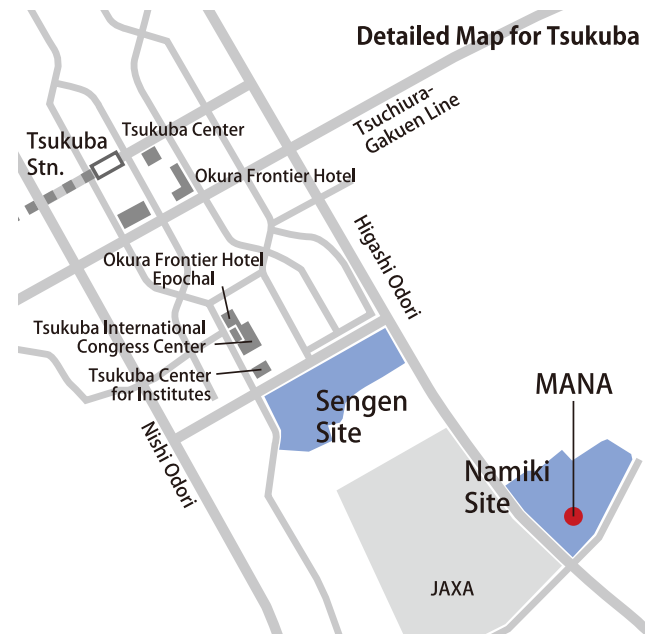
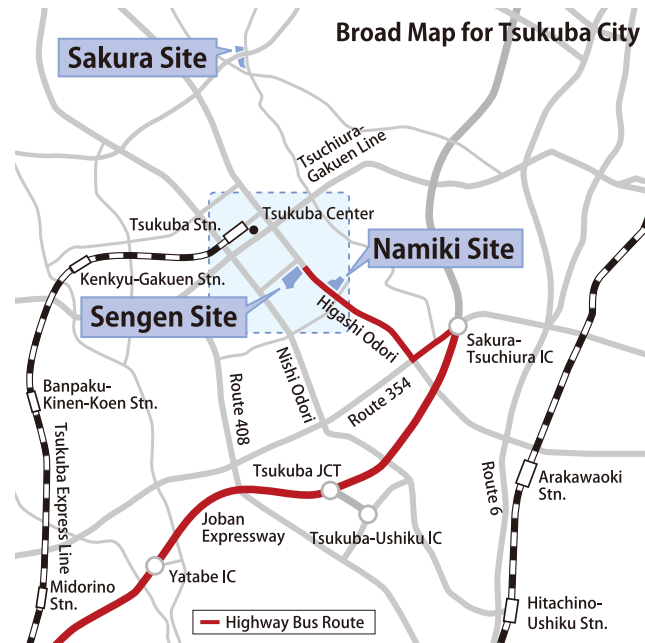


Access to MANA and Contact Information



Access to Namiki site:

- **By Tsukuba Express Line**
Get off at Tsukuba Station. Take the bus for "Arakawaoki Station" and get off at "Busshitsu Kenkyujo mae". 1 minute walk.
- **By JR Joban Line**
Get off at Arakawaoki Station. Take the bus for "Tsukuba Center" and get off at "Busshitsu Kenkyujo mae". 1 minute walk.
- **By Highway Bus**
Take the Highway bus from JR Tokyo Station for "Tsukuba Center" and get off at "Namiki 1-chome". 1 minute walk.



**WPI Research Center
International Center for
Materials Nanoarchitectonics (MANA)**



National Institute for Materials Science

International Center for Materials Nanoarchitectonics

1-1 Namiki, Tsukuba, Ibaraki, 305-0044
TEL : +81-(0)29-860-4709 FAX : +81-(0)29-860-4706
E-mail : mana@nims.go.jp

<http://www.nims.go.jp/mana/>



MANA Building



WPI Research Center

MANA
International Center for
Materials Nanoarchitectonics



National Institute for Materials Science

“Towards a World-top Level Fundamental Research Institute in Nanotechnology and Materials Science”



Prof. Teruo Kishi
NIMS President

Today, the world demands problem-solving research that focuses on numerous problems associated with the global environment, energy, and resources. Here, the development of innovative materials will be essential if the sustainable society that such research envisions is to be realized. Nanotechnology (nanotech) is an innovative technology that is advancing with increasing speed as the early 21st century moves forward. Nanotech is building new integrated scientific and technical frameworks and establishing base technologies for new industries by tearing down boundaries that separate physics, chemistry, biology, and other existing academic fields. Even so, it cannot be said that nanotech has progressed as originally anticipated. Nanotech, as a field, must undergo a paradigm shift if it is to get back on track. We believe that the application of a new nanotech framework known as “materials nanoarchitectonics” will trigger this paradigm shift. We also believe that materials nanoarchitectonics will deliver a continuing series of new materials and devices with hitherto unimagined functions that will create innovations which will inject new life into industry.



Prof. Masakazu Aono
MANA Director-General

The National Institute for Materials Science (NIMS) has been selected to participate in the World Premier International (WPI) Research Center Initiative of Japan’s Ministry of Education, Culture, Sports, Science and Technology (MEXT). In October 2007, NIMS has launched a new center entitled “International Center for Materials Nanoarchitectonics” (MANA). Indeed, MANA was established with the aim of becoming a visible “world-class research center for nanotech and nanomaterial research” that would bring together top researchers from around the world and that leading researchers would aspire to visit as well as be a part of. Taking advantage of the autonomous qualities of multinational researchers gathered from around the world, MANA is creating innovation and contributing to scientific and technical advancement by promoting bold, leading-edge basic research that makes full use of nanotech, and inventing and discovering new materials and devices while simultaneously elucidating the basic principles behind them.

What is WPI Program?

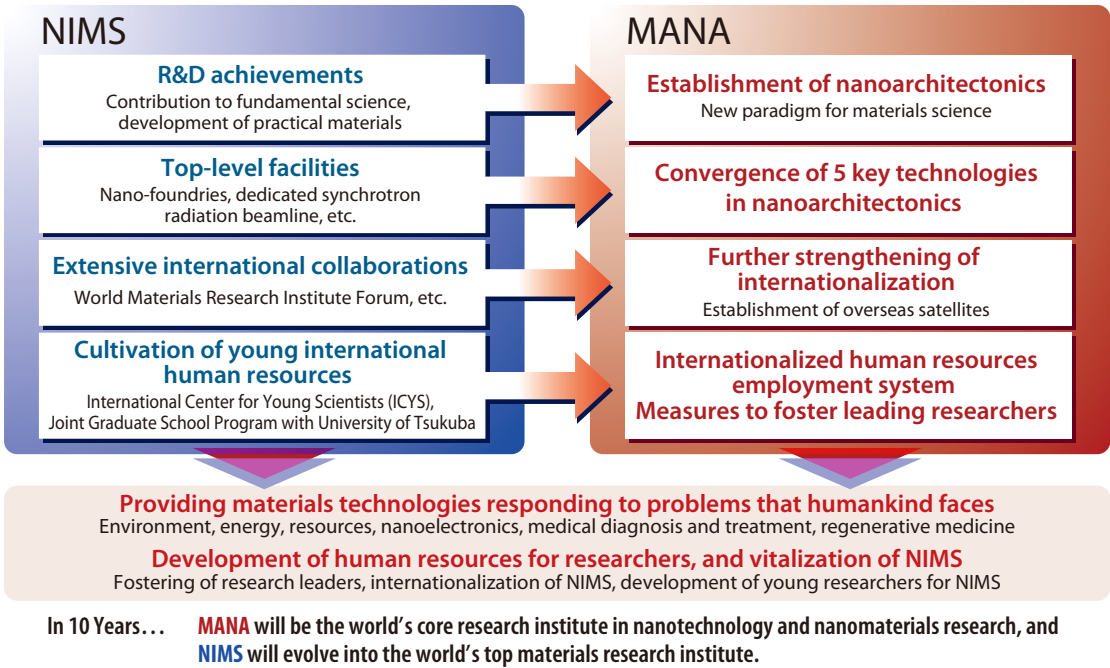
The WPI Program (World Premier International Research Center Initiative Program) by MEXT provides priority support for projects creating world-top level research centers with “global visibility” that attract top researchers from all over the world. NIMS is one of five Japanese institutions selected in FY 2007.

- WPI program supports the five institutions for 10-15 years to achieve
- a critical mass of outstanding researchers (top-level researchers)
 - an attractive research environment

Host institution	WPI research center	Research fields
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)	Materials Science

Goal of MANA

The goal of the MANA concept is not only to develop MANA into a world-top-level research center in the field of nanotechnology/nanomaterials within 10 years, but also to ensure that NIMS itself evolves into the world’s top materials research institute with MANA. MANA and NIMS will develop innovative materials that contribute to realize a sustainable society in the 21st century.



Mission and Research Target

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.

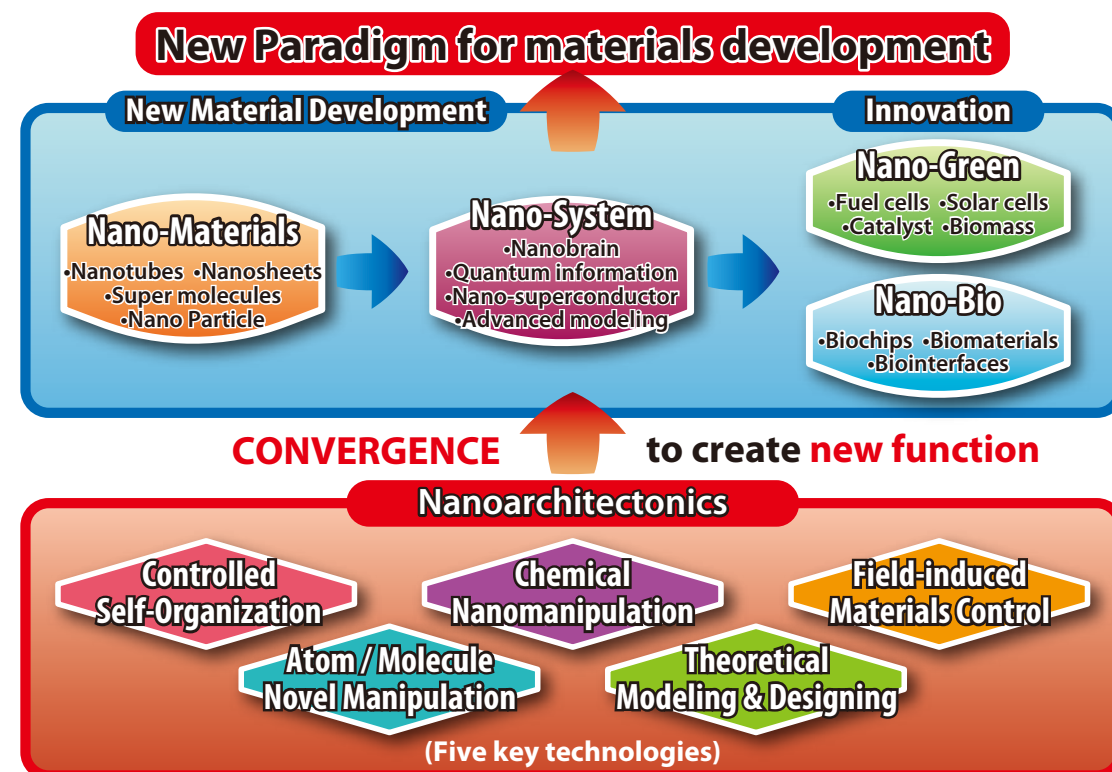
Mission of MANA

To achieve the 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.

- Challenging research by materials nanoarchitectonics
- Creation of a "Melting Pot", where top-level researchers gather from around the world
- Fostering and securing young scientists, who are rich in originality
- Construction of a network, which links the world's top-notch nano centers

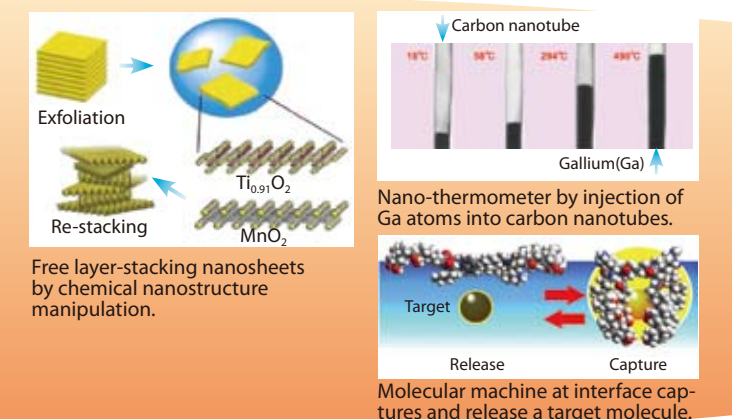
Research Target of MANA

As basic science and technologies for "nanoarchitectonics", the five key-technology in the following chart will be converged to control the arrangement of individual nanostructures and extract ultimate functions. Utilizing outcome from the convergence, MANA will focus on the four research fields to develop novel materials and create epoch-making innovations for a sustainable society in the future.



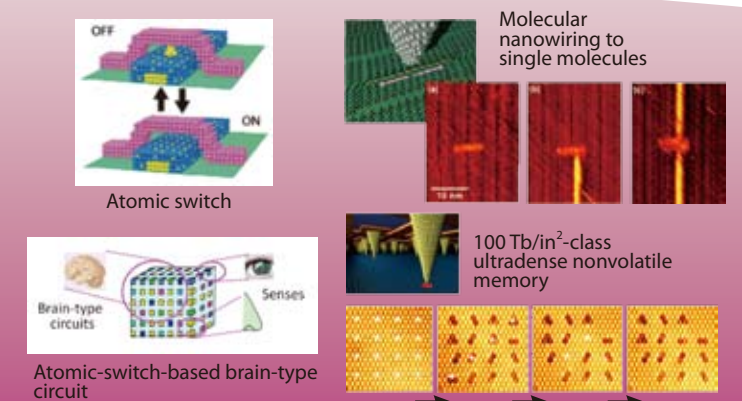
Nano-Materials

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 environmental applications.



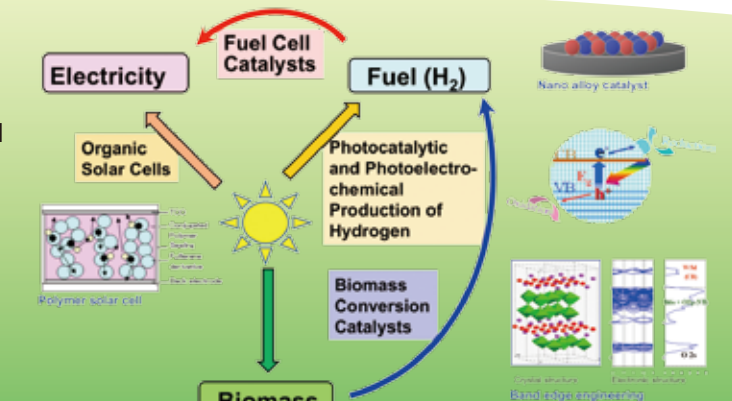
Nano-System

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.



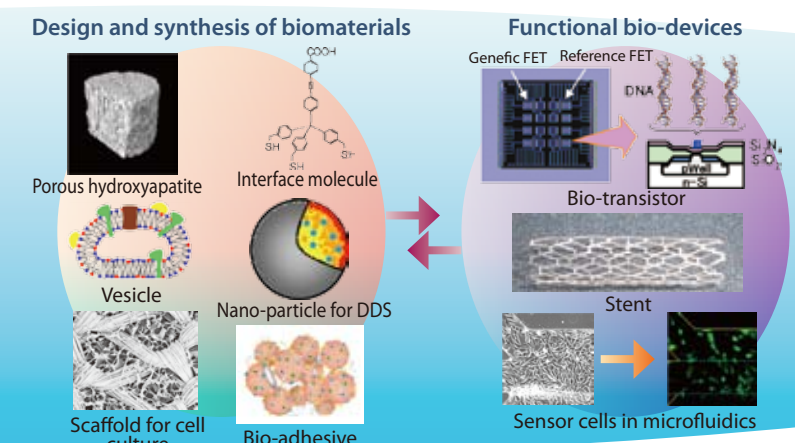
Nano-Green

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

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



Attractive Research Environment

In order to create one of the world's premier research centers with "global visibility", the following excellent management will be strongly promoted at MANA.

Melting pot environment

MANA provides a "melting pot" environment for gathering researchers of different fields, cultures, and nationalities in one space, based on the know-how accumulated in the operation of the NIMS International Center for Young Scientists (ICYS) since 2003.

- To foster this melting pot environment more and more, MANA will increase the number of foreigners to over 50% of the MANA researchers.
- The convergence of various research fields in the melting pot environment at MANA will create new research seeds for innovation.



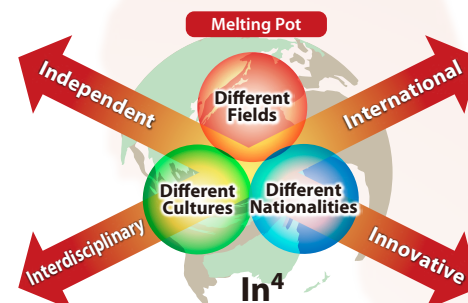
Coffee Break
Inspiring each other with mutual communication at the coffee break every afternoon.

Fostering young scientists

- Young researchers in MANA will be involved in interdisciplinary research in the 3D system with Double-affiliations (MANA and a satellite or affiliated institution), Double-discipline (double specializations), and Double-mentors.
- Two mentors, such as two outstanding Principal Investigators, and visiting advisors, provide young researchers advice on research.
- Young scientists benefit from international collaboration, such as summer school, international symposium/workshop.



Mentor / Visiting Advisor
Young scientist getting advice from visiting advisor, such as Prof. Kroto, Nobel Prize Winner.



Melting pot environment has characteristics of In⁴ ("International", "Interdisciplinary", "Independent", "Innovative"). It is of great importance to foster world-top level researchers.



MANA Seminar
MANA Seminar given every week by MANA researchers, visiting outstanding researchers, etc.



International Symposium/workshop
Having MANA International Symposium/workshop every year.



Summer School
Having Nanotechnology Summer School with USA, UK every summer.

Full support in English

- MANA will achieve internationalization at all levels, using English as a common language.
- Technical and administrative staff, fluent in English, will assist foreign researchers.
- Moreover, MANA has the following system which eliminates the barriers of language and nationality.
- Use of English for information on Web and intranet in MANA
- Information in English about external funds
- English-language orientation for non-Japanese researchers
- Use of English in documents related to administrative procedures, etc.
- English-language support by administrative staff and technical support staff



• Japanese culture classes



• Research/daily life guidebooks in English



NIMS Facilities

- MANA researchers will be able to use many highly sophisticated, world-renowned facilities in NIMS, including advanced medium- and large-scale devices.

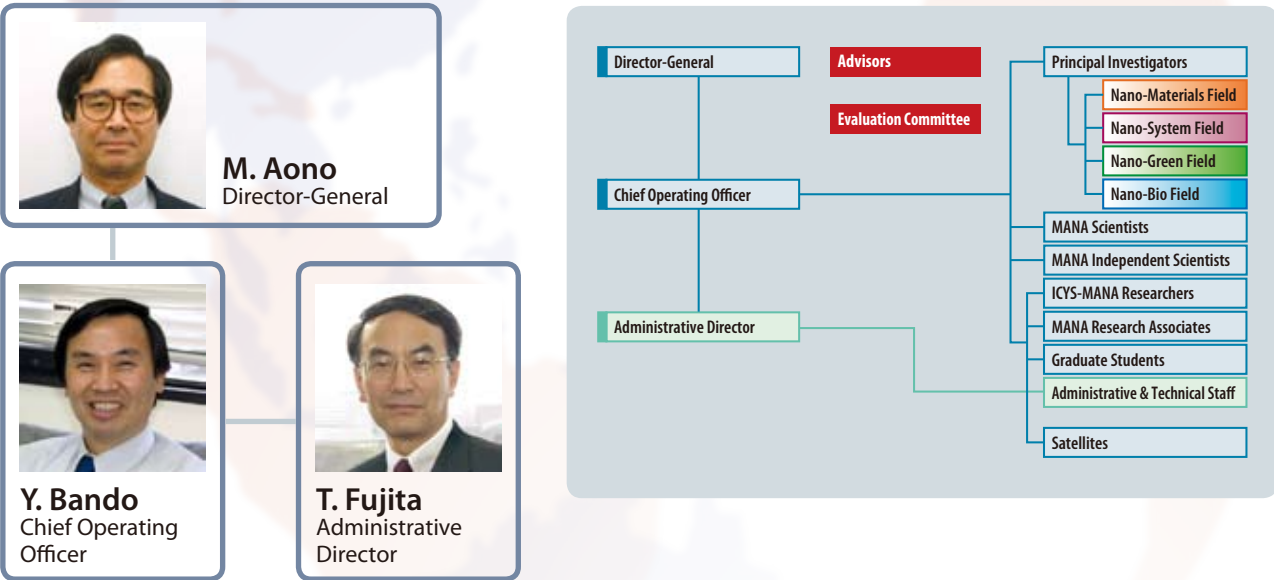


- 1 MV ultra-high voltage electron microscope
- 930MHz NMR Magnet
- Nano-foundries
- Dedicated beamline for synchrotron radiation research at SPring-8

Support for innovation

- MANA will foster technology transfer through acquisition of patents. NIMS administrative staff will assist to apply patents.
- MANA will return research outcome to society through collaboration with industry, such as NIMS evening seminar, etc.


Organization and Members




MANA Principal Investigators (PI)

Principal Investigators are internationally known world-top class scientists, who take the main role to achieve the MANA research targets and serve as mentors for younger researchers. MANA has selected Principal Investigators from NIMS and other domestic and overseas institutes.


Nano-Materials Field




T. Sasaki*
NIMS




Y. Bando
NIMS




K. Ariga
NIMS




K. Kitamura
NIMS




O. Yaghi
UCLA




E. T.-Muromachi
NIMS




Y. Sakka
NIMS




K. Hono
NIMS



N. Ohashi
NIMS




Z. L. Wang***
GIT




D. Golberg
NIMS

11PIs


Nano-System Field




M. Aono*
NIMS




J. Gimzewski**
UCLA




M. Welland**
U. Cambridge




C. Gerber
Univ. Basel




C. Joachim
CNRS




D. Fujita
NIMS




X. Hu
NIMS




T. Hasegawa
NIMS



K. Kadowaki***
Univ. Tsukuba




T. Nakayama
NIMS




H. Takayanagi***
Tokyo Univ. Sci.

11PIs


Nano-Green Field




K. Uosaki***
Hokkaido U.



R. Han
NIMS




J. Ye
NIMS




K. Tomishige***
Univ. Tsukuba

4PIs

Nano-Bio Field



Y. Miyahara*
NIMS



Y. Nagasaki***
Univ. Tsukuba

2PIs

* : Field Coordinator ** : Satellite Co-Director *** : Satellite PI

MANA Scientists

A MANA Scientist is a researcher from NIMS, who performs MANA research together with a Principal Investigator.



G. Chen



Y. Ebina



J. Hill



S. Hiromoto



A. Islam



C. Kataoka



K. Kawakami



N. Kawazoe



M. Kikuchi



M. Kohno



M. Kubo



R. Ma



N. Maruyama



M. Mitome



T. Mori



K. Nagaoka



T. Ohnishi



Y. Okawa



J. Okuda



M. Osada



T. Ozawa



M. Pumera



M. Sakurai



Y. Shingaya



Y. Shirai



R. Souda



Y. Suetsugu



T. Taguchi



K. Takada



A. Tanaka



C. Tang



A. Taniguchi



K. Tashiro



K. Terabe



T. Tsuruoka



T. Uchihashi



A. Yamamoto



T. Yamazaki



C. Zhi

MANA Independent Scientists

A MANA Independent Scientist is a younger researcher at NIMS, who works full-time for MANA and can perform his own research independently.



A. Belik



N. Fukata



M. Higuchi



S. Moriyama



T. Nagao



J. Nakanishi



Y. Tateyama



S. Tsuda



L. Vayssieres



A. Vinu



Y. Yamauchi



C. Yoshikawa

ICYS-MANA Researchers (Postdoc):

An ICYS-MANA Researcher is a position for postdoctoral fellows selected from all over the world by open recruitment. ICYS-MANA researchers perform their own research independently by receiving advice from Mentors and MANA Principal Investigators.



S. Acharya



R. Charvet



X. Fang



U. Gautum



C. Gomez



M. Imura



M. Lee



C. Liu



R. Scipioni



Y. Shirai

MANA Research Associates (Postdoc):

A MANA Research Associate is a post-doctoral fellow employed by a Principal Investigator or a MANA Independent Scientist.

Graduate Students:

A Graduate Student is a doctor-course student, who is employed by MANA as a part-time researcher.

Satellites:

Please see page 10.

Advisors:

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



Prof. Heinrich Rohrer
1986 Nobel Prize Winner in Physics



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



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



Prof. Galen D. Stucky
University of California
Santa Barbara

Evaluation Committee Members:

Evaluation Committee Members provide us their critical comments and expert recommendations on the operation and re-search strategy of the MANA project.



A. Cheetham
U. Cambridge



M. Ruehle
Max-Planck



L. Schlapbach
EMPA



H. Hahn
Karlsruhe



R. Ruoff
U. Texas



Y. Nishi
Stanford U.



M. Endo
Shinshu U.



K. Tanaka
JST



K. Hashimoto
U. Tokyo



T. Aida
U. Tokyo

MANA Workforce

As of Octorber 1st, 2008

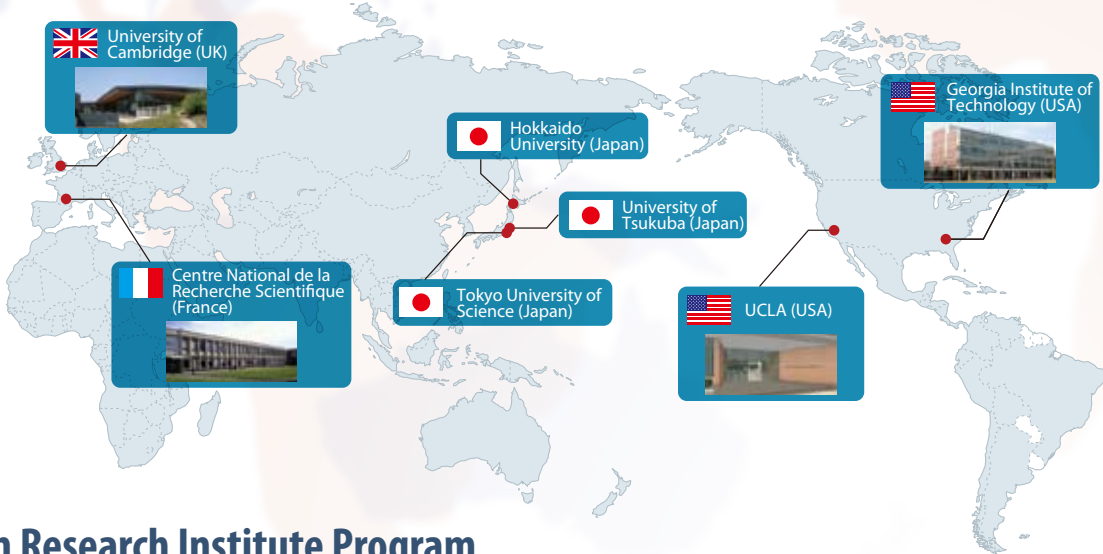
Position	Number		Foreigner
Principal Investigator (NIMS)	18	28	5
Principal Investigator (Satellite)	10		5
MANA Scientist (NIMS)	39	126	7
MANA Independent Scientist (NIMS)	12		3
ICYS-MANA Researcher (Postdoc)	10		8
MANA Research Associate (Postdoc)	44		37
Graduate Student	21		11
Administrative Staff and Technical Staff	21	21	2
Total	175		78

Proportion of foreigners : 44.6%

Global Network

Satellites

The home research institutes of Senior Researchers who are invited to participate in MANA from institutions other than NIMS are called “satellites.” MANA will efficiently promote research at the world’s highest level through active collaboration with these satellites. At the same time, foreign satellite institutes will also function as overseas bases for NIMS.



Open Research Institute Program

Open Research Institute Program is a new NIMS Invitation Program, established to facilitate the visit of re-searchers from all over the world. Using this invitation program, MANA will invite outstanding researchers from all over the world and promote research collaborations.

World Nanotechnology Research Institute Forum

NIMS/MANA plan to sponsor an international forum that will bring together the heads of all of the world’s nanotechnology research institutes with the aim of constructing an international nanotechnology research net-work through this program.

Joint Graduate Schools with Domestic and Foreign Universities

MANA will actively utilize the system of the Doctoral Programs with University of Tsukuba and Hokkaido Uni-versity, which are administered jointly by NIMS and the Universities to secure talented graduate students, in-cluding non-Japanese students. These graduate students will be treated as NIMS Junior Researchers. Taking advantage of the following NIMS international graduate school programs system, MANA will allow tal-ented foreign graduate students to participate in research under the guidance of MANA’s senior researchers.

Universities with which NIMS has signed International Joint Graduate School agreements

- Charles University (Czech Republic)
- University of Queensland (Australia)
- University of Sidney (Australia)
- University of Western Australia (Australia)
- University of Melbourne (Australia)
- University of New South Wales (Australia)
- Warsaw University of Technology (Poland)
- Anna University (India)
- Jawaharlal Nehru Centre for Advanced Scientific Research (India)
- Xi’an Jiaotong University (China)
- Ningbo Institute of Material Technology and Engineering (China)