TOHOKU
UNIVERSITY

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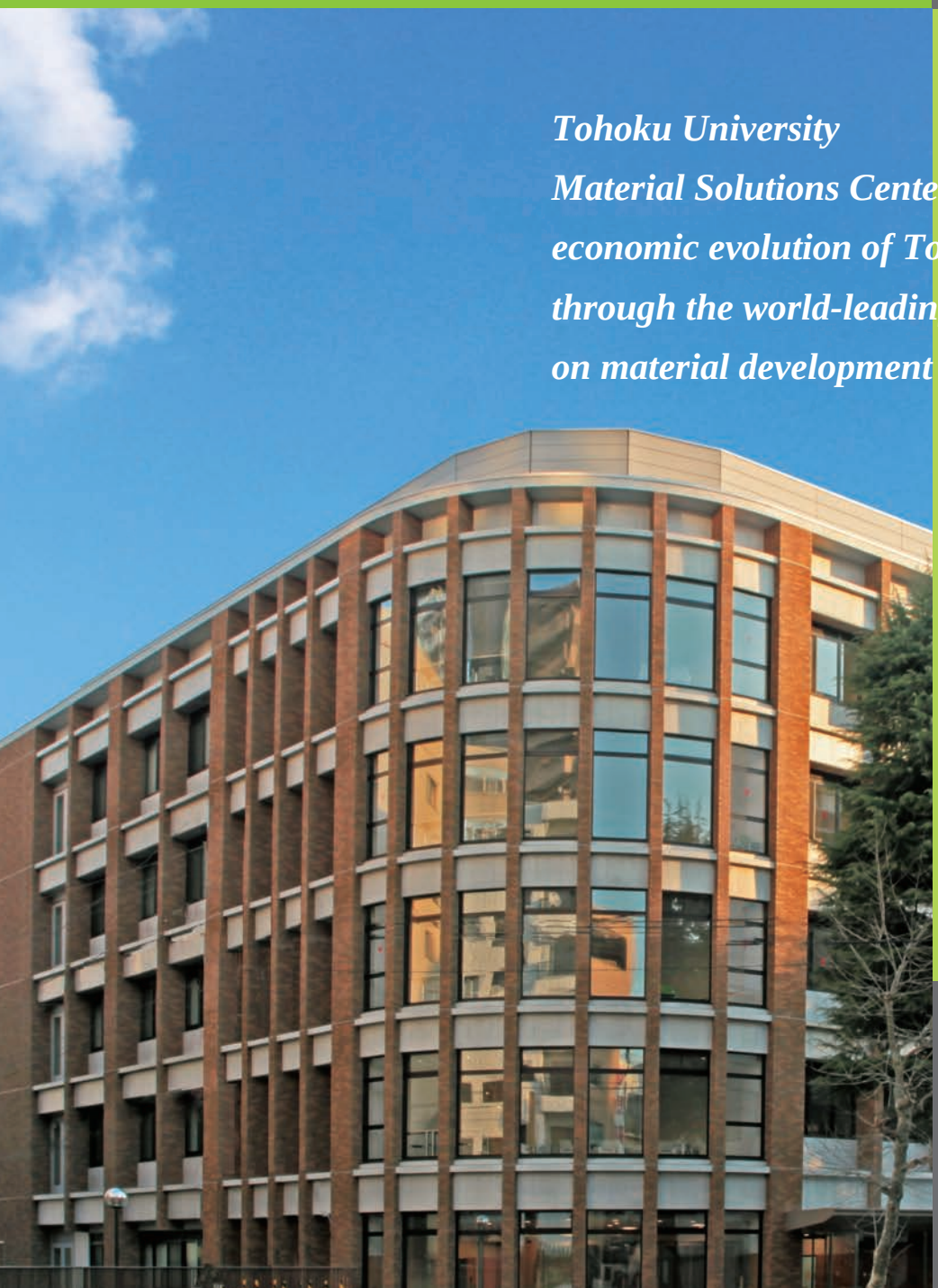
# Material Solutions Center

# 2025



*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

# Greetings
## from the Director of the Center

2025

Director of
TOHOKU UNIVERSITY
Material Solutions Center
**Hiroyuki Fukuyama**

## Working on new materials for the future of society

Material Solutions Center (MaSC) at Tohoku University was founded on 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.

Since the center was founded, many industry-academia collaborative research projects have emerged through the “Real Exchange Meeting” and the “Associate Membership” activities which have been continuously operated as our vital components of industry-academia collaboration activities. On the other hand, the “Real Exchange Meeting” has led to the establishment of three research consortium centered on researchers from our university, and made-to-order collaborations have become active between researchers at each consortium and industrial companies. In addition, the "Real Tour in Tohoku University," an attempt to explore open innovation that started in 2022, has led to industry-academia co-creation in a wide range of research fields.

Leveraging the know-how that we gained over the past 11 years from exploring new ways to co-create with industry and promoting collaborative activities, we aim to build a GX value chain by focusing on research and social implementation of materials, devices, and systems that contribute to energy and food security.

We‘d like to express our appreciation for your continued support.



From Tohoku to the world

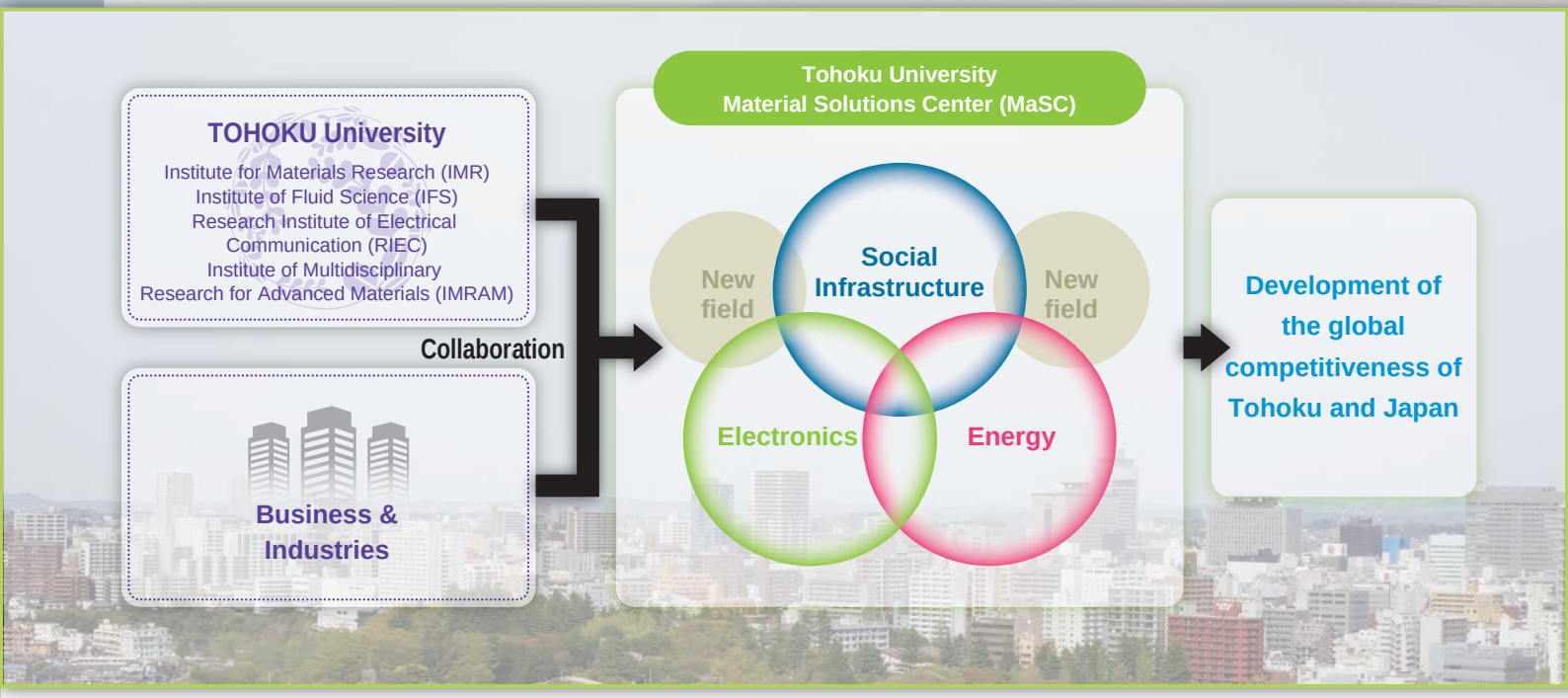
# *Collaboration with industry to create the advanced materials for the future*

## -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

Research on semiconductor nanofabrication

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

Ammonia combustion hybrid air propulsion system

Project Leader

## Shigeru Obayashi

Research Professor
Institute of Fluid Science

SO EL EN

Fusion Research Laboratory of Tribology

Project Leader

## Kazue Kurihara

Professor
New Industry Creation Hatchery Center (NICHe)

SO EL EN

Technological Development and Social Implementation of Advanced Functional Materials

Project Leader

## Kentaro Totsu

Professor
Micro System Integration Center
(subleader Prof.Em. Shigeru Suzuki)

SO EL EN

Seiko Epson Corporation×Tohoku Univ. Co-creation Research Center for Sustainable Materials

Project Leader

## Tomonaga Okabe

Professor
Department of Aerospace Engineering, Tohoku University
Director
Research Center for Green X-Tech, Tohoku University

SO EL EN

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

SO EL EN

Development of Novel Scintillation Crystals for Next Generation

Project Leader

## Akira Yoshikawa

Professor
Institute for Materials Research

SO EL EN

Additive Manufacturing Innovation Center

Project Leader

## Akihiko Chiba

Specially Appointed Professor
New Industry Creation Hatchery Center (NICHe)

SO EL EN

Research on the Integration of Renewable Energy Management Systems and Community Development

Project Leader

## Hiroyasu Ando

Professor
Advanced Institute for Materials Reserarch (AIMR)

SO EL EN

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

Project Leader

## Kazuhiko Endo

Professor
Green Nanotechnology Laboratory
Institute of Fluid Science

SO EL EN

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

Project Leader

## Toshiro Fujimori

Specially Appointed Professor (Research)
Institute of Fluid Science,Senior Technical Advisor, Resource, Energy and Environmental Business Area, IHI Corporation

SO EL EN

The France-Japan Joint Laboratory: ELyTMaX,CNRS-Universitē de Lyon-Tohoku University,International Joint Unit

Project Leader

## Asako Sugimoto

Executive Vice President for Reserch
Director of Organization for Advanced Studies(OAS)

SO EL EN

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

Tohoku University Core Facility Center

Project Leader

## Asako Sugimoto

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

Molecular Engineering of Interfaces

Project Leader

## Kazue Kurihara

Professor
New Industry Creation Hatchery Center (NICHe)

SO EL EN

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

Project Leader

## Yoshinao Taniguchi

Specially Appointed Professor
Graduate School of Engineering
Department of Communications Engineering

SO EL EN

Ultra-low Loss Magnetic Materials for Innovative Power Electronics

Project Leader

## Satoshi Okamoto

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

SO EL EN

Startup Incubation Center

Project Leader

## Tsuyoshi Tohyama

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

# Research Projects

3 DC Inc.

CEO
Takuma Kuroda

SO EL EN

TAMURA CORPORATION

Director Executive Vice President
and Chief Technical Officer
Shoichi Saito

SO EL EN

SmartTECH Lab. Inc.

Representative Director, President & CEO
Masami Nakano

SO EL EN

EM Devices Corporation
NEXEM Advanced Technology Center

Head of NEXEM Advanced Technology Center
Yasunori Otsuki

SO EL EN

AZUL Energy Inc.

President & CEO
Koju Ito

SO EL EN

Matsuo Industries Co., Ltd.

Director R&D Department
and Sales Department
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 26 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.

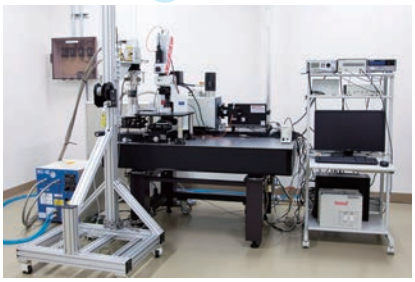
## Equipment list

**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**

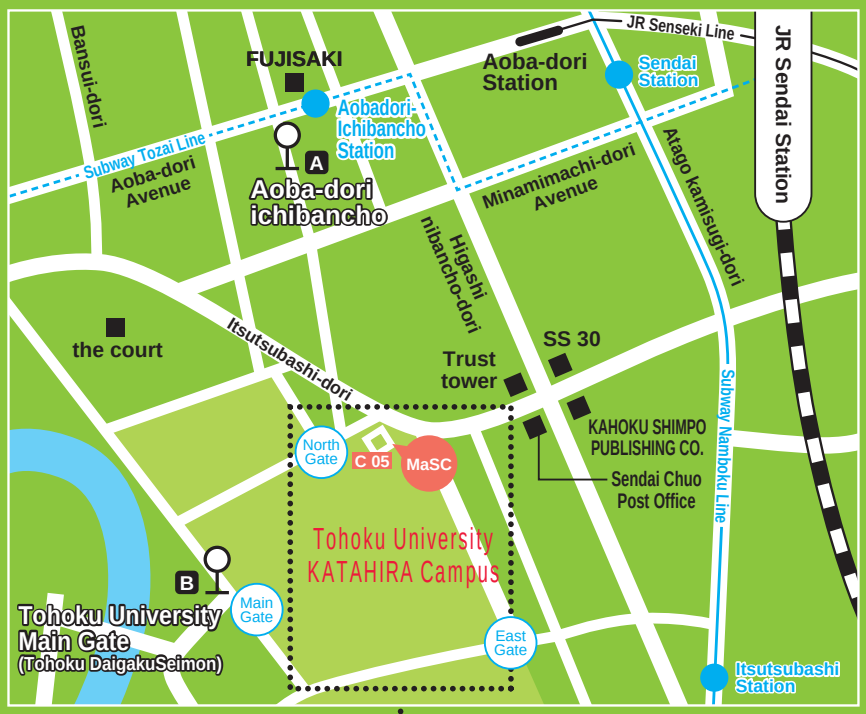
Helios NanoLab™ 600i

### 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.




# 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)

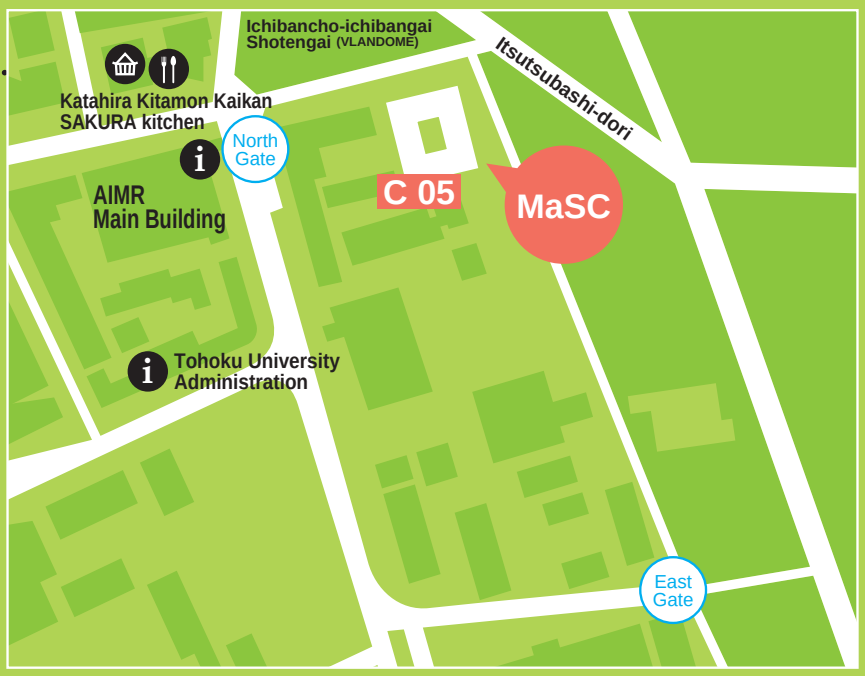
About 10 min

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)





TOHOKU UNIVERSITY
**Material Solutions Center**

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