009).
556	C.Y. Zhi, Y. Bando, C.C. Tang, H. Kuwahara, D. Golberg, <i>Large-scale fabrication of few-atomic-layer boron nitride nanosheets and their utilization in polymeric composites with improved thermal and mechanical properties</i> , Adv. Mater. 21 , 2889 (2009).
557	C.Y. Zhi, Y. Bando, T. Terao, C.C. Tang, H. Kuwahara, D. Golberg, <i>Towards highly thermo-conductive electrically insulating polymeric composites with boron nitride nanotubes as fillers</i> , Adv. Funct. Mater. 19 , 1857 (2009).
558	C.Y. Zhi, Y. Bando, T. Terao, C.C. Tang, H. Kuwahara, D. Golberg, <i>Chemically activated boron nitride nanotubes</i> , Chem. Asian J. 4 , 1536 (2009).
559	Y.M. Zhu, M. Weyland, A.J. Morton, K. Oh-ishi, K. Hono, J. F. Nie, <i>The building block of long-period structures in Mg-RE-Zn alloys</i> , Scripta Mater. 60 , 980 (2009).
560	M. Zunic, L. Chevallier, F. Deganello, A. D'Epifanio, S. Licocchia, E. Di Bartolomeo, E. Traversa, <i>Electrophoretic Deposition of Dense BaCe_{0.9}Y_{0.1}O_{3-x} Electrolyte Thick-Films on Ni-Based Anodes for IT-SOFCs</i> , J. Power Sources 190 , 417 (2009).

Appendix 8.9: Patents

List of Japanese Patent Applications (October 2007 – December 2009):

No.	Name of Invention	Application Number	Date of Application
1	Method of mass production of ZnO nanowires	2007-272490	2007 Oct 19
2	Thermally stable resin composition having excellent mechanical properties and process for production thereof	2007-275072	2007 Oct 23
3	Co based Heusler alloy half-metal	2007-276353	2007 Oct 24
4	A metal compound probe for Raman spectroscopy	2007-276691	2007 Oct 24
5	Gel of BN nanotubes, alkylation of BN nanotubes and their fabrication process	2007-282523	2007 Oct 30
6	Synthetic method for anion-exchangeable layered double hydroxides	2007-314339	2007 Dec 5
7	A nanoscale pH sensor	2007-323034	2007 Dec 14
8	Optical devices and their applications to display devices	2007-325022	2007 Dec 17
9	High strength sintered steel	2007-329408	2007 Dec 21
10	Mesoporous Carbon (MC-MCM-48) and Method for Producing the Same	2007-334245	2007 Dec 26
11	Cage Type Mesoporous Silica (SNC-2), Method for Producing the Same and Absorbent Using the Same	2007-334246	2007 Dec 26
12	Mesoporous Carbon (CNP-2) and Method for Producing the Same	2007-334247	2007 Dec 26
13	BN nanofibers and their fabrication process	2007-336861	2007 Dec 27
14	Dope solution for molding	2008-000645	2008 Jan 7
15	Swellable layered double hydroxides and sol, gel and nanosheets derived from them	2008-012914	2008 Jan 23
16	Layered oxide phosphors and oxide nanosheet phosphors	2008-014606	2008 Jan 25
17	Layered rare-earth hydroxides and their photoluminescent material	2008-025833	2008 Feb 6
18	Synthetic method of layered rare-earth hydroxides	2008-025834	2008 Feb 6
19	Rechargeable solid-state lithium battery	2008-032828	2008 Feb 14
20	Electrode element, method of manufacturing electrode element, and lithium ion secondary battery	2008-036537	2008 Feb 18
21	Frequency conversion devices made of lithium tantalite single crystal	2008-039835	2008 Feb 21
22	Cobalt hydroxide crystals, cobalt hydroxide unilamellar nanosheets and their fabrication process	2008-043681	2008 Feb 26
23	Layered double hydroxides and their delaminated nanosheets	2008-043681	2008 Feb 26
24	Electronic devices and method of their fabrication	2008-054671	2008 Mar 5
25	An instrument for sample preparation and characterization	2008-062344	2008 Mar 12
26	Storage media, recording system, and methods for data recording and erasing	2008-054917	2008 Mar 13
27	Recording media, its implementation, and the methods of recording and erasing information	2009-505219	2008 Mar 17
28	Apparatus for producing artificial opal film	2008-076953	2008 Mar 25
29	Characterization methods for substrates of semiconductor solid solutions	2008-079863	2008 Mar 26
30	Fabrication method of nano electron emitters	2008-080358	2008 Mar 26

31	Metal-doped Mesoporous Silica (MeKIT-5) and Method for Producing the Same	2008-100264	2008 Apr 8
32	Polymer electrolytes having excellent mechanical properties, dimension stabilities and their fabrication process	2008-110103	2008 Apr 21
33	Polarization-tailored devices	2008-118118	2008 Apr 30
34	Transparent magnetic films, reading techniques for magnetic patterns, fabrication methods for transparent magnets, and magnetic patterns	2008-118785	2008 Apr 30
35	Synthetic method of anion-exchangeable layered double hydroxides	2008-119873	2008 May 1
36	TiN-based crystals and their bonding bodies	2008-131424	2008 May 20
37	Transparent magnetic films, reading techniques for magnetic patterns, fabrication methods for transparent magnets, and magnetic patterns	2008-135379	2008 May 23
38	TiN-based crystals	2008-131429	2008 Jun 5
39	Photocatalytic nanosheets and their coating films	2008-147592	2008 Jun 5
40	Electro-magnetic absorbers	2008-151636	2008 Jun 10
41	Superconducting sintered bodies and their preparation method	2008-170178	2008 Jun 30
42	Nanosheet phosphor materials and fluorescent lighting, solar cells and color displays utilizing nanosheet phosphors	2008-180826	2008 Jul 11
43	Nanosheet paint	2008-180828	2008 Jul 11
44	Photoresponsive drug delivery system (DDS) and drug-conjugated photoresponsive DDS	2008-184326	2008 Jul 15
45	Environment friendly Yellow pigment	2008-194346	2008 Jul 29
46	Co based Heusler alloy half-metal	2008-199712	2008 Aug 1
47	Current perpendicular to plan giant magnetoresistance device	2008-219619	2008 Apr 28
48	Age hardening magnesium Sn alloy	2008-243311	2008 Sep 22
49	Age hardening Magnesium Mg-Sn alloy	2008-243342	2008 Sep 22
50	Polymer brush-solid hybrid material and its manufacturing	2008-247361	2008 Sep 26
51	Graphene-coated materials and the fabrication method	2008-261875	2008 Oct 8
52	Prepregs having high thermal conductivities, process for production thereof and laminates	2008-269820	2008 Oct 20
53	Cage-type mesoporous silica (SNC-2): its synthetic method and application as adsorbents	2008-271929	2008 Oct 22
54	Mesoporous carbon (CNP-2) and its synthetic method	2008-272012	2008 Oct 22
55	Mesoporous carbon (MC-MCM-48) and its synthetic method	2008-274047	2008 Oct 24
56	Preparation of crystalline-oriented titania photoelectrodes	2008-288304	2008 Nov 11
57	Synthesis of semiconductor nanowires and fabrication of vertical-type field effect transistors using semiconductor nanowires	2008-296940	2008 Nov 20
58	ZnS/ZnO biaxial nanowires and their fabrication process	2008-297575	2008 Nov 21
59	Co based Heusler alloy and manetic device	2008-299551	2008 Nov 25
60	Calibration method of dopant impurities	2008-308073	2008 Dec 3
61	Organic field effect transistor	2008-321975	2008 Dec 18
62	A nanorod blend for liquid crystal display for polarization-tailored electro-optic devices	2008-322401	2008 Dec 18
63	Nano-conductance materials and their fabrication process	2009-006731	2009 Jan 15
64	Dry process apparatus	2009-007329	2009 Jan 16
65	PH sensitive nanomaterials and their fabrication process	2009-010581	2009 Jan 21
66	An ordered mesoporous fullerene with high specific surface area and fabrication method thereof,	2009-021407	2009 Feb 2
67	TiO ₂ nanoparticle	2009-021457	2009 Feb 2

68	BN nanoparticles and their fabrication process	2009-002174	2009 Feb 3
69	Nanocrystal particle terminated with organic monolayers and preparation method of nanocrystal particle terminated with organic monolayers	2009-037746	2009 Feb 20
70	Hetero pn junction semiconductor and its fabrication method	2009-045406	2009 Feb 27
71	Surface-enhanced Raman scattering-responsive nanoscale pH sensor	2009-048844	2009 Mar 3
72	High thermal conductive prepregs, their fabrication process and laminates	2009-051914	2009 Mar 5
73	Light-emitting device	2009-052779	2009 Mar 6
74	Chip-based immunosensor	2009-077715	2009 Mar 26
75	Layered rare earth hydroxides and their films and their fabrication method	2009-081303	2009 Mar 30
76	Silicon nanoparticles light emitting devices	2009-089645	2009 Apr 2
77	Rare earth oxide phosphors and their films and their fabrication method	2009-090042	2009 Apr 2
78	Light emitting sheets	2009-097564	2009 Apr 14
79	Ferromagnetic tunnel junction and its applications to magnetoresistive devices	2009-099483	2009 Apr 16
80	Luminous nanosheets and their applications in phosphor materials, solar cells and color displays	2009-099595	2009 Apr 16
81	Nanosheet paint	2009-101578	2009 Apr 20
82	Lithium Tantalate Single Crystal, Frequency Conversion device and Frequency Conversion Apparatus	2009-107382	2009 Apr 27
83	Photodegradable heterobifunctional crosslinker	2009-114028	2009 May 8
84	Anode material and lithium battery using the same	2009-117114	2009 May 14
85	Hydrogen evolution material	2009-125016	2009 May 25
86	ZnS nanobelts, their fabrication process and UV sensitive devices	2009-131847	2009 Jun 1
87	Hetero pn junction semiconductor and its fabrication method	2009-132693	2009 Jun 2
88	Molecular electronic devices and method of their fabrication	2009-169740	2009 Jul 21
89	Thermoelectric device/element	2009-171907	2009 July 23
90	Rare earth boride thermoelectric device/element and thermoelectric power generating device/element	2009-171979	2009 July 23
91	Thermoelectric semiconductor and thermoelectric power generating device/element	2009-172597	2009 July 24
92	Current perpendicular plane giant magnetoresistive devices	2009-182968	2009 Aug 6
93	Rubber composites having excellent mechanical properties and process for production thereof	2009-183438	2009 Aug 6
94	Nano-ribbon and its fabrication method, nano-ribbon FET and its fabrication method, DNA sequencing method and apparatus using nano-ribbon	2009-194892	2009 Aug 26
95	Fabrication method of graphene film	2009-199126	2009 Aug 31
96	Production of substrates for dielectric and conductive films, their device and electronics	2009-205911	2009 Sep 7
97	Methodology and an instrument for simultaneous thermal analysis of multiple samples	2009-219189	2009 Sep 24
98	Single-crystalline ZnSe blue/ultraviolet-light photodetectors and its fabrication method	2009-232381	2009 Oct 6
99	Ultra thin BN nanosheets, their fabrication process and photo devices including their sheets	2009-234651	2009 Oct 8

100	Boron doped semiconductor nanowires and their synthesis methods	2009-236883	2009 Oct 14
101	Analysis of dopant atoms in dopant doped Ge	2009-258108	2009 Nov 11
102	Fabrication method of contact and structure in the organic transistor	2009-268309	2009 Nov 26
103	BN nanofibers, their fabrication process and production process of nanotubes	2009-279375	2009 Dec 9
104	UV micro-sensors and their fabrication process	2009-279520	2009 Dec 9
105	Nanoparticle preparing equipment and preparation method of nanoparticle using it	2009-280039	2009 Dec 10

List of International Patent Applications (October 2007 – December 2009):

No.	Name of Invention	Application Number	Date of Application
1	Dielectric devices and their fabrication methods	PCT/JP2007/074552	2007 Dec 20
2	Lead-free magneto-optical devices and their fabrication methods	PCT/JP2008/054656	2008 Mar 13
3	Recording media, its implementation, and the methods of recording and erasing information	PCT/JP2008/054917	2008 Mar 17
4	Mesoporous carbon nitride and its synthetic method	PCT/JP2008/056802	2008 Apr 4
5	High strength and high ductility magnesium alloys	PCT/JP2008/058677	2008 May 9
6	Magnetio Film, Magnetio Recording/Reproducing Device, and Polarization Conversion Component	US Patent 12/135472	2008 Jun 9
7	Organic solvent dispersion of titania nanosheet and its film	PCT/JP2008/065989	2008 Sep 4
8	Fabrication method of sensor material for surface enhanced infrared absorption	PCT/JP2008/066107	2008 Sep 5
9	Totally-solid lithium secondary battery	PCT/IB2009/000240	2009 Feb 12
10	Electrode element, method of manufacturing electrode element, and lithium ion secondary battery	PCT/IB2009/000279	2009 Feb 17
11	Dielectric films, high-k devices and their fabrication methods	PCT/JP2009/059550	2009 May 25
12	Electromagnetic wave absorbers	PCT/JP2009/060636	2009 Jun 10
13	Luminous nanosheets and their applications in phosphor materials, solar cells, color displays, nanosheet paint	PCT/JP2009/062681	2009 Jul 13
14	Alloy particles and wires used for atmospheric plasma spray and wire arc spray	PCT/JP2009/066508	2009 Sep 24
15	High thermal conductive prepregs, their fabrication process and laminates	PCT/JP2009/068293	2009 Oct 19
16	Fabrication of dual structure ceramics by a single step process	US Patent 61/255645	2009 Oct 28
17	Analysis of Ex vivo cells for disease state detection and therapeutic agent selection and monitoring	PCT/US2008/085194	2009 Nov 26

List of Japanese Patent Registrations (October 2007 – December 2009):

No.	Name of Invention	Registration Number	Date of Registration
1	Ga ₂ O ₃ nanowires and their fabrication process	4025869	2007 Oct 19
2	Fabrication process of MgO nanocables and nanotubes	4025872	2007 Oct 19
3	Process for production of BN nanowires	4025873	2007 Oct 19

4	Fabrication process of GaN nanowires covered with gallium oxides	4025876	2007 Oct 19
5	Process for production of BN nanotubes included magnesium peroxides	4029158	2007 Oct 26
6	Manganese oxide nanosheet	4035599	2007 Nov 9
7	Layered cobalt oxide hydrate	4041883	2007 Nov 22
8	Electrochromic film	4051446	2007 Dec 14
9	Porous manganese oxide pillared with aluminum polyoxoions	4065953	2008 Jan 18
10	Single crystalline α -, β - Si_3N_4 nanoribbons and their fabrication process	4072622	2008 Feb 1
11	Lithium tantalate single crystal, its optical devices and growth method	4107365	2008 Apr 11
12	Photorefractive material	4139881	2008 Jun 20
13	Poling method of ferroelectric single crystals	4148451	2008 Jul 4
14	Shape control method of nanostructures	4192237	2008 Oct 3
15	ZnCdS nanocables and their fabrication process	4072622	2009 Feb 20
16	Textured sintered bodies of β -alumina and β'' -alumina, and their preparation method	4269049	2009 Mar 6
17	Thin film with ferroelectric mesocrystals and its synthesis method	4360467	2009 Aug 21
18	Hydrous sodium cobalt oxide	4370382	2009 Sep 11
19	Optical Modulator	4420202	2009 Dec 11

List of International Patent Registrations (October 2007 – December 2009):

No.	Name of Invention	Registration Number	Date of Registration
1	Method of inverting polarization by controlling defect density or degree of order of lattice points, and optical wavelength conversion element	German Patent 602004014399.5-08	2008 Jun 11
2	Method of inverting polarization by controlling defect density or degree of order of lattice points, and optical wavelength conversion element	UK Patent 1684112	2008 Jun 11
3	Wavelength conversion element having multi-gratings and light generating apparatus using said element, and wavelength conversion element having cylindrical ferroelectric single crystals and light generating apparatus using said element	US Patent 7403327	2008 Jul 22
4	Method of inverting polarization by controlling defect density or degree of order of lattice points, and optical wavelength conversion element	US Patent 7446930	2008 Nov 4
5	Hollow spheres and flakes of titanium dioxide and their production method	US Patent 7531160	2009 May 12
6	Cantilever based Sensors and Transducers	US Patent 7560070 B1	2009 Jul 14
7	High-performance all-solid lithium battery	Chinese Patent ZL200580018142.X	2009 Jul 15

Note: Additional MANA patents applications are not listed in this Appendix, because of privacy reason of the involved MANA researchers.

Appendix 8.10: Commendations

List of Commendations (October 2007 – December 2009):

Date	Prize	Prize Winner	Research for Commendation
2007 Oct	Poster Award at the Second International Symposium on Atomic Technologies	Shunsuke Tomita, Hiroyuki Hamada, Yukio Nagasaki, Kentaro Shiraki	Artificial chaperon system of amphiphilic polymer in combination with small additives to prevent protein aggregation
2007 Oct	Poster Award at the Second International Symposium on Atomic Technologies	Shogo Sumitani, Motoi Oishi, Yukio Nagasaki	Nanobiomaterials-design of pH-sensitive PEGylated nanogels containing fluorinated compounds as tumor-specific smart 19F MRI probes
2007 Nov 2	SSSJ Review Paper Award	Kazuya Terabe, Tsuyoshi Hasegawa, Tomonobu Nakayama, Masakazu Aono	Atomic switch-a nano device using motion of atoms and ions
2007 Nov 27	Days highlighted talk in MRS Fall Meeting 2007, Boston, USA	Somobrata Acharya	Ultra-thin Nanosheet Fabrication from Ultra-narrow PbS Nanowires
2007 Dec 1	Papers of Editors' Choice of Journal of the Physical Society of Japan	Shin Yaginuma, Katsumi Nagaoka, Tadaaki Nagao, Tomonobu Nakayama	Electronic structure of Ultrathin Bismuth Films with A7 and Black-Phosphorus-like Structures
2008 Jan	Best Poster Presentation Award at the Meeting of Special Postdoctoral Researchers Program, RIKEN, Japan	Satoshi Moriyama	Shell structures and spin configurations in carbon nanotube artificial atoms
2008 Jan	Best Cover Image Competition of the Year 2007, Journal: Materials Today	Pedro Costa, Dmitri Golberg, Guoshen Shen, Masanori Mitome, Yoshio Bando	"Solar Flares", an image of a CdS nanobelt deformed inside a transmission electron microscope
2008 Feb	Khwarizmi International Award by IRST Iran, Laureate of KIA	Ajayan Vinu	Multifunctional Nanoporous Materials
2008 Feb	Poster Award at the 18th Symposium of Materials Research Society of Japan	Toru Yoshitomi, Daisuke Miyamoto, Yukio Nagasaki	Synthesis of acetal-poly(ethyleneglycol)-b-poly(chloromethylstyrene) and application for functional bioimaging nanosphere
2008 Feb 19	Poster Award at WPI-AIMR & IFCAM Joint Workshop	Genki Yoshikawa	Evaluation of Sensitivity and Selectivity of Piezoresistive Cantilever-Array Sensors
2008 Mar	Poster Award at the First International Symposium on Interdisciplinary Materials Science	Shogo Sumitani, Motoi Oishi, Yukio Nagasaki	Preparation and Characterization of Tumor-Specific Imaging Probes Utilizing the pH-sensitive PEGylated Nanogels Containing 19F Compounds

2008 May 7	Asian Excellent Young researcher Lectureship Award 2008, Chemical Society of Japan	Ajayan Vinu	Discovery of Mesoporous Carbon Nitride (MCN), Boron Nitride and Boron carbon Nitride
2008 May 21	Best Poster Award at International Workshop on Nanomechanical Cantilever Sensors	Genki Yoshikawa	Evaluation of Sensitivity and Selectivity of Piezoresistive Cantilever-Array Sensors
2008 Jul	Award for Best Research by Young Scientist at International Conference on Carbon (Carbon 2008), Nagano, Japan	Pedro Costa, Yoshio Bando, Ujjal Gautam, Dmitri Golberg	Manipulating the current conductivity of halide-filled multi-walled carbon nanotubes
2008 Jul 9	Inoue Harushige Award of Japan Science and Technology Agency	Kenji Kitamura	Advancing Optical Technology by Controlling Single Crystal Defects
2008 July 16	2008 Tsukuba Prize	Takayoshi Sasaki, Minoru Osada	Synthesis of inorganic nanosheets and their organization into functional materials
2008 Aug 1	Best Oral Paper Award at IUMRS-ICEM 2008, Australia	Xiaosheng Fang, Yoshio Bando, Ujjal K Gautam, Dmitri Golberg	1D ZnS Nanostructures: Controlled Growth and Field-emission Applications
2008 Sep 4	Fellow of the International Society of Electrochemistry	Kohei Uosaki	Scientific achievements within the field of electrochemistry
2008 Sep 14	Outstanding Research Award of Magnetic Society of Japan	Kazuhiro Hono	Excellent research on the microstructure-property relationships of magnetic materials
2008 Sep 25	SPSJ Hitachi Chemical Award	Masayoshi Higuchi	Discovery of electrochromic properties in organic-metallic hybrid Polymer and application to color electronic paper
2008 Oct 6	Fellow of the American Ceramic Society	Yoshio Bando	Studies of inorganic nanotubes
2008 Oct 6	5th Osawa Award of The Fullerenes and Nanotubes Research Society	Yasuhiro Shirai	Design, Synthesis, and Testing of Fullerene-wheeled Nanocars
2008 Nov 7	IWDTF Young Researcher Award	Jun Chen	Study on carrier transport in high-K gate dielectric
2008 Dec 1	MRS Best Poster Award at MRS Fall Meeting, Boston, USA	Naoki Fukata	Phosphorus Donors and Boron Acceptors in Silicon Nanowires Synthesized by Laser Ablation
2008 Dec 13	Award for Encouragement of Research in Materials Science at the IUMRS International Conference in Asia 2008	Alexei Belik	Effects of doping on structural, physical, and chemical properties of multiferroic BiMnO ₃ and BiCrO ₃
2008 Dec 13	Award for Encouragement of Research in Materials Science at the IUMRS International Conference in Asia 2008	Pavuluri Srinivasu, Ajayan Vinu	Pore-size control of mesoporous materials using high temperature microwave treatment
2009 Jan 21	Journal of Materials Chemistry, Cover Image Winner	Junqing Hu, Yoshio Bando, Dmitri Golberg	Novel semiconductor nanowire heterostructures: synthesis, analysis, properties and applications

2009 Mar 5	Excellent Poster Award, 3rd International Symposium on Atomic Technology (ISAT-3)	Shogo Sumitani, Motoi Oishi, Tatiana K. Bronich, Alexander V. Kabanov, Michael D. Boska, Yukio Nagasaki	Preparation and Characterization of pH-sensitive ¹⁹ F-MRI Nano-probes Based on the PEGylated Nanogels
2009 Mar 28	CSJ Award for Young Chemists by the Chemical Society of Japan	Ajayan Vinu	Research on Nanoporous carbons and nitrides
2009 Mar 30	Incentive Award for Excellent Presentation	Masato Nakaya, Yuji Kuwahara, Masakazu Aono, Tomonobu Nakayama	Ultra-high density data storage into a C ₆₀ thin film using an STM probe
2009 Apr 14	The Young Scientists' Prize, Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT).	Minoru Osada	Nanoscale structural control and novel physical properties in transition metal oxides
2009 May 7	Journal of Materials Chemistry, Cover Image Winner	Ujjal Gautam, Yoshio Bando, Xiosheng Fang, Dmitri Golberg	Synthesis of metal-semiconductor heterojunctions inside carbon nanotubes
2009 May 8	2009 Honda Frontier Award by the Honda Memorial Foundation	Kazuhiro Hono	Research on nano-structures and characterizations of metallic materials
2009 May 15	Fellow of the Royal Society	James K. Gimzewski	Pioneering the use of the scanning tunneling microscope to image, characterize and manipulate molecules on surfaces.
2009 May 23	Advanced Materials, Cover Image Winner	Xiosheng Fang (first author)	Single-crystalline ZnS nanobelts as ultraviolet-light UV sensors
2009 Jun 12	Best Paper Award, 62th Japan Oxidative Stress Society	Kazuko Toh, Toru Yoshitomi, Aiki Marushima, Kensuke Suzuki, Hideo Tsurushima, Akira Matsumura, Yukio Nagasaki	Radical-containing Nanoparticle for Cerebral Ischemia-reperfusion Damage
2009 Jun 15	Best paper award of Japan Thermal Spraying Society in 2009	Jin Kawakita, Seiji Kuroda, Sachiko Hiromoto, Akiko Yamamoto, Norio Maruyama	Fabrication and mechanical properties of composite structure by Warm Spraying of Zr-base metallic glass
2009 Jun 23	Advanced Functional Materials, Cover Image Winner	Chunyi Zhi (first author)	Towards highly thermo-conductive electrically insulating polymeric composites with boron nitride nanotubes as fillers
2009 Jun 26	Best Poster Award, 10th International Conference on Science and Technology of Nanotubes	Mingsheng Wang, Dmitri Golberg, Yoshio Bando	Interface dynamic behavior between carbon nanotube and metal electrode

2009 Jul	Academician of World Academy of Ceramics	Yoshio Sakka	Ceramic processing
2009 Jul 16	Special Prize in 3rd Grand Prize for Japan MONO TSUKURI (by MEXT)	Kenji Kitamura	Commercialization of highly functional optical single crystals grown under defect density control and optical devices using them
2009 Jul 27	Best Poster Award, 38th Symposium on Polymer for Biomaterial Science	Toru Yoshitomi, Takashi Mamiya, Aki Hirayama, Yukio Nagasaki	Design of pH-sensitive Radical-containing Nanoparticle for Bioimaging of Oxidative Stress in vivo
2009 Aug 10	Advanced Functional Materials, Cover Image Winner	Tianyou Zhai (first author)	Characterization, cathodoluminescence and field-emission properties of morphology-tunable CdS micro/nanostructures
2009 Aug 28	The 41st Ichimura Award by the new technology development foundation	Daisuke Fujita	Development of active nanoprobe measurement technology under controlled environments
2009 Sep	Senior Fellow in Residence of IMéRA / L'Institut Méditerranéen de Recherches Avancées Marseille France	James K. Gimzewski	Exploration of Creativity and Imagination in fields of Nanotechnology and its future Role on Society with emphasis on Nano-Neuromorphic Information Technology and Material Nanoarchitectonics
2009 Sep 18	Excellent Poster Award, The International Forum on Post-Genome Technologies (IFPT' 6)	Masaki Kubota, Keitaro Yoshimoto, Yukio Nagasaki	Advanced genome sequencing Completely stable streptavidin immobilized on magnetic beads in terms of thermal treatment cycles
2009 Sep 25	Japan Society for Analytical Chemistry Award for Younger Researchers	Jun Nakanishi	Fluorescence imaging of protein conformational change in living cells and photopatterning of cells
2009 Sep 29	JSCTA Award for Young Scientists	Kohsaku Kawakami	Thermal Analysis of Physical State of Crystalline/Grassy Pharmaceuticals
2009 Oct 5	Fellow of the Electrochemical Society	Kohei Uosaki	Scientific achievements within the field of electrochemistry
2009 Oct 8	BCSJ Award of the Chemical Society of Japan	Hiroyuki Noda, Hiromitsu Uehara, Masaaki Abe, Takayuki Michi, Masatoshi Osawa, Kohei Uosaki, Yoichi Sasaki	In situ Scanning Tunneling Microscopy Observation of Metal-Cluster Redox Interconversion and CO Dissociation Reactions at a Solution/Au(111) Interface
2009 Oct 26	The Richard M. Fulrath Award from American Ceramics Society	Naoki Ohashi	Contribution to thin film synthesis and properties of functional ceramics
2009 Nov 17	MNC 2008 Award for Most Impressive Presentation Award	Yuji Okawa, Daisuke Takajo, Tsuyoshi Hasegawa, Masakazu Aono	Fabrication of nanostructures composed of copper-phthalocyanine and diacetylene molecules

2009 Nov 19	The 4th International Symposium of Atomic Technology, The Best Poster Award	Shogo Sumitani, Motoi Oishi, Yukio Nagasaki	Enhanced Stability of Biodegradable Polymeric Micelles Encapsulating Boron Cluster for Boron Neutron Capture Therapy
2009 Dec	Best Poster Award at Winter School on the Chemistry and Physics of Materials	Mamiko Kawakita, Jin Kawakita, Yoshio Sakka	Orientation dependence of energy level in anatase TiO ₂ polycrystalline aggregates
2009 Dec 1	Advanced Materials, Cover Image Winner	Mingsheng Wang, Dmitri Golberg, Yoshio Bando	Multi-branched junctions of carbon nanotubes via metal particles
2009 Dec 11	Dalton Transactions, Hot Article (http://www.rsc.org/Publishing/Journals/dt/HotArticles.asp)	Takao Mori (first author)	Effect of Zn doping on improving crystal quality and thermoelectric properties of borosilicides

Appendix 8.11: International Cooperation

Cooperation under Memorandum of Understanding (MOU) Agreements:

List of MOU agreements of MANA with overseas institutions signed in 2008 and 2009.

Organization	Country	Date of Agreement
Kent State University, Department of Chemistry	USA	2008 Jan 10
Rensselaer Polytechnic Institute, Chemistry and Biological Engineering	USA	2008 Feb 28
UCLA (University of California Los Angeles)	USA	2008 Mar 24
Georgia Institute of Technology, Center for Nanostructure Characterization	USA	2008 May 6
CNRS (Centre d'elaboration de materiaux et d'etudes structurales)	France	2008 May 30
University of Cambridge, Nanoscience Centre	UK	2008 Jun 20
Indian Institute of Chemical Technology	India	2008 Jul 3
University of Basel, National Center of Competence for Nanoscale Science, Institute of Physics	Switzerland	2008 Jul 20
Yonsei University Korea	South Korea	2008 Sep 1
Indian Institute of Science Education and Research	India	2008 Dec 19
Supramolecular Chemistry Group at the Institute for Inorganic Chemistry, University of Karlsruhe	Germany	2009 Jan 29
New Energy and Materials Laboratory (NEML), Department of Chemistry, Fudan University	China	2009 Mar 16
National Centre for Catalysis Research (NCCR), Indian Institute of Technology Madras	India	2009 Apr 5
Inorganic and Materials Chemistry at the Institute of Inorganic Chemistry, University of Cologne	Germany	2009 May 28
Institute of Microengineering, Ecole Polytechnique Federale de Lausanne (EPFL)	Switzerland	2009 Jul 20
Center for Nanoscience & Nanotechnology & Innovative Instrumentation (NAST) at The University of Rome Tor Vergata	Italy	2009 Jul 30
Kirchhoff Institute of Physics at University of Heidelberg	Germany	2009 Aug 31
Loughborough University	UK	2009 Oct 28

Appendix 8.12: Media Coverage

List of Media Coverage of MANA (September 2007 – February 2010):

Date	Media	Description
2007 Sep 14	Science	Dr. Masakazu Aono was interviewed on interdisciplinary collaboration at MANA
2007 Dec	ACS Nano	A Conversation with Dr. Masakazu Aono: Leader in Atomic Scale Control and Nanomanipulation
2008 Apr 28 2008 May 2	World Times, Joyo Newspaper, Science News	Dr. Masayoshi Higuchi succeeded in developing Multi-Color Electronic Paper using an organic/metal hybrid polymer
2008 Jun 9	Science News	Dr. Yusuke Yamauchi succeeded in fabricating mesoporous metal with a giant mesocage structure using an electrochemical technique
2008 Jul 2 2008 Jul 11	Nikkei News, Science News	Dr. Kitamura won the 2008 Inoue Harushige Prize for “Highly functional single crystals for optics grown by a method under defect control”
2008 Jul 11 2008 Jul 15 2008 Jul 22 2008 Jul 25 2008 Nov 22	The Chemical Daily, Joyo Newspaper, The Chemical Times, Nikkan Kogyo Shimbun, Science News, Asahi Shimbun	Success in Development of Novel Photocatalyst with High Activity in Visible Light
2008 Jul 16 2008 Oct 8	Nikkan Kogyo Shimbun, Mainichi Newspapers, Sankei Shimbun, Ibaraki Shimbun, Nikkei News, Joyo Newspaper	Dr. Sasaki and Dr. Osada won the 2008 Tsukuba Prize for “Synthesis of inorganic nanosheets and their organization into functional materials”
2008 Jul 17	Nikkei News	Introduction of PI Dr. Ye and the WPI program Title: Rapid rise of “NEW Chinese Abroad”
2008 Jul	Shikizai	Introduction of MANA as WPI program
2008 Sep 26	Denki Shimbun	Focus on the Sunlight basic research
2008 Dec 01	Physics Today	Japan aims to internationalize its science enterprise
2008 Dec 11	NHK (TV)	News: Good Morning, Japan Introduction of MANA as WPI program
2008 Dec 11 2008 Dec 12	Nikkan Kogyo Shimbun, Nikkei News	NIMS/MANA and Waseda University Faculty of Science and Engineering Concluded a “Joint Doctoral Program Agreement”
2009 Apr 12	Yomiuri Shimbun	Dr. Ajayan Vinu appeared in an article on the research environment for foreign researchers at MANA
2009 Apr 15	Asahi Shimbun	Dr. Liyuan Han and Dr. Jinhua Ye were featured in a report on the lives of researchers
2009 May 13 2009 May 20	Fuji TV	In the Lab-meister TV Program “Can human body be generated like a newt?” Dr. Masanori Kikuchi and Dr. Guoping Chen explained about the possibility of regenerative medicine
2009 Jun 24 2009 Jul 10	Asahi Shimbun Kagaku Shimbun	A study by Dr. Yusuke Yamauchi and colleagues on platinum nanoparticles with an ultra-fine candy-ball-like structure was featured in two reports

2009 Jul 24	Science News	Dr. Katsuhiko Ariga was interviewed on his research of functional material which can automatically switch between ON and OFF states without additional stimuli
2009 Aug 27	Fuji TV	Dr. Masayoshi Higuchi (about multi-color electronic paper) and Dr. Tsuyoshi Hasegawa (about atomic switch) appeared in the Kyodo TV program "Lab Meister: In Search for Future of TV and PC"
2009 Sep 4	United States National Public Radio (NPR)	Prof. James K. Gimzewski spoke about "How Tiny Nanoparticles Are Transforming Technology" with host Ira Flatow and took calls from listener's on NPR's weekly program "Science Friday"
2009 Sep 29	Nihon Keizai Shimbun	Dr. Yoshio Bando was interviewed on the internationalization at MANA and ICYS
2009 Dec 14	Nano-Magazine	An interview with Prof. James K. Gimzewski appeared in Issue 7 of Nano-Magazine (Institute of Nanotechnology, UK)
2010 Jan 31 2010 Feb 4	NHK BS-1 TV NHK BS-hi TV	In the TV program "The proposal for the future - Nanotech revolution changes the world", Prof. James K. Gimzewski was interviewed on the future of nanotech and his collaborative work of science and art

Appendix 8.13: Visitors at MANA

List of Visitors at MANA (January – December 2009):

Date (2009)	Name	Affiliation
Jan 6 – Feb 17	Prof. Arcan Dericioglu	Middle East Technical University, Dept. of Metallurgical & Materials Eng., Turkey
Jan 6 – Feb 22	Seogjae Seo	Yonsei University, Department of Chemical and Biomolecular Engineering, Korea
Jan 7	Prof. Francois Grey	Tsinghua University, Department of Physics, China
Jan 14	Prof. Claes Tord Claeson	Chalmers University of Technology, Micro Technology and Nano Science, Sweden
Jan 15 – Mar 31	Lung-Ching Sang	Rensselaer Polytechnic Institute NY, Chemical Engineering, USA
Dec 20 – Mar 21	Leila Samiee	Iranian University of Technology, Iran
Jan 14	Karthikeyan Gopalsamy	Anna University, India
Jan 20 – Feb 1	Yeon-sik Choi	Yonsei University, Department of Chemical and Biomolecular Engineering, Korea
Jan 20 – Feb 20	Byeong Gwan Kim	Yonsei University, Department of Chemical and Biomolecular Engineering, Korea
Jan 20 – Mar 30	Jinwoo Sung	Yonsei University, Department of Chemical and Biomolecular Engineering, Korea
Jan 22 – 23	Prof. Hisanori Shonohara	Nagoya University, Department of Chemistry & Institute for Advanced Research, Japan
Jan 15 – 16	Prof. Thomas E. Mallouk	Penn State University, MRSEC, USA
Jan 12 – Feb 13	Prof. Zhong Sheng Wang	Fudan University, Laboratory of Advanced Materials, China
Jan 28 – 31	Prof. Matthew Linford	Brigham Young University, Dept. of Chemistry and Biochemistry, USA
Jan 28 – Feb 2	Prof. Robert Davis	Brigham Young University, Dept. of Chemistry and Biochemistry, USA
Feb 1 – 6	Prof. Zhuan Xu	Zhejiang University, Department of Physics, China
Feb 2 – 14	Dr. Janoc Volk	Research Institute for Technical Physics and Materials Science, Hungarian Academy of Sciences, Hungary
Feb 6	Prof. Run-Wei Li	Chinese Academy of Sciences, Ningbo Institute of Materials Technology and Engineering, China
Feb 12	Prof. Vladimir Matolin	Charles University, Surface Physics Group, Czech Republic
Feb 13	Sakarindr Bhumirattana, President	National Science and Technology Development Agency, Thailand
Feb 16	Prof. Harald F. Krug	EMPA, Materials-Biology Interactions, Switzerland
Feb 17 – 18	Prof. Yuping Wu	Fudan University, Department of Chemistry, China
Feb 17	Prof. Robert A. Wolkow	University of Alberta, National Institute for Nanotechnology Edmonton, Department of Physics, Canada
Feb 17	Cedrik Meier	University of Paderborn, Germany
	Rudolf Bratschitsch	University of Konstanz, Germany
	Claus D. Eisenbach	University of Hamburg, Germany
	Arnaud Caron	University Ulm, Germany
	Wiebke Lohstroh	Forschungszentrum Karlsruhe, Germany
	Stefan Walheim	Forschungszentrum Karlsruhe, Germany

Feb 17	Prof. Huiming Cheng	Chinese Academy of Science, Institute of Metal Research, China
	Prof. Qingbo Meng	Chinese Academy of Sciences, IOP, China
	Prof. Feng Huang	Chinese Academy of Sciences, Fujian Institute of Research on the structure of Matter, China
	Prof. S.M. Shivaprasad	Jawaharlal Nehru Centre for Advanced Scientific Research, India
	Dr. T. Chakrabarti	National Environmental Engineering Research Institute, India
	Prof. Soon Hyung Hong	Korea Inst. of Sci. and Technology (KIST), Korea
	Dr. Sung-Joon Kim	Korea Insitute of Materials Science(KIMS), Korea
	Dr. Kyungtae Hong	Korea Inst. of Sci. and Technology (KIST), Korea
	Dr. Ramam Akkipeddi	Inst. of Mat. Res. & Engineering (IMRE), Singapore
	Dr. Alex Yu-Min Peng	Industrial Technology Research Institute (MCL, ITRI) Mater. & Chem. Research Laboratory, Taiwan
	Dr. Paul Chi-Keung Chung	Metal Industries Res. & Development. Centre (MIRDC), Taiwan
	Dr. An-Chou Yeh	Metal Industries Res. & Development. Centre (MIRDC), Taiwan
	Prof. Siriluck Nivitchanyong	National Metal and Materials Technology Center, Thailand
Feb 19	Dr. Heinz Frei	Lawrence Berkeley National Laboratory, Helio-Solar Energy Research Center, USA
Feb 19	Dr. Stefan J. Michalowski	Executive Secretary, OECD Global Science Forum, Japan
	Takeyuki Kudo	Global Science Forum, Japan
	Masahiro Nakade	MEXT, Japan
Feb 20	Sanae Yonemichi	Embassy of Canada, Japan
	Mariyan Nishi	Embassy of Canada, Japan
	Prof. Peter Mascher	McMaster University, Canada
	Prof. Alan Francq, Managing Director	University of Waterloo, Waterloo Institute for Nanotechnology, Canada
	Prof. Mustafa Yavuz, Director	University of Waterloo, Nano and Micro Systems Lab, Waterloo Institute for Nanotechnology, University of Waterloo, Canada
	Prof. Frank Gu	University of Waterloo, Department of Chemical Engineering, Canada
	Prof. Pu Chen	University of Waterloo, Department of Chemical Engineering, Canada
	Prof. Hany Aziz	University of Waterloo, Department of Electrical and Computer Engineering, Canada
	Walter Stewart, Senior Advisor	Toronto Region Research Alliance, Canada
	Darren Anderson, Chief Technology Officer	Vive Nano, Canada
	Keith Peiris	University of Waterloo, Canada
	Ivan Law	University of Waterloo, Canada
	Edgar Cao	University of Waterloo, Canada
	Charles-Anica Endo, President	AGY Consulting, Canada
Pierre-Jean Alarco	CREPEC, Canada	
Dr. Gwenael Chamoulaud, Technical Director	NanoQAM-University of Quebec, Environment and Energy, Canada	

	Alain Lacourse, Project Manager	NanoQuébec, Canada
	Brian Haydon	Canada Standards Association, Canada
	Raymond Mark	Minister of Economic Development, Innovation and Export Trade, Canada
	Jean-François Masson	University of Montreal, Department of Nanotechnology, Biosensors, Canada
	Karim Maghni	University of Montreal, Nanotoxicity, Canada
	Prof. Claude Emond	University of Montreal, Nanotoxicity, Canada
	Dr. Benoit Simard, Principal Research Officer	National Research Council, Molecular and Nano-Material Architectures Group, Canada
Feb 22 – 26	Jose Rivas, Director General	International Iberian Nanotech. Laboratory, Spain
Feb 24 – 27	Dr. Adam Stieg	UCLA, California Nano Systems Institute, USA
Feb 26	Yaseen Ahmed Abbas, President	Iraqi Red Crescent Society, Iraq
	Mohammed Abid Atiya, General Director	Ministry of Higher Education and Research, Research and Development Dept., Iraq
	Hussain Ali Abbas, Acting Chairman	Iraqi Radioactive Sources Regulatory Authority, Iraq
Mar 6 – 9	Prof. Jimmy Chai-mei Yu	The Chinese University of Hong Kong, Department of Chemistry, China
Mar 11 – 22	Prashant Gupta	Indian Institute of Chemical Technology, India
Mar 15 – 21	Prof. Frank Marken	Bath University, Dept. of Chemistry, UK
Mar 16 – 17	Dr. Nedad E. Markovic	Argonne National Laboratory, MSD, USA
Apr 1	Dr. Makoto Hirayama	University at Albany, State University of New York, USA
Apr 1	Prof. Seimei Shiratori	Keio University, Japan
Apr 1 – Aug 31	Prof. Dr. Zhen-Yan Deng	Department of Physics, College of Science, Shanghai University, China
Apr 2	Prof. Gero Decher	Université Louis Pasteur, Department of Chemistry, France
Apr 4 – 18	Prof. Stefan Goedecker	University of Basel, Department of Physics and Astronomy, Switzerland
Apr 5 – Jul 4	Dr. Veer Pal Singh Awana	National Physical Laboratory, Superconductivity and Cryogenics Division, India
Apr 5 – 6	Prof. Sanjay Mathur	University of Cologne, , Germany Inst. of Inorg. Chem. Leibniz Institute of New Materials (INM), India
Apr 7	Prof. Youwei Du	Nanjing University, Department of Physics, China
	Prof. Zhigang Zou	
	Prof. Yining Fan	
	Prof. Shaolong Tang	
	Prof. Cheng Li	
	Prof. Ying Wang	
Apr 12	Prof. Indranil Manna	Indian Institute of Technology, Indian
Apr 15 – Jun 12	Robert Brzozowski, Head of the Department	Industrial Chemistry Research Institute, High-Pressure Processes Research Group, Poland
Apr 16	Dr. Hun Seung Oh, President	Korea Research Inst. of Chem. Tech., Korea
	Dr. Kew-Ho Lee, Director	Korea Research Inst. of Chem. Tech., Strategy and Cooperation Division, Korea
	Dr. Yong Ki Min	Korea Research Inst. of Chem. Tech., Bio-Organic Science Division, Korea
Apr 17	Prof. Eugene Gamaly	Australia National University, Australia

Apr 17	Prof. Michael Rousseas	University of California at Berkeley, USA
Apr 19 – 22	Prof. Michael Graetzel Director	Ecole Polytechnique de Lausanne Lab. of Photonics & Interfaces, France
Apr 20 – May 9	Vyacheslav Silkin	University of Basque Country, Department of the Physics of Materials, Spain
Apr 21	Prof. Javier Llorca, Director	University of Barcelona, Madrid Advanced Studies Inst. Of Mater., Catalonia Inst. for Energy Research (IREC), Spain
	Prof. Alejandro Perez-Rodriguez	University of Barcelona, Catalonia Inst. for Energy Research (IREC), Institute of Catalysis and Petrochemistry, Consejo Superior de Investigaciones Científicas (CSIC), Spain
	Prof. Inmaculada Rodriguez-Ramos	Consejo Superior de Investigaciones Científicas (CSIC), Spain
	Fernando Rey, Director	Spanish Natil. Res. Council, Inst. Chem. Tech., Univ. Politecnica de Madrid, Spain
	Prof. Jose Rivas	University of Santiago de Compostela, Spain
	Prof. M. Ricardo Ibarra	University of Zaragoza, Spain
	Dr. Pedro Serena	Consejo Superior de Investigaciones Científicas (CSIC) Institute of Materials Science, Spain
	Julio Barbas Gonzalez	Ministry of Science and Innovation, Spain
	Rosa Rodriguez Bernabe	Ministry of Science and Innovation, Spain
	Mr. Pablo Rubin	Embassy of Spain Industry & Investment Commercial Officer
Apr 20 – 21	Prof. Venkatesh Narayanamurti	Harvard Kennedy School, USA
Apr 23	Prof. Mike Gillan	University of College London, UK
Apr 23	Dr. Couomar Oudea R&D Manager	Astrium Space Transportation, France
	Dr. Olivier Vendier	Thales Alenia Space (TAS), France
	Dr. Frederic Courtade	Centre National d'Etudes Spatiales (CNES), France
	Dr. Mathieu Grialou	Centre National d'Etudes Spatiales (CNES), France
Apr 25	Prof. Michael Schuetze	Karl-Winnacker-Institute, Germany
Apr 29 – 30	Prof. Frank Caruso	University of Melbourne, Department of Chemical and Biomolecular Engineering, Australia
May 3 – July 3	Dr. Eric Fleury	Korea Institute of Science and Technology, Korea
May 12	Prof. Indranil Manna	Indian Institute of Technology, Department of Metallurgical and Materials Engineering, India
May 20 – 21	Venkatesh Narayanamurti Dean of Department	Harvard University, Physical Science / Engineering and Applied Sciences, USA
May 24 – Jun 3	Ayyappanpillai Ajayaghosh	National Institute for Interdisciplinary Science and Technology (NIIST), India
May 25	Prof. Michael Schuetze Institute Director	Karl Winnacker Institute, Germany
May 25 – 31	Prof. Muro Boero	The Institute of Physics and Chemistry of Materials of Strasbourg (IPCMS), CNRS, University of Louis Pasteur, Strasbourg, France
May 31 – Jul 24	Prof. Alagarsamy Perumal	Indian Institute of Technology, Guwahati, Department of Physics, India
Jun 3	Prof. Christina Berger	Darmstadt University of Technology, Germany
	Prof. Herman Grunling	Dortmund University of Technology, Germany
Jun 8	Dr. Masami Suganuma Chief of Center	Saitama Cancer Center, Cancer Prevention G., Research Inst. for Clinical Oncology, Japan

Jun 10	Dr. Akira Toyama Director	Asahi Glass, Research Center, Japan
	Dr. Setsuro Ito	Asahi Glass, Research Center, Japan
	Dr. Yoshitomi Morisawa	Asahi Glass, Research Center, Japan
	Dr. Makoto Sato	Asahi Glass, Research Center, Technology Development Division, Japan
Jun 15 – 20	Xianggang Qiu, Vice Director	National Laboratory for Superconductivity, China
Jun 15 – 20	Xincheng Xie, Regents Professor	Oklahoma State University, USA
Jun 16	Dr. Yong Ki Park, Vice President	Korea Research Institute of Standards and Science (KRISS), Korea
Jun 18	Dr. Evelyn Obele	Counsellor, Science, Technology and Environment, Embassy of the Federal Republic of Germany, Tokyo
Jun 22	Dr. Claire Baines, Academic Secretary, Head of Academic Services	Sheffield University, UK
Jun 23 – 26	Prof. Peter Vettiger	Inst. of Microengineering (IMT), EPFL, Lausanne, Switzerland
Jun 28 – Jul 4	Prof. Maria Jose Esplandiú	Autonomous University of Barcelona, Spain
Jul 1 – Aug 29	Dr. P.M.F.J. da Costa	University of Aveiro, Portugal
Jul 7 – Aug 8	Dr. Tang Junwang	University College London, Department of Chemical Engineering, UK
Jul 15 – 17	Prof. Francois Grey	Tsinghua University, China
Jul 21 – Aug 14	Prof. Guy Le Lay	Université de Provence, UFR Sciences de la Matière, Marseille & Centre Interdisciplinaire de Nanoscience de Marseille (CINaM-CNRS), France
Jul 22 – 28	Prof. Marco Rolandi	University of Washington, USA
Jul 1	Prof. Hiromitsu Maeda	Ritsumeikan University, Institute of Science and Engineering, Japan
Jul 1	Prof. John Dayton Tovar	Johns Hopkins University, Department of Chemistry, USA
Jul 3	Prof. Tomi Ohtsuki	Sophia University, Japan
Jul 6	Prof. Manfred Wilhelm Sigrist	Swiss Federal Institute of Technology (ETH), Zurich, Switzerland
Jul 9	Wen-Chang Chang, Deputy Minister	National Science Council, Taiwan
	Chih-Wei Hue, Director	National Science Council, Dept. of Science Education, Taiwan
	Ming-Kuan Lee, Section Chief	National Science Council, Dept. of Science Education, Taiwan
	Prof. Ching-Mei Tang	National Science Council, Dept. of Science Education, Taiwan
	Prof. Ru-Jang Lin	National Taiwan Normal University, Department of Applied Chemistry, Taiwan
	Prof. Fuh-Sheng Shieu	National Chung Hsing University, Dept. of Materials Science and Engineering, Taiwan
	Prof. Horn-Jiunn Sheen	National Taiwan University, Institute of Applied Mechanics, Taiwan
	Prof. Chia-Chi Sung	National Taiwan University, Engineering Science and Ocean Engineering, Taiwan
	Prof. Wei-Lun Chen	National Taiwan University, Engineering Science and Ocean Engineering, Taiwan

	Prof. Ching-Hua Lo, Dean of College of Science	National Taiwan University, Dept. of Geosciences, Taiwan
	Prof. Chung-Ming Liu	National Taiwan University, Dept. of Atmospheric Sciences, Taiwan
	Prof. Shin-Cheng Yeh	National Taiwan Normal University, Graduate Institute of Environmental Education, Taiwan
	Prof. Li-Ling Chen	National Taiwan University, Office of Energy Saving & Carbon Reduction Education Project, Taiwan
Jul 10	Prof. Anvar Zakhidov	University of Texas at Dallas, NanoTech Institute , Department of Physics, USA
Jul 13	Anne Emig, Program Manager	National Science Foundation, East Asia and Pacific Program Office of International Science & Engineering, USA
Jul 14	Ellen Stechel	United States Department of Energy (DOE), National Laboratory, Sandia NL, USA
	Venkateswara Desari	United States Department of Energy (DOE), National Laboratory, Los Alamos National Lab (LANL), USA
	Jinghua Guo	United States Department of Energy (DOE), National Laboratory, Lawrence Berkeley National Laboratory (LBNL), USA
	Kevin Ott	United States Department of Energy (DOE), National Laboratory, Los Alamos National Lab (LANL), USA
	Michael Thompson	United States Department of Energy (DOE), National Laboratory, Pacific Northwest National Laboratory (PNNL), USA
	Jim Cross	United States Department of Defense, USA
	Rick Fingers	United States Department of Defense, Air Force Research Laboratory (AFRL), USA
	Ed Shaffer	United States Department of Defense, Army, USA
	Mark Spector	United States Department of Defense, Office of Naval Research, USA
	Tetsuo Satoh	Asian Technology Information Program (ATIP), Japan
Jul 14	Prof. Osamu Terasaki	Stockholm University, Structural Chemistry, Arrhenius Laboratory, Sweden
Jul 24 – 30	Nobuyoshi Miyamoto, Lecturer	Fukuoka Institute of Technology, Department of Life, Environment and Materials Science, Japan
Jul 31	Prof. Iwao Matsuda	University of Tokyo, Synchrotron Radiation Laboratory Affiliated to the ISSP, Japan
Jul 28 – Aug 20	Prof. Bedri Cetiner	Utah State University, Electrical and Computer Engineering Department, USA
Aug 4	Prof. Hussain Al-Ahmad	UAE Khalifa University, Dept. of Electronic Engineering, United Arab Emirates
	Maria Yogo, External Relation Coordinator	UAE Khalifa University, United Arab Emirates
Aug 8 – Sep 8	Prof. Yuri M. Lvov	Louisiana Tech University, Institute for Micromanufacturing, USA
Aug 17 – 27	J.S. Yadav, Director	Indian Institute of Chemical Technology (IICT), Hyderabad, India
	Prof. M.Lakshmi Kantam	
Aug 17 – 22	Prof. Eunyoung Kim	Yonsei University, Korea
Aug 17 – 21	Gurudas Prakash Mane	National Chemical Laboratory, Pune, India
Aug 28	Prof. Junwang Tang	University College London, Department of Chemical Engineering, UK

Aug 31	Iris Wieczorek, Director	DFG Office Japan
Sep 1	A.E. Koshelev	Argonne National Laboratory, Materials Science Division, USA
Sep 7	Prof. Raul Quijada	University of Chile, Chile
	Luis Amestica, Project Director	COMOTECH, Chile
Sep 11	Prof. Yuval Golan	Ben-Gurion University of the Negev, Department of Materials Engineering, Israel
Sep 11	Prof. Norbert Kroó	Hungarian Academy of Sciences, Research Institute for Solid State Physics and Optics, Hungary
Sep 17	Clifford J. Gabriel, Executive Officer	National Science Foundation, Mathematical & Physical Science, USA
	Machi F. Dilworth, Director	National Science Foundation, Tokyo Regional Office, Japan
Sep 23 – Oct 2	Ramasamy Jayavel, Director	Anna University, Centre for Nanoscience&Technology, India
Sep 24	Prof. Patrik Schmuki	University of Erlangen-Nürnberg, Department of Materials Science and Engineering, Germany
Sep 25	Prof. Tomoyuki Kakeshita	Osaka University, Division of Materials and Manufacturing Science, Graduate School of Engineering, Japan
Oct 26	Prof. Prashant V. Kamat	University of Notre Dame, Department of Chemical & Biomolecular Engineering, USA
Sep 28 – Oct 12	Shivappa B. Halligudi	Nanoscience Laboratory, C-MET, Govt. of India
Oct 2	Prof. Svante Lindqvist, Director/ President	Nobel Museum / Royal Swedish Academy of Sciences, Sweden
	Edvard Fleetwood, Secretary General	Sweden-Japan Foundation
Oct 2 – 5	Prof. Silvija Gradecak	Massachusetts Institute of Technology, Department of Materials Science and Engineering, USA
Oct 2 – 9	Prof. Harry Kroto	Florida State University, Department of Chemistry and Biochemistry, USA
Oct 6	Prof. Marc Audier	CNRS-Grenoble INP, Laboratoire des Matériaux et du Génie Physique (LMGP), France
Oct 7	Prof. Georg Bednorz, Nobel Prize Winner	IMB, Switzerland
Oct 7	Sreekanth H. Chalasani	The Rockefeller University, Laboratory of Neural Circuits and Behavior, USA
	Prof. Chiara Daraio	California Institute of Technology, Graduate Aerospace Laboratories (GALCIT), USA
	José Luis Badano Caballero	Institut Pasteur de Montevideo, Human Molecular Genetics Laboratory, Uruguay
	Arnaud Czaja	Imperial College London, Physics Department, Space Atmospheric Physics Group, UK
	Prof. Klaus Wehrle	RWTH Aachen University, Department of Computer Science, Germany
	Daud Kassam, Head of Department	Bunda College of Agriculture, Aquaculture and Fisheries Science Department, Republic of Malawi
	Prof. Kazuyo Matsubae-Yokoyama	Tohoku University, Graduate School of Environmental Studies, Japan
Oct 15	Prof. Jurgen Michel	Massachusetts Institute of Technology, Microphotonics Center, USA
Oct 26	Prof. Prashant V. Kamat	University of Notre Dame, Department of Chemical & Biomolecular Engineering, USA

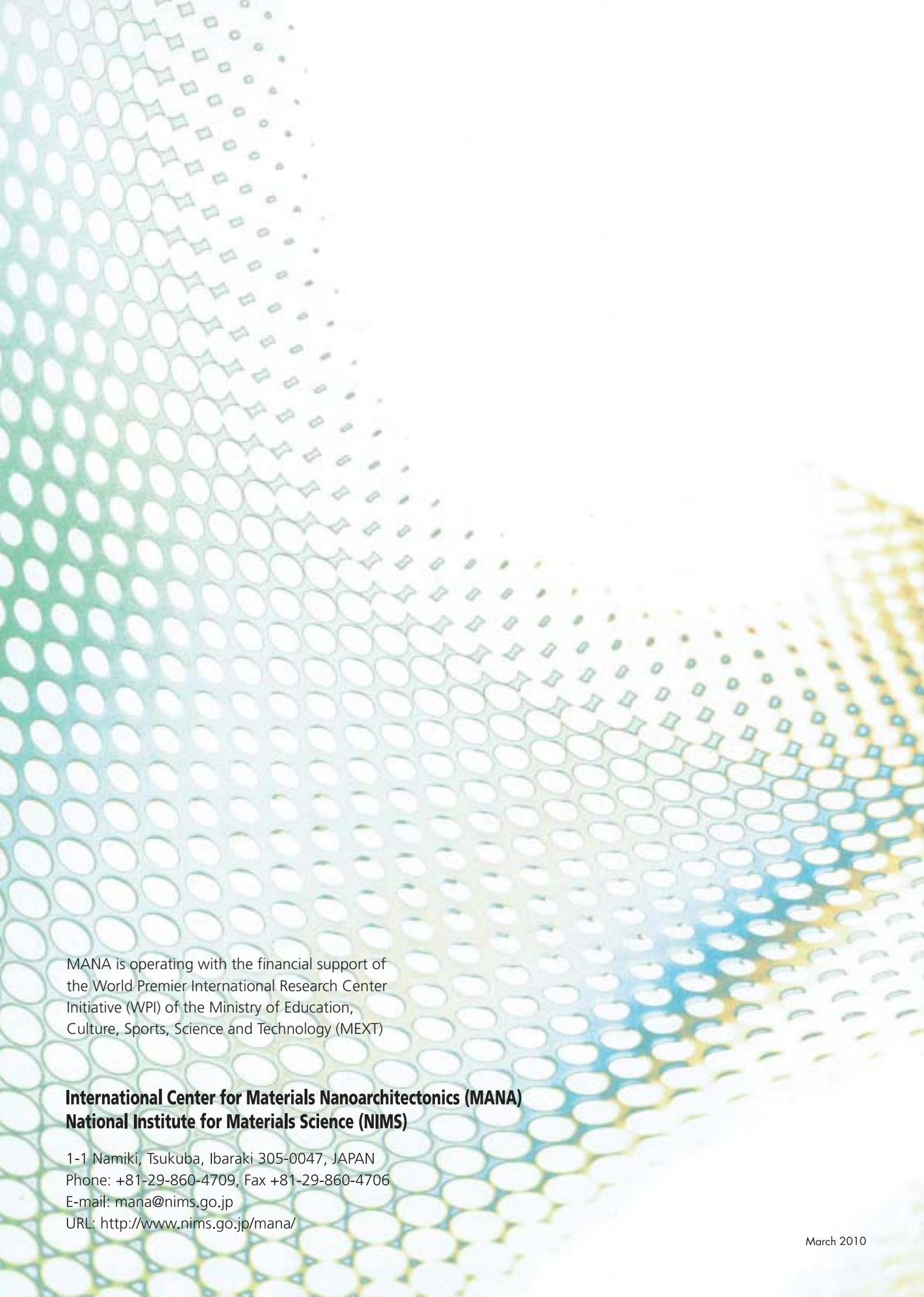
Oct 13	Prof. Ying Ma	Chinese Academy of Science, China
Oct 18 – 23	Habib Ibrahim Abualhamayel, Director	King Fahd Univ. of Petroleum & Minerals (KFUPM), Center of Research Excellence in Renewable Energy, Saudi Arabia
	Prof. Sid Ahmed Mohamed Saied	King Fahd Univ. of Petroleum & Minerals (KFUPM), Mechanical Engineering Department, Saudi Arabia
Oct 22 – 24	Prof. Louis Schlapbach	EMPA, Experimental physics, Switzerland
Oct 22 – 25	Prof. Anthony Cheetham	University of Cambridge, Department of Materials Science & Metallurgy, UK
Oct 21 – 24	Prof. Thomas Boellinghaus	Federal Institute for Materials Research and Testing (BAM), Germany
Oct 22 – 24	Mihail C. Roco, Director	The National Science Foundation, USA
Oct 22 – 24	Prof. Jean Etourneau	University of Bordeaux, ICMCB-CNRS, France
Oct 25 – 30	Prof. Ayusman Sen	Penn State University, Chemistry Department, USA
Nov 9	Prof. Shinichi Yoshikawa	Hokkaido University, Japan
Nov 9 – 15	Karolina Statkiewicz Secretariat	Warsaw University of Technology, Poland
Nov 10 – 15	Ewelina Zawadzak	
Nov 10 – 15	Krystian Paradowski	
Nov 11 – 12	Prof. K. J. Kurzydowski	
Nov 11 – 12	Prof. M. Lewandowska	
Nov 11 – 14	Wojciech Swieszkowski	
Nov 11 – 14	John Blizzard	
Nov 11 – 14	Prof. Jolanta Janczak-Rusch	EMPA, Switzerland
	Prof. Andreas Zuetzel	
	Prof. Ralph Spolenak	
	Vinzenz Bissig	
	Karolina Sosnowska	
	Roberto Gaspari	
Nov 11 – 14	Dr. Miguel A. Marioni	
Nov 16 – Mar 30	David McCarthy	University of Canterbury, Department of Physics and Astronomy, New Zealand
Dec 14 – 23	Prof. K. K. Nanda	Indian Institute of Science, India
Dec 15	Prof. Kannan Krishnan	University of Washington, Department of Materials Science and Engineering, USA
Dec 22 – 29	Prof. Pulickel Ajayan	Rice University, Department of Mechanical Engineering & Materials Science, USA

Appendix 8.14: MANA History

MANA History (October 2007 – March 2010):

Date	Event
2007 Oct 1	Official Inauguration of MANA
2007 Oct 18	MANA Opening Ceremony (at Okura Frontier Hotel Tsukuba)
2008 Mar 10-13	First MANA International Symposium held in Tsukuba
2008 Mar 12	First MANA Evaluation Committee Meeting
2008 Mar 24	MANA signed a MOU with UCLA, USA (to open MANA Satellite)
2008 Apr 1	Start of ICYS-MANA Program
2008 Apr 16	First MANA Site Visit by the WPI Program Committee
2008 May 6	MANA signed a MOU with the Georgia Institute of Technology, USA (to open MANA Satellite)
2008 May 20	First Follow-up Meeting by the WPI Follow-Up Committee
2008 May 30	MANA signed a MOU with the CNRS, France (to open MANA Satellite)
2008 Jun 2	NIMS Overseas Operation Office opened at the University of Washington, USA
2008 Jun 20	MANA signed a MOU with the University of Cambridge, UK (to open MANA Satellite)
2008 Jul 19	Prof. Sir Harry W. Kroto visited MANA
2008 Jul 28 – Aug 1	Fifth NIMS-IRC-UCLA Nanotechnology Summer School held at NIMS
2008 Oct 1	Celebration of First Anniversary of MANA. Organizational Reform of MANA
2008 Nov 27-28	Second MANA Site Visit by the WPI Program Committee
2008 Dec 11	NHK covered MANA activities on the NHK Program “Ohayou Nippon (Good Morning Japan)”
2009 Feb 25-27	Second MANA International Symposium held in Tsukuba
2009 Mar 17	Second Follow-up Meeting by the WPI Follow-Up Committee
2009 Jun 15-17	The 8th Japan-France Workshop on Nanomaterials was held at NIMS in Japan in June 2009
2009 Jul 3	The 1st MANA-NSC Joint Workshop on fusion of nanotechnology and bioscience held at the MANA Satellite at University of Cambridge, UK
2009 Jul 14	Delegation from U.S. Department of Energy (DOE) and U.S. Department of Defense (DOD) visits MANA
2009 Jul 27-31	The 6th MANA-NSC-CNSI Nanotechnology Students’ Summer School held at the MANA Satellite at UCLA, Los Angeles, USA
2009 Sep 20-22	XJTU-NIMS/MANA Workshop on Materials Science 2009 held at Xi’an Jiaotong University, China
2009 Oct 2	Prof. Svante Lindqvist, Nobel Museum Director and Chair at the Royal Institute of Technology, Stockholm, visits MANA
2009 Oct 9	Prof. Sir Harry W. Kroto visits MANA for one-on-one meetings with young scientists
2009 Oct 10-12	Tsukuba-Shinchu Bilateral Symposium on “Advanced Materials Science and Technology” at National Tsing Hua University, Taiwan

2009 Oct 13	MANA-URTV Joint Workshop on Nanostructured Materials for Sustainable Development held at University Rome Tor Vergata, Italy
2009 Oct 13-14	The 1st MANA-CEMES Joint Workshop on Fusion of Theory and Experiment held at the MANA Satellite in CNRS Toulouse, France
2009 Nov 10	Nanjing University-Anhui Normal University-Hokkaido University-MANA Joint Symposium was held at Nanjing University
2009 Dec 10	Osaka University-MANA/NIMS Joint Symposium on “Advanced Structural and Functional Materials Design” at Osaka University
2009 Dec 18	WPI Program Director Prof. Toshio Kuroki visited MANA Satellite at UCLA
2010 Jan 7-8	Third MANA Site Visit by the WPI Program Committee
2010 Jan 14	Waseda University-MANA/NIMS Joint Symposium on “Advanced Materials Designed at Nano- and Meso-scales toward Practical Chemical Wisdom” at Waseda University
2010 Jan 31 2010 Feb 4	Prof. James Gimzewski (MANA Satellite Principal Investigator) was featured in the NHK’s satellite TV program “The proposal for the future (mirai-eno teigen)”
2010 Mar 3-5	Third MANA International Symposium held in Tsukuba
2010 Mar 5	Second MANA Evaluation Committee Meeting



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**International Center for Materials Nanoarchitectonics (MANA)
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