



TOHOKU
UNIVERSITY

TOHOKU UNIVERSITY Material Solutions Center

2023

*Tohoku University
Material Solutions Center (MaSC) contributes to
economic evolution of Tohoku and Japan
through the world-leading research projects
on material development for the future.*



MaSC



Director of
TOHOKU UNIVERSITY
Material Solutions Center

Kaoru Maruta

Working on new materials for the future of society

Tohoku University Material Solutions Center (MaSC) was founded on Tohoku University's Katahira campus in January 2014. It aims to promote innovation, entrepreneurship and industrialization from the endeavors of joint-research on new materials in order to contribute to society in the future. The construction cost of the center was provided by the Ministry of Economy, Trade and Industry's subsidization for the improvement of industrial technology development facilities. The remaining cost was shared by the Institute for Materials Research (IMR), the Institute of Fluid Science (IFS), the Institute of Multidisciplinary Research for Advanced Materials (IMRAM), and Tohoku University headquarters.

In 2018, the Research Institute of Electrical Communication (RIEC) also began participation in the operations of the center, expanding the scope of research and development to both materials and their applied devices, allowing the University to create a cooperative creation base between industry and academia in the Katahira area.

Tohoku University is proud of its world-leading practical accomplishments and its tradition of material science research. Katahira campus in particular has a number of excellent research institutes for material science. Bringing together these strengths, MaSC will help the solution of your problems to meet various industrial demands.

Operations of MaSC is financially independent from the university and its funds come from usage fees for spaces and equipment, as well as other sources while attention is given to uphold security and safety.

The main research themes of this center are categorized into three fields: "Social Infrastructure", "Electronics" and "Energy". Each research project is determined by open application.

Last year marked the 9th year since the establishment of the center, we held "Real Exchange" meetings and associate membership activities online while taking preventive measures against the Covid-19 infection. And we co-sponsored the online symposium for the Multi-Material Consortium and the Soft-Material Consortium which were established in the wake of past "Real Exchange" meetings.

In addition, we held the "Real Tour in Tohoku University" for the first time, which is a new attempt to explore novel open innovation based on the technical seeds of our young researchers.

This year, the three-year-long Covid-19 crisis becomes to an end, and we will hold face-to-face "Real Exchange" meetings and "Real Tours in Tohoku University". We also will continue to support the industry-academia collaboration activities such as the Consortium for Bulk Soft Magnetic Materials, aiming to greatly contribute to the industrial recovery of the Tohoku area and the strengthening of Japan's global competitiveness.

MaSC would like to express its appreciation for your continued support.





Collaboration with industry to create the advanced materials for the future

-From Tohoku to the world-

Tohoku University Material Solutions Center (MaSC) is a cooperative base between academics and industries with the help of government, which aims to promote the development of new-functional materials for industrial use and to boost up the local economy in Tohoku region.

MaSC has been set up in a joint effort of Tohoku University and its four institutes:

Institute for Materials Research (IMR), Institute of Fluid Science (IFS), Research Institute of Electrical Communication (RIEC) and Institute of Multidisciplinary Research for Advanced Materials (IMRAM).

The construction fees are partly supported by the Ministry of Economy, Trade and Industry.

Main topics of the MaSC project are the following three industrial fields:

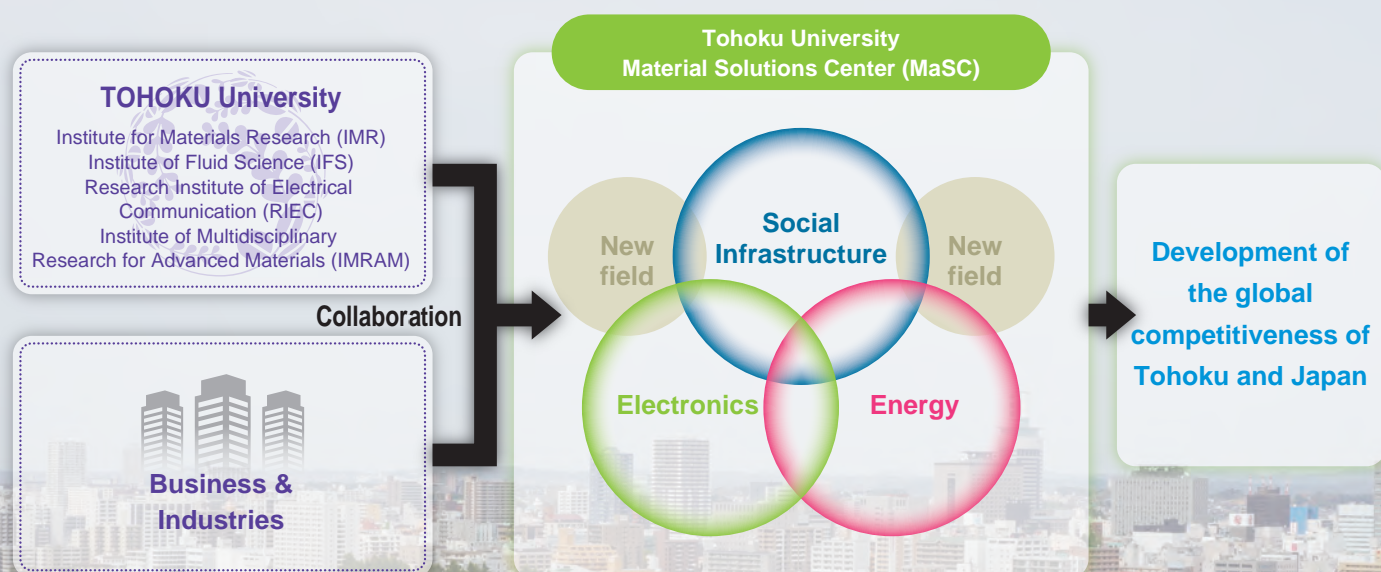
Social Infrastructure (materials for automobiles, aerospace, and life-science)

Electronics (materials for power devices and electronic devices)

Energy (materials for solar batteries, hydrogen energy, and batteries)

They provide this role from the nano-scale to the macro-scale on technical bases such as metal nano-control technology, ultra-hybrid material technology, and next-generation device creation technology, which are innovative material process technologies.

We trust that bringing up this center will help towards the reconstruction of the economy in Tohoku area after the earthquake and tsunamis in 2011, and that the technologies and new businesses will start here from the innovative results in MaSC to create jobs and lead to a strengthening of Japan's competitive power internationally in the area of materials.



Research Projects

Development of Innovative Manufacturing Processes for Quantum Dot Arrays and Nano-energy Devices

Project Leader

Kazuhiko Endo

Professor
Green Nanotechnology Laboratory
Institute of Fluid Science



SO EL EN

Creation of Functional Multiphase Fluids-smart Materials and Their Measurement and Simulation Evaluation

Project Leader

Jun Ishimoto

Professor
Institute of Fluid Science, Deputy Head of Global Collaborative Research and Education Center for Integrated Flow Science (IFS-GCORE) Deputy Head of MaSC



SO EL EN

Supercritical Nanomaterials Technology

Project Leader

Tadafumi Adschiri

Distinguished Professor
Advanced Institute for Materials Research (AIMR)



SO EL EN

Development of new materials based on new metal additive manufacturing technology.

Project Leader

Akihiko Chiba

Specially Appointed Professor
New Industry Creation Hatchery Center (NICHe)



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Fusion Research Laboratory of Tribology

Project Leader

Kazue Kurihara

Professor
New Industry Creation Hatchery Center (NICHe)



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Development of Technology for Functional Condensed Matter Applications

Project Leader

Shigeru Suzuki

Professor
Micro System Integration Center



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Development of Multi-material Additive Manufacturing Technology

Project Leader

Tomonaga Okabe

Professor
Department of Aerospace Engineering, Graduate School of Engineering/Multi-Physics Design Laboratory, Institute of Fluid Science/Director of Research Center for Green X-Tech



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Food and Secondary Battery related Fine Powder Manufacturing Project

Project Leader

Yuji Takakuwa

Professor
Micro System Integration Center



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Development of Novel Scintillation Crystals for Next Generation

Project Leader

Akira Yoshikawa

Professor
Institute for Materials Research



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Research and Development of Additive Manufacturing Technologies

Project Leader

Akihiko Chiba

Specially Appointed Professor
New Industry Creation Hatchery Center (NICHe)



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projects are using space for research from the first floor to the fifth floor.

Development of Electron Beam Melting Based Additive Manufacturing Technology and New Materials

Project Leader

Akihiko Chiba

Specialty Appointed Professor —
New Industry Creation Hatchery Center (NICHe)



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Molecular Engineering of Interfaces

Project Leader

Kazue Kurihara

Professor —
New Industry Creation Hatchery Center (NICHe)



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Advanced Imaging and Modeling Center for Soft-materials (Tohoku AIMcS)
Advanced Electron Microscopy Project

Project Leader

Masami Terauchi

Professor —
Institute of Multidisciplinary Research for Advanced Materials

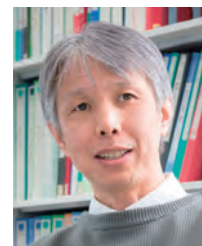


Ultra-low Loss Magnetic Materials for Innovative Power Electronics

Project Leader

Satoshi Okamoto

Professor —
Institute of Multidisciplinary Research for Advanced Materials (IMRAM), Tohoku University



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Development of Novel Recycling Technology for Magnesium Alloy Fuel Cell by Renewable Energy

Project Leader

Hiroyuki Shibata

Professor —
Materials Separation Processing, Institute of Multidisciplinary Research for Advanced Materials



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Tohoku University/National Yang Ming Chiao Tung University International Joint Laboratory = Worldwide Top-notch Joint Researches for Constructing a Technology Infrastructure for a Sustainable and Smart Society

Project Leader

Kazuhiko Endo

Professor —
Green Nanotechnology Laboratory
Institute of Fluid Science



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IHI x Tohoku University Co-creation Research Center of Ammonia Value Chain for Carbon Neutrality

Project Leader

Toshiro Fujimori

Specialty appointed professor (Research) —
Institute of Fluid Science, Senior Technical Advisor, Technology & Intelligence Integration, IHI Corporation



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Realization of energy/material circulation technology based on biomass resources

Project Leader

Hiroshi Yabu

Professor/Principal Investigator
WPI-AIMR, Tohoku University
CSO, AZUL Energy, Inc.



SO EL EN

Development of Fundamental Technologies for Metal Additive Manufacturing Technology

Project Leader

Akihiko Chiba

Specialty Appointed Professor —
New Industry Creation Hatchery Center (NICHe)



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The France-Japan Joint Laboratory: ELyTMax, CNRS-Université de Lyon-Tohoku University, International Joint Unit

Project Leader

Motoko Kotani

Professor —
Tohoku University Executive Vice President for Research, Director of Organization for Advanced Studies(OAS)



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Research Projects

Tohoku University Core Facility Center

Project Leader

Motoko Kotani

Executive Vice President for Research
Director of the Tohoku University Core
Facility Center



SmartTECH Lab. Inc.

Representative Director, President & CEO

Masami Nakano

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ALPSALPINE x Tohoku Univ.
Co-creation Research Center for
Connected Value Creation

Project Leader

Shinichiro Omachi

Professor
Graduate School of Engineering
Department of Communications Engineering



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AZUL Energy Inc.

President & CEO

Koju Ito



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Startup Incubation Center

Project Leader

Takuro Ueda

Tohoku University Executive Vice President
(for Industry- University Collaboration)
General Director, Startup Incubation Center



EM Devices Corporation
NEXEM Advanced Technology Center

Director CTO

Tsutomu Ono



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3 DC Inc.

CEO

Takuma Kuroda



SO EL EN

Matsuo Industries Co., Ltd.

Operating officer

Yuji Sekitomi



SO EL EN

Research & Development on new materials and devices that will impact society in the fields of “Social infrastructure materials”, “Electronic materials” and “Energy materials” with 28 research projects selected through public offering from both in and outside the university.

SO Social infrastructure EL Electronics EN Energy



Shared Equipment

High performance equipment for material analysis is served for shared use on the first floor, such as “structural analysis systems”, “physical property analysis system”, “composition analysis systems” and “micromachining system”.

These equipments have unique optional features.

Members of the MaSC can use these systems to analyze their materials and to achieve speedy implementation of their findings.

Equipment list



Multipurpose X-ray Diffraction System

SmartLab 3G/VariMax DW with IP



Scanning Electron Microscope System and Cross Section Polisher

JSM-7800F & IB-09020CP



NIR Spectrometer

NX-FLIM-T03



Scanning X-ray Photoelectron Spectroscopy

PHI 5000 VersaProbe II



Field Emission Electron Probe Microanalyzer with SXES

JXA-8530F+SXES



Focused Ion Beam/Scanning Electron Microscope Dual-beam System

Helios NanoLab™ 600i

Seismic isolator equipped

The center building is base isolated with seismic isolators made of laminated rubber and dampers. The areas that have seismic isolators installed are called “base-isolated layers”. These areas are designed to absorb the heavy shock during an earthquake to keep the “base-isolated layers” stable without serious vibrations.



Map

From Sendai Station to KATAHIRA Campus, Tohoku University.



Bus stop

Access

Walk

About 20 min

From the west exit of Sendai Station to KATAHIRA Campus North Gate of Tohoku University

Bus

About 10 min

From the bus stop of No. **11**, **12** at Sendai Station Bus Terminal

Get on bus for DOBUTSU-KOEN 3 by way of OTAMAYABASHI

11 - Sendai municipal bus 701, 704 and 706 system

12 - Miyagi Kotsu bus 14, 28 and 29 system

Subway

About 15 min

Get off at Subway Namboku Line Sendai Station (Exit South 2) or Itsutsubashi Station (Exit North 2) and walk to KATAHIRA campus

About 10 min

Get off at Subway Tozai Line Aobadori-Ichibancho (Exit South 1) and walk to KATAHIRA campus

Taxi

From the Taxi stand at the JR Sendai Station, West Exit (1F)

About 10 min

KATAHIRA Campus

※Schedule is subject to change due to weather conditions, road situation and other factors.



Tohoku University KATAHIRA Campus

From North Gate to Material Solutions Center (MaSC)



Information



Restaurant



Shop



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<http://www.masc.tohoku.ac.jp/english>



Jun 2023