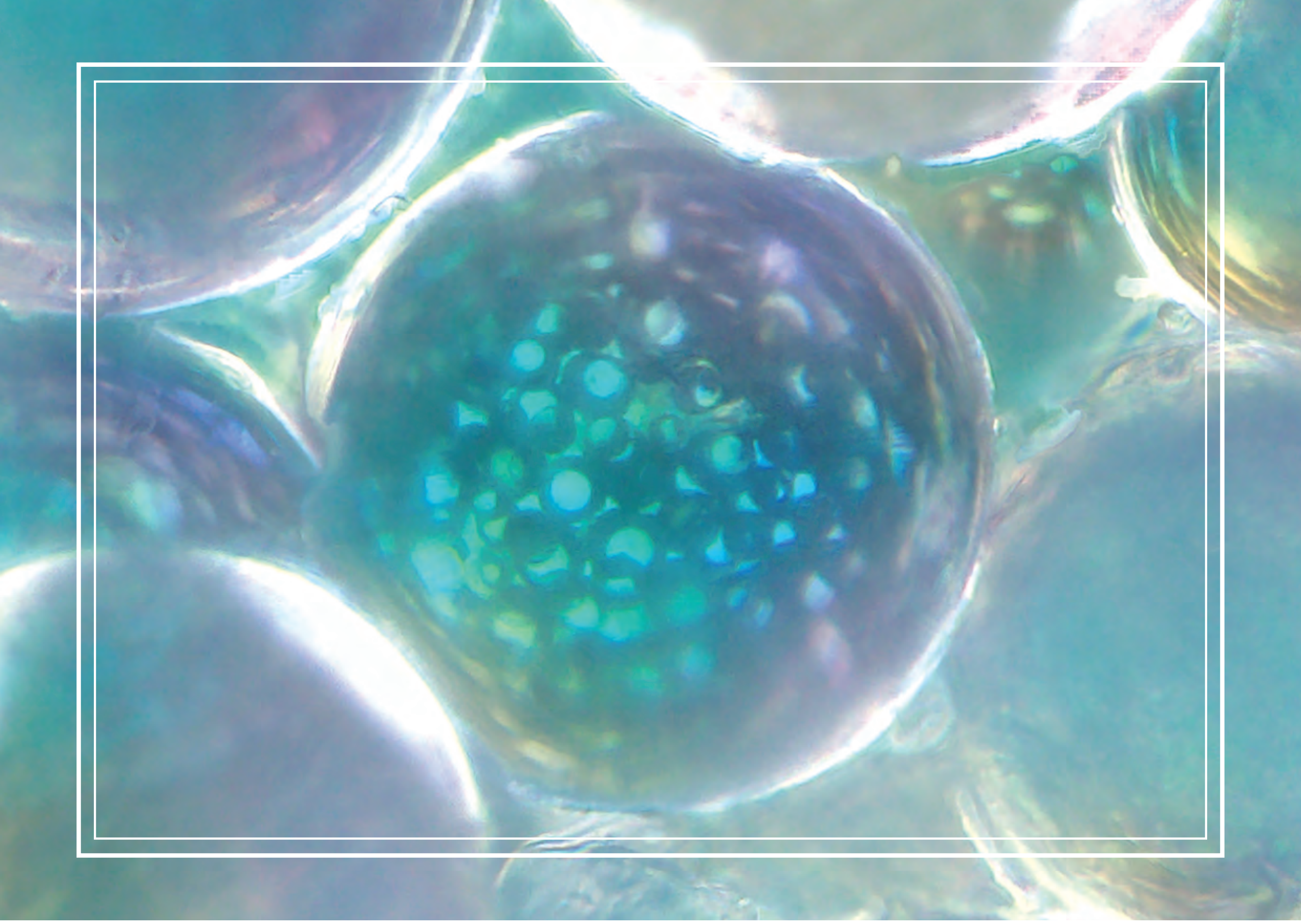


MANA

RESEARCH CENTER FOR MATERIALS NANOARCHITECTONICS

Nano Revolution for the Future

Research Center for Materials Nanoarchitectonics (MANA)

Aiming to become one of the world's leading research centers for nanoarchitectonics and materials science.

CONTENTS

What is Nanoarchitectonics?

Nanoarchitectonics (nanoarchitecture) is a concept that aims to create innovative new materials by combining "nano-parts" made of atoms and molecules to discover new and unexpected phenomena.

The term 'nano' denotes one billionth of a meter, the world at the atomic and molecular scale. It differs significantly from the realm of microtechnology (one millionth of a meter) that has contributed to advancements like semiconductor micromachining, as materials exhibit entirely different behaviors at the nanoscale. By taking advantage of this property, we can construct new materials that function by linking nanostructures together. This new concept of nanotechnology is what we call "Nanoarchitectonics".

The concept of "nanoarchitectonics", which was born at MANA, has grown to be accepted worldwide over the past 15 years, and is now introduced in many media, including academic journals and general books.

Fields of MANA

Quantum Materials Field

Contributing to Quantum Technology Research through Quantum-Architectonics

- Accelerating Quantum Research through the Development of Novel Quantum Materials and Exploration of New Phenomena -

Our research contributes to quantum technology by introducing a new concept of quantum-architectonics, which aims to integrate and systematize low-dimensional nanomaterials that control the particle-like and wave-like nature of matter and fields. By leveraging nanotechnology for material synthesis, fusion/junction of heterogeneous nanomaterials, and precision engineering for dimensional control, we develop novel quantum materials. Using ultra-low-temperature evaluation techniques, theoretical computation, and information technology, we explore new phenomena and aim to manifest functions through diverse system nanotechnologies, thereby establishing a foundational research infrastructure for quantum research.

Nanomaterials Field

Creating new materials and eliciting novel functions by sophisticated control of compositions and structures at the nano level

Leveraging Chemical Synthesis Techniques to Create Novel Nanomaterials

We are pursuing researches across a wide range of material systems, with the aim of discovering novel properties and phenomena that emerge from the nanometer size and shape, and significantly enhancing their functions. We develop and possess cutting-edge evaluation equipments, performing in-situ analysis of individual nanomaterials. Furthermore, we are advancing our research in Chemical Nano-Meso Architectonics, aiming to contribute to the development across a wide range of technological fields.

VISION

Toward a Better Global Future :

Pioneering a new paradigm in materials development on the basis of "Nanoarchitectonics"

MISSIONS

1 Develop groundbreaking new materials and realize

" The New Paradigm of Nanotechnology "

VISION・MISSIONS & MESSAGE

A Message from the Director

Research Center for Materials Nanoarchitectonics(MANA) has been promoting bottom-up basic research on Nanoarchitectonics, a unique technology for creating nanomaterials in nanotechnology and materials research. The purpose of this project is to discover new materials and new functions, disseminate excellent basic research results, and create seeds for innovation in a variety of fields by realizing "Material Nanoarchitectonics".
This concept is used to create new materials by using precision synthesis, integration, linking, and compositing of nanoscale components under interfacial control to achieve advanced functions. We have produced many unique results based on nanosheets, atomic switches, and metallic nanoporous materials, and we have also recently developed novel applications such as high-performance thermoelectric materials, neuromorphic devices, and nano photonic thermal management devices. Furthermore, we are focusing on fundamental research for the creation of quantum materials that will make full use of the nanotechnology resulting from Nanoarchitectonics.

As one of the first five WPI research centers established by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in 2007 under the World Premier International Research Center (WPI) Program, MANA aims to become a nanotechnology hub with an international research environment. As a leading international research center in the field of nanotechnology and materials science, we have been engaged in challenging research activities for more than 15 years, building a broad research network through collaboration with world-class laboratories located in MANA satellites, and through joint research with many overseas universities and research institutions. In addition, we have established a system where many researchers and students from all over the world gather to conduct research. This is reflected in the fact that more than 400 researchers who have experienced research life at MANA are now active as MANA alumni around the world.

While emphasizing the three points of originality of research, international perspectives, mutual understanding and collaboration that lead to innovation, we also realize that beyond essential basic research activities, any results should be returned to society for its improvement. "Achievements" are not limited to solving the most recent problems, but also include fundamental findings and discoveries that lead to breakthroughs in research, and for this reason I believe it is important to nurture research from a long-term perspective, and also to properly train young researchers. We will continue our efforts to further deepen our understanding of "Nanoarchitectonics" and to develop new themes in quantum materials research based on this concept. I would like to request the warm support of all concerned.

Director of MANA Takashi Taniguchi

2 Construct a worldwide network to accelerate

" Global Circulation for World Top-Level Researchers "

3 Provide a creative environment to foster

" Young Scientists who Challenge Innovative Research "

Research Environment Open to the World

Environment

MANA is situated at the center of Tsukuba Science City, a hub for numerous national research and educational institutions, fostering a cooperative and innovative research environment with other research institutions and universities. We are located adjacent to JAXA (Japan Aerospace Exploration Agency) and AIST (National Institute of Advanced Industrial Science and Technology).

Seminars & Symposia

MANA actively promotes international collaboration through seminars and international symposia, offering young scientists invaluable opportunities for engagement. Our seminars, frequently hosted by MANA researchers and distinguished visiting scientists, along with the annual MANA International Symposium, provide platforms for young researchers to interact with world-leading scientists in lively discussions.

Full Support in English

MANA promotes internationalization at every level by using English as the common language of communication. Our administrative staff, fluent in English, are committed to supporting foreign researchers, allowing them to focus entirely on their research endeavors.

Foundry

We offer the most advanced core technology facilities within NIMS, supported by English-speaking engineering staff. This ensures that all researchers, regardless of their native language, have access to the tools and support they need for cutting-edge research.

Melting Pot Café

Our building features numerous spaces where researchers from diverse nationalities and backgrounds can converge. These meeting points are the birthplaces of next-generation innovations, fostering a unique and vibrant community of ideas.

THIS IS MANA

Organization

Takashi Taniguchi
Director

Naoki Fukata
Deputy Director,
Field Director, Quantum Materials Field

Takao Mori
Deputy Director,
Field Director, Nanomaterials Field

Yutaka Wakayama
Manager,
Administrative Office

Quantum Materials Field

Nanomaterials Field

Administrative Office

World Premier International Research Center Initiative

MANA is an international research center established at NIMS, supported by the World Premier International Research Center Initiative (WPI), a project initiated by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT) in 2007. After a decade of support from the program, MANA has evolved into the "WPI Academy," marking significant progress as the world's leading center for nanotechnology materials research.

Challenges in Building Top-world Institutes **WPI Mission**

- **Leading-edge research**
- **Fusion research**
- **System reform**
- **Globalization**
- **Social value of basic research**
- **Nurturing next generation**

MANA Satellite Network

MANA introduced the "Satellite" system to implement the internationalization of our research environment. We invited prominent researchers as Satellite PIs, and established MANA satellites at each research institute to strongly support world-class research of MANA.

These satellites also provide young researchers at MANA an international research training ground, with satellite PIs working as their mentors.

Quantum Materials Field

DAVID BOWLER

LARGE-SCALE ORDER-N DFT CALCULATIONS

UNIVERSITY COLLEGE LONDON

CHRISTIAN JOACHIM

MOLECULAR DEVICE ENGINEERING

THE FRENCH NATIONAL CENTRE FOR SCIENTIFIC RESEARCH

Nanomaterials Field

DMITRI GOLBERG

TRANSMISSION ELECTRON MICROSCOPY, NANOTUBES

QUEENSLAND UNIVERSITY OF TECHNOLOGY

YUSUKE YAMAUCHI

INORGANIC TOTAL SYNTHETIC CHEMISTRY, CONDUCTIVE POROUS MATERIALS

THE UNIVERSITY OF QUEENSLAND

THOMAS E. MALLOUK

NANOSCALE CHEMISTRY

UNIVERSITY OF PENNSYLVANIA

GLOBALIZATION

Independent Researchers: Young researchers producing remarkable research achievements

MANA hires young researchers who have produced outstanding research achievements as MANA Independent Researchers. To develop these future leaders, and as the title suggests, Independent Researchers are granted "independent" authority over their research. MANA provides these researchers with special support, providing them with an environment in which they can freely pursue independent research projects and opportunities to spend long periods of time at foreign research institutions as well as actively assisting them with interdisciplinary research. Independent Researchers do not merely receive support from MANA, they also actively approach companies and government institutions to secure external research subsidies and must manage their own research funding. In this way, the top-tier research environment at MANA creates research leaders for the world. It is no overstatement to say that Independent Researchers are the future of humankind.

Independent Authority over Research

Just as the name implies, researchers are given independent discretion over their research. In Japan, there are almost no other research institutes that give this much authority and discretion to researchers in their 30s or early 40s. Thanks to this authority, Independent Researchers can decide their own intention and take action related to their own research themes. With this as one way to speed up research, the number and quality of publications by Independent Researchers is increasing year after year. With researchers in charge of managing their own research, the quality of their research is also enhanced.

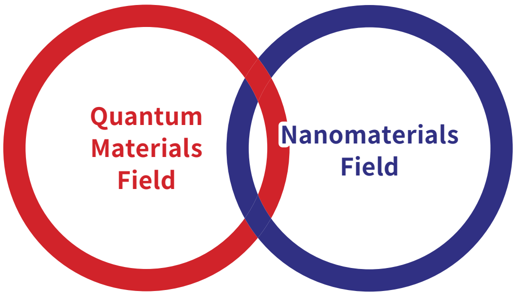
Independent Research Budget

Independent Researchers receive some funding from MANA, but not much. Independent Researchers must approach corporations and federal institutions on their own and take the initiative to acquire their own funding. In this way, they secure funding to enable them to conduct research freely and of their own accord. MANA proactively supports them in these endeavors, however, pulling in research funding from external sources is no easy task. That’s why the network of renowned researchers from all different fields and overseas research institutes that MANA can introduce to Independent Researchers is of great assistance.

Independent Action

The Independent Researchers have a high degree of freedom in their activities, allowing them to conduct research abroad as necessary, and to the extent required. They have the opportunity to meet directly with top scientists worldwide, interact with them on a personal level, and listen to their research insights, broadening their horizons through engagements with people across diverse fields. To become a researcher who thrives on the global stage, it is crucial to engage with varied cultures and interdisciplinary research, fostering growth both professionally and personally.

FIELDS OF MANA

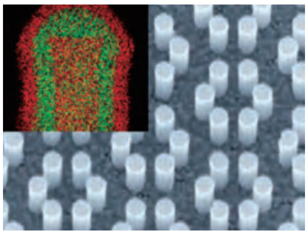


At MANA, there are two main research fields: the "Quantum Materials Field" and the "Nanomaterials Field". The Quantum Materials Field is committed to exploring a variety of nanosystems that exhibit novel quantum functionalities and advancing research that utilizes them in a systematic manner. The Nanomaterials Field focuses on the creation of materials at the nanoscale with a highly sophisticated control through chemical processes, driving the emergence of groundbreaking functionalities.

While cooperation within each field is a given, all our groups also actively engage in research that transcends these boundaries. We foster an environment that encourages cross-disciplinary collaboration and integrative research.

Quantum Materials Field

KEYWORDS *Low-dimensional nanostructures* | *Semiconductors* | *Nanofabrication* | *Electronic devices* | *Energy-related devices*



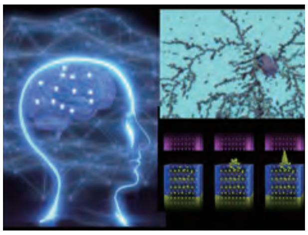
Nanostructured Semiconducting Materials Group

Field Director
Group Leader
Naoki Fukata

Development of new functional semiconductor nanomaterials and devices

Semiconductor nanomaterials, known for their unique properties not found in bulk materials, hold the potential for new device applications. Our goal is to bring forth new properties and superior functionalities in semiconductor materials.

KEYWORDS *Solid-state ionics* | *Atomic electronics* | *Neuromorphic engineering* | *Brain-like devices/circuits* | *Artificial Intelligence systems*



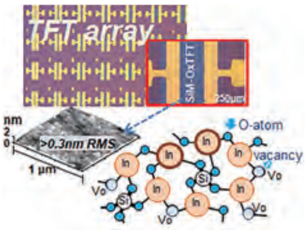
Ionic Devices Group

Group Leader
Kazuya Terabe

Hardware-oriented AI technology utilizing ion transport

In order to further advance our information society, there is an urgent need to create high-performance/high-function devices based on entirely new concepts. We aim to bring about devices/circuits/systems (especially AI-related) through the fusion of ionics and electronics.

KEYWORDS *Ultra-thin films* | *Electronics* | *Device properties* | *Quantum effects* | *Interface engineering*



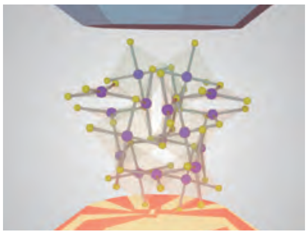
Thin Film Electronics Group

Group Leader
Kazuhito Tsukagoshi

Development of novel ultra-thin films and electronics implementation

We develop atomic-scale film and its heterostructure formation to explore novel ultra-thin films. And by applying microfabrication to device structures, we conduct research to derive the functionality of ultra-thin films. Our ultimate goal is to achieve electronics that have never existed before using ultra-thin films.

KEYWORDS *Superconducting materials* | *Functional materials* | *High pressure* | *Diamond anvil cell* | *Machine learning* | *Materials informatics*



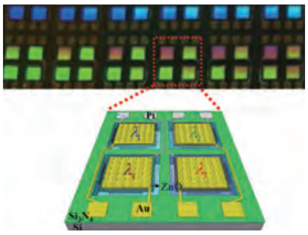
Frontier Superconducting Materials Group

Group Leader
Yoshihiko Takano

Development of novel functional materials utilizing AI and MI

Our aim is to develop cutting-edge functional materials such as superconductors. We explore the candidate materials obtained through AI and MI techniques by synthesizing and evaluating their properties under extremely high-pressure conditions. Our ultimate goal is to discover room-temperature superconductors—one of the longstanding dreams of mankind.

KEYWORDS *Light energy conversion* | *Thermal radiation/absorption* | *Surface interface phenomena* | *Ceramics* | *Metals*



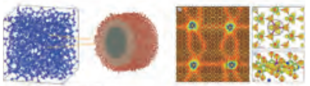
Photonics Nano Engineering Group

Group Leader
Tadaaki Nagao

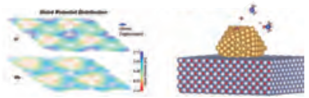
Controlling and utilizing light and thermal radiation at the nano interface

Light can be confined and manipulated in nano-scale spaces. Based on the discovery and elucidation of optical phenomena occurring at the interfaces of nano-materials, we thrust research in nano-material science aimed at utilizing infrared and solar radiation.

KEYWORDS First-principles calculations | Large-scale computational methods | Density functional theory | Molecular simulations | Nano-complexes | Machine learning



Reprinted from D. R. Smabraten et al., Phys. Rev. B 102, 144103 (2020)



Reprinted from Geng et al., Matter 6, 493 (2023)

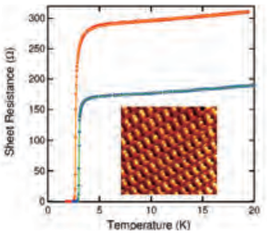
Quantum Materials Simulation Group

Group Leader
Tsuyoshi Miyazaki

Elucidation of the structure, properties, and function of quantum nano-materials using first-principles methods

Based on large-scale first-principles simulations and other analytical methods, we aim to elucidate and predict the structure, properties, and functions of various materials such as nano surfaces/interfaces and nano complexes at the atomic level.

KEYWORDS Surface and interface | Quantum physics | Low-dimensional materials | Superconductivity | Hydrogen-terminated diamond



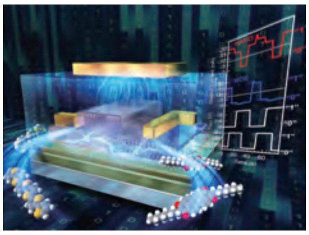
Surface Quantum Phase Materials Group

Group Leader
Takashi Uchihashi

Designing and creating two-dimensional materials at the atomic/molecular level

The surfaces and interfaces of materials are critical places where quantum functionalities manifest themselves. We design and create new surface quantum materials at the atomic/molecular level, and reveal unexpected physical properties and functionalities.

KEYWORDS Multivalued logic circuits | Logic operation | Hetero interface | Two-dimensional atomic layers | Organic semiconductors | Molecular spintronics



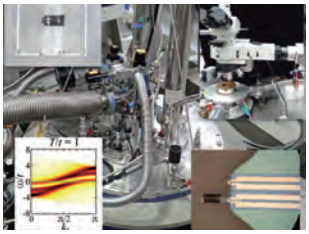
Quantum Device Engineering Group

Group Leader
Yutaka Wakayama

Development of innovative operational mechanisms using quantum nano materials

Centered on quantum nano materials such as two-dimensional molecular membranes and single molecules, we design new device architectures. We aim to control the conduction of electrons and spins, and are committed to developing innovative operational mechanisms and ultra-low power devices.

KEYWORDS Superconductivity | Vortex | Topological | Strong correlation | Low temperature high magnetic field



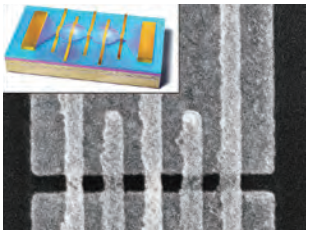
Quantum Material Properties Group

Group Leader
Taichi Terashima

Research on the electronic states and properties of superconductors and topological materials

We elucidate the state of the electrons in a material through the measurement of electronic states using ultra-low temperature high magnetic fields and theoretical research. Also, the study of quantum flux occurring in superconductors is an important theme.

KEYWORDS Atomic layer materials | Oxides | Superconductivity | Quantum dots | Spin qubits | Valley qubits | Topological qubits



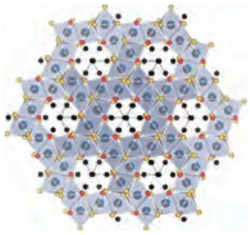
Qubit Materials Group

Group Leader
Yusuke Kozuka

Materials for solid-state quantum systems and quantum hardware

We aim to advance the performance of solid-state qubits and hardware systems based on materials research, comprehensively utilizing a variety of techniques such as thin film fabrication, structural analyses, microfabrication processes, and electrical measurements.

KEYWORDS Transition metal oxides | High temperature high pressure synthesis | Nonlinear optical function | Statistical mechanical calculation | Quantum beam experiment



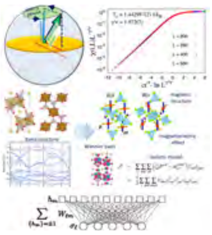
Quantum Solid State Materials Group

Group Leader
Kazunari Yamaura

Manifestation of quantum function and dynamics in symmetry-broken quantum materials

Our research group develops innovative materials with exceptional quantum capabilities. We focus on creating single crystals, analyzing crystal structures, characterizing physical properties, and conducting theoretical calculations. Our primary goal is to discover novel functionalities by breaking spatial inversion and/or time-reversal symmetry.

KEYWORDS
Atomic layer materials | Quantum spin system | Strongly correlated materials | Magnetism | Electromagnetic effects | Phase transitions | Quantum entanglement structures | First-principles calculations | Monte Carlo method | Quantum Field Theory



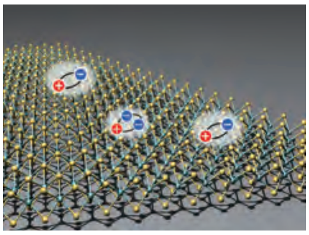
Quantum Materials Modeling Group

Group Leader
Youhei Yamaji

Understanding the diverse phases of quantum materials and the structure of quantum entanglement

We theoretically analyze and design quantum information carriers that serve as "building materials" for nanoarchitectonics. By understanding the process of generating material phases and quantum entanglement through the condensation of information carriers, we contribute to the research of quantum materials and collaborate with device research.

KEYWORDS
Two-dimensional quantum materials | Semiconductors | Optical properties | Crystal growth



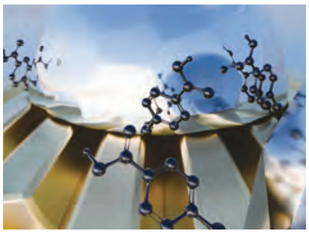
2D Quantum Materials Group

Group Leader
Ryo Kitaura

Nano-science involving two-dimensional quantum materials

Two-dimensional systems are a treasure trove of new functions and properties. By promoting the creation of new two-dimensional materials and property exploration using advanced measurements, we aim to create a new trend in nano-science.

KEYWORDS
Neuromorphic devices | Reservoir computing | Brain-inspired computing



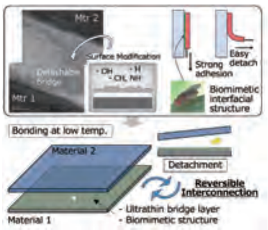
Neuromorphic Devices Group

Group Leader
Takashi Tsuchiya

Innovative AI electronics that solve energy problems through the functionality of materials

We develop neuromorphic devices that utilize the spatiotemporal dynamics of various information carriers, such as ions, molecules, and spin in materials, as computational resources. This approach contributes to realizing low-power and high-performance AI electronics, a significant step forward to Society 5.0.

KEYWORDS
Reversible interconnection | Low temperature | Solid-state | Electronics packaging | 3-D integration | Biomimetics

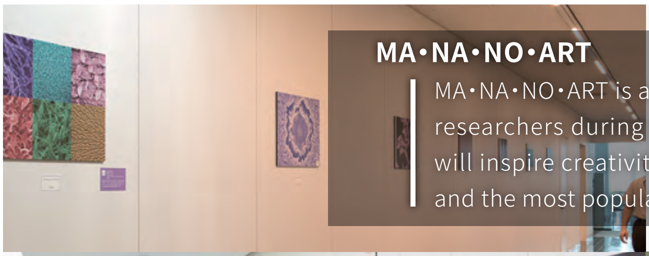


Smart Interface Team

Team Leader
Akitsu Shigetou

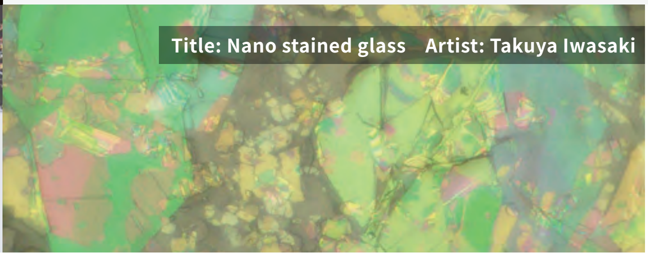
Interfacial nano-micro structure design for reversible interconnection

We are developing a low temperature solid-state reversible interconnection technology by tuning micro-nano interfacial structures via semiconductor fabrication and biomimetic approaches, aiming at low-loss and high-functionality quantum system integration.



MA･NA･NO･ART

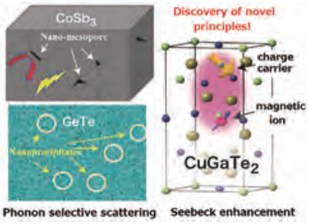
MA･NA･NO･ART is a works of art processed from the data obtained by MANA researchers during their experiments. We hope that the beautiful artwork will inspire creativity and new ideas. The work is displayed in our building, and the most popular pieces are used as posters and brochure covers.



Title: Nano stained glass Artist: Takuya Iwasaki

Nanomaterials Field

KEYWORDS Thermoelectric materials · Novel enhancement principles · Phonon engineering · Thermal control



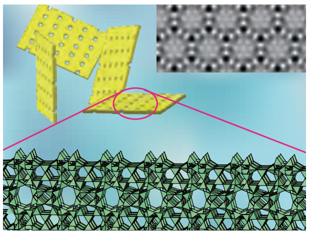
Thermal Energy Materials Group

Field Director
Group Leader
Takao Mori

Realizing the widespread application of thermoelectric materials; a 200-year dream

We aim to achieve a high degree of control over charge transport and thermal/phonon transport using nanostructuring and novel principles, leading to the 200 year dream of wide-scale practical application of thermoelectric materials and efficient thermal control.

KEYWORDS Nanomesh · Nanosheet · Exfoliation · Hierarchical structure · Energy-related materials



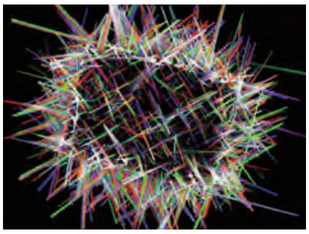
Soft Chemistry Group

NIMS Fellow
Group Leader
Takayoshi Sasaki

Creating Nanomeshs and Developing Advanced Functions through Their Integration

We aim to create nanomeshes having regular open channels as a new class of two-dimensional materials and develop new materials useful in applications towards batteries and catalysts via precisely assembling them into tailored nanostructures.

KEYWORDS Supramolecular chemistry · Interfacial science · Thin films · Self-assembly · Fullerene · Nanocarbon · Organic semiconductors · Devices · Cell control



Supermolecules Group

Group Leader
Katsuhiko Ariga

The world's masterpiece materials revolutionized by interfacial science and supramolecular chemistry

We create materials architected with supermolecules and materials assemblies at interfaces with free tunning of their shapes and electronic states, to develop world-surprising systems and devices for energy/environmental/bio-functional revolutions.

KEYWORDS Layered compounds · Porous materials · Catalysts · Adsorption · UV cut

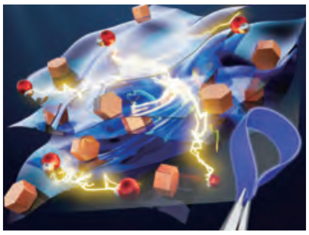
Layered Nanochemistry Group

Group Leader
Yusuke Ide

Development of Eco-friendly and High-performance Nanomaterials

We develop new materials and new functionalization methods for low-dimensional nanomaterials, such as layered inorganic compounds, and aim to develop materials that can replace existing consumer goods and industrial products, or for realizing a hydrogen society.

KEYWORDS Nanosheets · Nanotubes · Energy conversion/storage · Catalysts · Membranes · Nanoelectronics



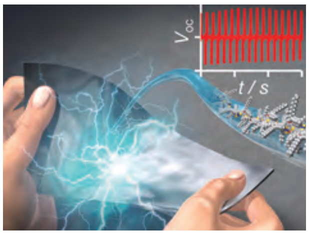
Functional Nanomaterials Group

Group Leader
Renzhi Ma

Synthesis and Function Exploration of Novel Nanomaterials

We design and synthesize new nanomaterials (nanosheets, nanotubes, etc.) that have a rich diversity in composition and structure. We aim to reveal new functions in optoelectronics and energy conversion/storage, etc.

KEYWORDS π-Conjugated molecules | Stimuli-responsiveness | Sensors | Liquids | Electrets | Energy harvesting



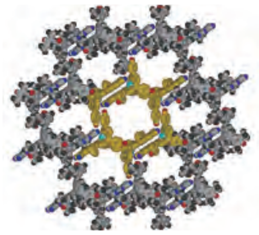
Frontier Molecules Group

Group Leader
Takashi Nakanishi

Development of Novel Functional Molecular Materials with Unique Stimuli-responsiveness

We aim to construct molecular systems that exhibit sensor and energy harvesting functions. It is achieved by creating novel π-conjugated molecules and dimensionally regulated molecules/polymers that respond uniquely and sensitively to external stimuli (molecules, light, heat, vibration, pressure, etc.).

KEYWORDS Functional chromophore | self-assembly | supramolecular chemistry | porphyrin | pyrazinacene



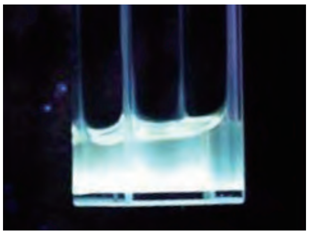
Functional Chromophores Group

Group Leader
Jonathan Hill

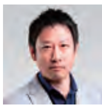
Towards new functional chromophore materials

Photofunctional chromophores with 3D nanomolecular structures have unique optical and supramolecular properties. This group designs and synthesizes new photofunctional chromophore molecules for the functionalization of self-assembled materials.

KEYWORDS Nanocrystals | Quantum dots | Perovskites | Optoelectronics | Photothermal conversion | Nanomedicine



Nanoparticle Group

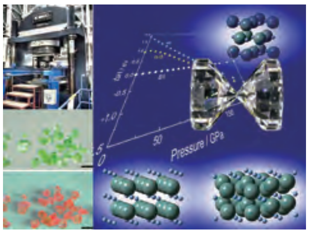


Group Leader
Naoto Shirahata

Creation of Eco-friendly Nanoparticles Aimed at Next-generation Photonics

We develop new materials that absorb and emit specific light by controlling the energy structure of crystals composed of environmentally friendly elements. We aim to contribute to next-generation optoelectronics and nanomedicine.

KEYWORDS Ultra high-pressure technology | Material structural controls | High-pressure hydrides | Diamond/BN impurity controls



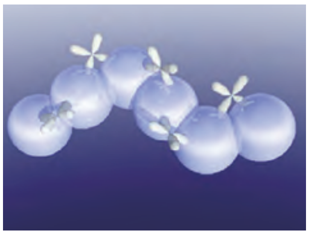
High-Pressure Structural Controls Group

Group Leader
Hitoshi Yusa

Material Structural Controls and Material Syntheses by Ultra High-Pressure Base Technology

By utilizing ultra high-pressure base technology, we develop novel synthetic processes, and in-situ observation techniques under high pressure and temperature. We have a wide range of research interests such as, super-hard materials, semiconductors, dielectrics, luminescent materials, hydrides, and magnet-related materials. We promote basic research on these functional materials, including the advancement of high-pressure base technology.

KEYWORDS New electronic functions | Material exploration | Material design | Semiconductors | Catalysts



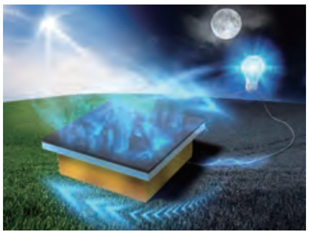
ElectroActive Materials Team

NIMS Distinguished Fellow
Team Leader
Hideo Hosono

Designing and Exploring New Electronic Functions with Original Ideas

We aim to explore functionalities that are primarily exhibited by electrons, using our original ideas and approaches. The targeted outputs are diverse, ranging from semiconductors, superconductors, and catalysts to luminescence and magnetism. We focus on areas bridging physics and chemistry.

KEYWORDS Nano-optics | Micro structures | Photovoltaic conversion | Thermal radiation | Photothermal conversion



Optical Nanostructure Team

Team Leader
Satoshi Ishii

Thermal Control and Functionalization using Optical Nanostructures

Thermal radiation and photothermal conversion depend on optical nanostructures. By arbitrary controlling thermal radiation spectra and developing new optical thermal property measurement methods through optical nanostructures, we contribute to thermal control research.

MANA FIGURES

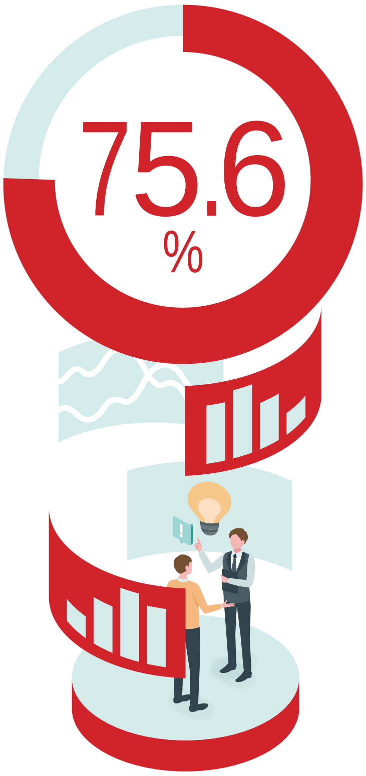
Number of Papers

8,475

2007-2023

Internationally Co-Authored Papers

2007-2023



75.6 %

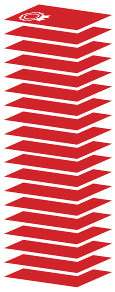
Top 1% Highly Cited Papers

6.8%

2020-2022

Web of Science, as of March 1, 2024

Patent Registrations



454

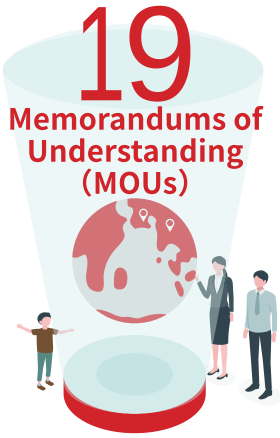
As of January 2024

FWCI

2020-2023

Field-weighted Citation Impact

2.11



19

Memorandums of Understanding (MOUs)

Valid MOUs (19 institutions, 11 countries) As of May 2024

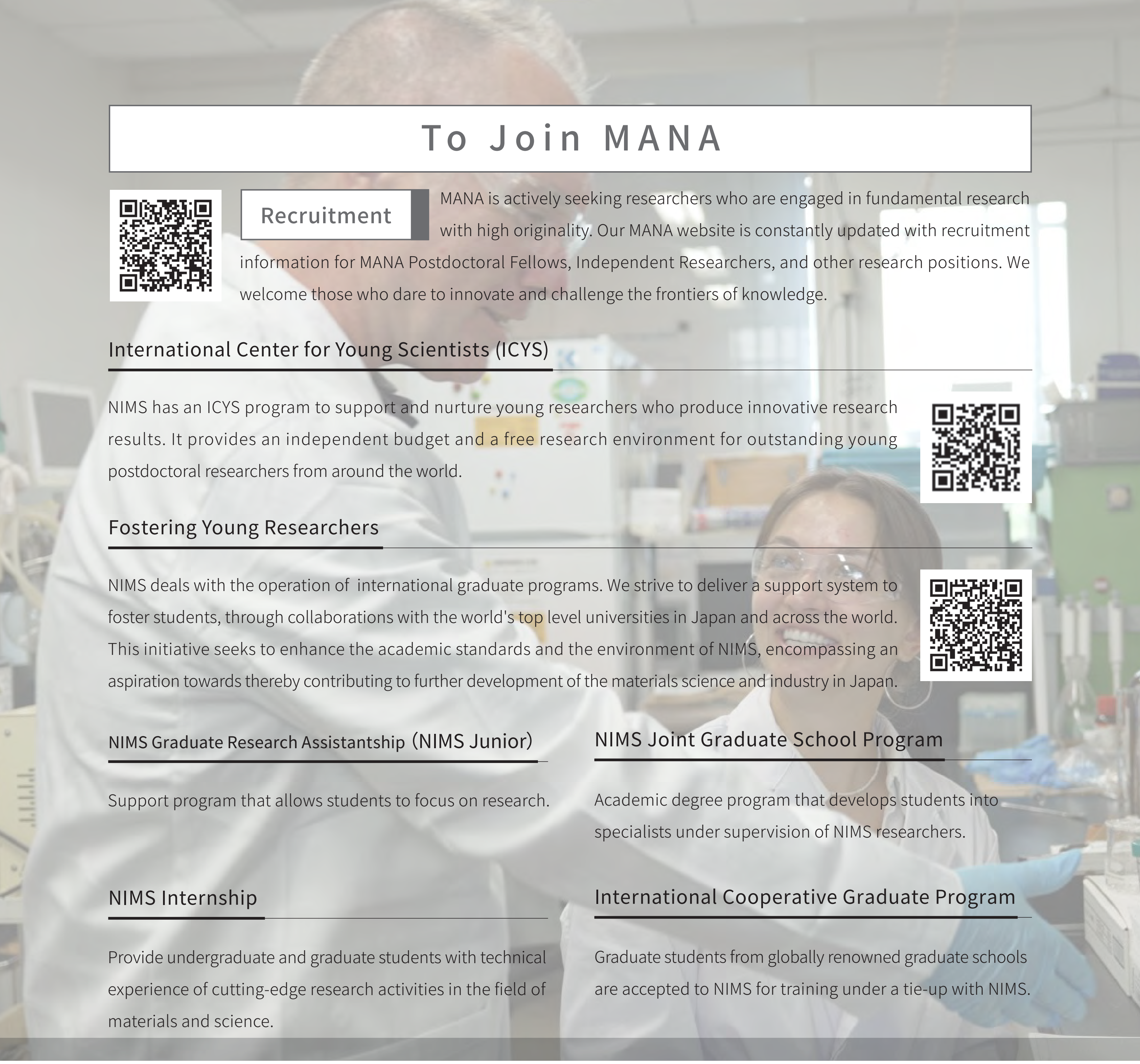
【Europe】 |Czech Republic| University of Chemistry and Technology, Prague (UCT) | Institute of Macromolecular Chemistry, Czech Academy of Sciences (IMC) | Faculty of Mathematics and Physics, Charles University | Faculty of Chemical Technology, The University of Pardubice |Finland| Department of Applied Physics and School of Pharmacy, The University of Eastern Finland (UFE) |Italy| The University of Naples Federico II and others (INFN, CNR, IPNS-KEK, RCFM-NIMS) |Slovak Republic| Comenius University in Bratislava |Spain| Catalan Institute of Nanoscience and Nanotechnology (ICN2) |UK| London Centre for Nanotechnology (LCN), University College London (UCL)

【North America】 |USA| School of Arts & Sciences, The Trustees of University of Pennsylvania **【Oceania】** |Australia| The University of Queensland (UQ) | Queensland University of Technology (QUT) | University of Technology Sydney | Sydney Nano Institute, The University of Sydney **【Middle East】** |Qatar| Qatar Environment and Energy Research Institute (QEERI)

【Asia】 |Nepal| Nepal Academy of Science and Technology (NAST) |Taiwan| i-Center for Advanced Science and Technology (iCAST), National Chung Hsing University (NCHU) | Hierarchical Green-Energy Materials Research Center (HiGEM), National Cheng Kung University (NCKU) | College of Science, National Chiao Tung University (NCTU)

Personnel Composition As of April 2024

	Group Leaders & Team Leaders	Satellite PIs	Faculty Scientists	Postdoctoral Researchers	Junior Researchers	Administrative and Technical Staff	Total
Number	27	5	64	61	44	50	251
Non-Japanese	2	4	11	43	32	5	97
Female	1	0	5	12	11	42	71



To Join MANA

Recruitment

MANA is actively seeking researchers who are engaged in fundamental research with high originality. Our MANA website is constantly updated with recruitment information for MANA Postdoctoral Fellows, Independent Researchers, and other research positions. We welcome those who dare to innovate and challenge the frontiers of knowledge.

International Center for Young Scientists (ICYS)

NIMS has an ICYS program to support and nurture young researchers who produce innovative research results. It provides an independent budget and a free research environment for outstanding young postdoctoral researchers from around the world.

Fostering Young Researchers

NIMS deals with the operation of international graduate programs. We strive to deliver a support system to foster students, through collaborations with the world's top level universities in Japan and across the world. This initiative seeks to enhance the academic standards and the environment of NIMS, encompassing an aspiration towards thereby contributing to further development of the materials science and industry in Japan.

NIMS Graduate Research Assistantship (NIMS Junior)

Support program that allows students to focus on research.

NIMS Internship

Provide undergraduate and graduate students with technical experience of cutting-edge research activities in the field of materials and science.

NIMS Joint Graduate School Program

Academic degree program that develops students into specialists under supervision of NIMS researchers.

International Cooperative Graduate Program

Graduate students from globally renowned graduate schools are accepted to NIMS for training under a tie-up with NIMS.

Outreach Activities at MANA

The MANA Outreach Team actively works to clearly communicate the most recent research and activities of MANA to a wide-ranging audience. Through regular publication of our PR magazine, global wire distribution via English web media, communication via official social media channels, and planning scientific events, we are working to make material development through Nanoarchitectonics more accessible and relatable to everyone.

BROCHURE

SNS

EVENT

MANA
official
SNS

RESEARCHERS

Research Groups &Team

Quantum Materials Field

Group

Nanostructured Semiconducting Materials


N. Fukata
Group Leader


W. Jevasuwan
Senior Researcher


R. Matsumura
Senior Researcher

Group

Frontier Superconducting Materials


Y. Takano
Group Leader


H. Sakurai
Principal Researcher


K. Terashima
Principal Researcher


R. Matsumoto
Researcher

Group

Quantum Solid State Materials


K. Yamaura
Group Leader


M. Hase
Chief Researcher


A. Belik
Chief Researcher


M. Nishino
Principal Researcher


Y. Tsujimoto
Principal Researcher

Group

Quantum Device Engineering


Y. Wakayama
Group Leader


R. Hayakawa
Principal Researcher

Group

Surface Quantum Phase Materials


T. Uchihashi
Group Leader


R. Arafune
Principal Researcher


T. Yamaguchi
Principal Researcher


K. Nagaoka
Senior Researcher

Group

2D Quantum Materials


R. Kitaura
Group Leader


T. Kariyado
Senior Researcher


D. Kozawa
Senior Researcher

Group

Quantum Materials Simulation


T. Miyazaki
Group Leader


A. Nakata
Principal Researcher


J. Nara
Principal Researcher

Group

Photonics Nano Engineering


T. Nagao
Group Leader


W. Hayami
Principal Researcher


K. Watanabe
Researcher

Group

Qubit Materials


Y. Kozuka
Group Leader


H. Oike
Senior Researcher

Group

Quantum Material Properties


T. Terashima
Group Leader


M. Kohno
Chief Researcher


M. Tachiki
Principal Researcher


T. Mochiku
Principal Researcher


H. Yamase
Principal Researcher


S. Ooi
Senior Researcher


T. Konoike
Senior Researcher

Group

Quantum Materials Modeling


Y. Yamaji
Group Leader


I. Solovyev
Principal Researcher


A. Tanaka
Principal Researcher


Y. Nonomura
Principal Researcher

Group

Thin Film Electronics


K. Tsukagoshi
Group Leader


T. Nabatame
Specially Appointed Researcher


S. Kato
Senior Researcher

Group

Ionic Devices


K. Terabe
Group Leader


T. Tsuruoka
Chief Researcher


M. Sakurai
Principal Researcher


W. Namiki
Researcher

Group

Neuromorphic Devices


T. Tsuchiya
Group Leader


Y. Shingaya
Senior Researcher

Team

Smart Interface


A. Shigetou
Team Leader


N. Hosoda
Chief Researcher

● Cross Appointment

Research Groups &Teams

Nanomaterials Field

■ Group

Thermal Energy Materials


T. Mori
Group Leader


M. Goto
Chief Researcher


N. Tsujii
Principal Researcher


I. Ohkubo
Principal Researcher


M. Tachibana
Principal Researcher


N. Sato
Researcher


Y. Iwasaki
Researcher

■ Group

Soft Chemistry


T. Sasaki
NIMS Fellow
Group Leader


Y. Ebina
Principal Researcher


N. Sakai
Principal Researcher

■ Group

Functional Nanomaterials


R. Ma
Group Leader


T. Taniguchi
Principal Researcher


D. Tang
Principal Researcher

■ Group

Layered Nanochemistry


Y. Ide
Group Leader


M. Oshikiri
Principal Researcher


W. Chaikittisilp
Senior Researcher

■ Group

Frontier Molecules


T. Nakanishi
Group Leader


S. Ishihara
Principal Researcher


K. Nagura
Researcher


M. Matsumoto
Researcher

■ Group

Functional Chromophores


J. Hill
Group Leader


A. Bandyopadhyay
Principal Researcher


J. Henzie
Principal Researcher


J. Labuta
Senior Researcher

■ Group

Nanoparticle


N. Shirahata
Group Leader


H. T. Sun
Principal Researcher

■ Group

Supermolecules


● **K. Ariga**
Group Leader


● **J. Takeya**
NIMS Invited Researcher


● **Y. Yamauchi**
Chief Invited Researcher


L. K. Shrestha
Principal Researcher


Y. Yamashita
Senior Researcher

■ Group

High-Pressure Structural Controls


H. Yusa
Group Leader


F. Kawamura
Principal Researcher


S. Nakano
Principal Researcher


T. Kawashima
Senior Researcher


M. Miyakawa
Senior Researcher

■ Team

ElectroActive Materials


H. Hosono
NIMS Distinguished Fellow／Team Leader


S. Matsuishi
Principal Researcher

■ Team

Optical Nanostructure


S.Ishii
Team Leader

Independent Researcher

Concurrent Appointment ▶


T. Iwasaki
Qubit Materials Group


M. Tenjimbayashi
Frontier Molecules Group


T. Harada
ElectroActive Materials Team

Fellow


T. Taniguchi
NIMS Fellow

Nano Revolution
for the Future

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World Premier International
Research Center Initiative

National Institute
for Materials Science

| **MA•NA•NO•ART** |
Cover photo：Blastomere
(Nanostructured core-shell gel)
Artist：Mizuki Tenjimbayashi

2024.10 | P.20 EN