東北大学 学際科学フロンティア研究所｜Frontier Research Institute for Interdisciplinary Sciences

2023

Frontier Research Institute for Interdisciplinary Sciences

Tohoku University

FRIS

fris.tohoku.ac.jp

2024.1

Outline

The Frontier Research Institute for Interdisciplinary Sciences (FRIS) was established in April 2013. It consists of the Managing and Planning Division, the Advanced Interdisciplinary Research Division, and the Creative Interdisciplinary Research Division. The Managing and Planning Division and the Advanced Interdisciplinary Research Division are staffed with four professors, three associate professors, and two university research administrators (the specially appointed associate professors), while the Creative Interdisciplinary Research Division is staffed with young researchers holding tenure-track positions (forty-three assistant professors, three associate professors as of June 1, 2023). The faculty members belong to one of the following six areas, from the viewpoint of interdisciplinary research: “Materials and Energy,” “Life and Environments,” “Information and Systems,” “Devices and Technology,” “Humans and Society,” and “Advanced Basic Science.”

What We Do

Our objective is to contribute to the enrichment of human society by supporting the work of young researchers through collaboration with each graduate school and research institute, as well as the Division for Interdisciplinary Advanced Research and Education in Tohoku University. We aim to pioneer and promote interdisciplinary research by collaboration among different fields.

How We Do It

While working primarily in their core disciplines, researchers promote interdisciplinary research through exchange and collaboration with researchers from different fields. To support these efforts, FRIS has established the Managing and Planning Division to facilitate cooperation among the six research areas. Additionally, the Managing and Planning Division provides support for collaboration with other departments within Tohoku University, as well as other universities.

Performance of FRIS

247	4.69	1.65	16.1%
Number of publications in 2022	Number of publications per researcher in 2022	Field Weighted Citation Impact by publications in 2016-2021	Ratio of publications in 2016-2021 in the top 10% of FWCI

Message

FRIS is a unique research institute whose goal is to create new wisdom and value through interdisciplinary research that fuses different fields, thereby contributing to the enrichment of human society.

FRIS’s achievements to date include progressing advanced interdisciplinary research, such as the research and development of novel functional materials and the device application of materials with distinctive properties by full-time faculty from a wide range of specialized fields. These results have led to many collaborative research projects with industry partners. FRIS has also produced outstanding results in life sciences and astrophysics.

A key feature of FRIS is fostering young researchers who promote interdisciplinary research across academic fields through the cooperation of the entire university. Every year, we recruit young researchers from all disciplines from around the world. In our selection process, we emphasize the perspectives of diversity of research domain, gender, and nationality, as well as interdisciplinary aspects. FRIS provides opportunities for exchange between researchers from different fields, offers a mentor system through cooperation with other departments/institutes, and secures an independent research environment for developing principal investigators (PIs). Furthermore, Tohoku University provides budget support to allow young researchers to focus on their own research.

Furthermore, our young researchers are producing world-class research that has opened doors to new fields of study. Fifteen researchers have won the Young Scientists, Award of the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, eleven have been selected for the PRESTO program, and eight have been chosen for the FOREST program.

Recently, FRIS has been focusing on establishing a mechanism through our tenure track system to enable our young interdisciplinary researchers to be active around the world, strengthening the FRIS alumni network, and looking ahead to the post-COVID-19 future by promoting further exchange among researchers from different disciplines in the Tohoku Initiative for Fostering Global Researchers for Interdisciplinary Sciences (TI-FRIS) program.

As an international and interdisciplinary research institute, FRIS will continue to support researchers to create new interdisciplinary science, promote world-class research, stimulate exchange among researchers from different disciplines, build networks, and disseminate research results. I hope that researchers who understand the importance of interdisciplinary exchange and pioneer new interdisciplinary research will illuminate the future of the world by joining FRIS.

The aspirations of
researchers pioneering
new interdisciplinary science
will open the gates to
the future of advanced research.

Professor **Toshiyuki Hayase**
Director,
Frontier Research Institute for Interdisciplinary Sciences,
Tohoku University

Professor Hayase has been the director of FRIS since 2018. His research interests are flow stability, flow control, flow in living organisms e.g., blood, its application to medical engineering, and the integration of flow simulation and measurement methods.

FRIS Triangle

FRIS has three missions at the heart of its activities.

Promoting Advanced Interdisciplinary Research

Faculty members of the Advanced Interdisciplinary Research Division promote advanced, highly interdisciplinary research internationally by integrating different fields of study, based on their own specialized research fields.

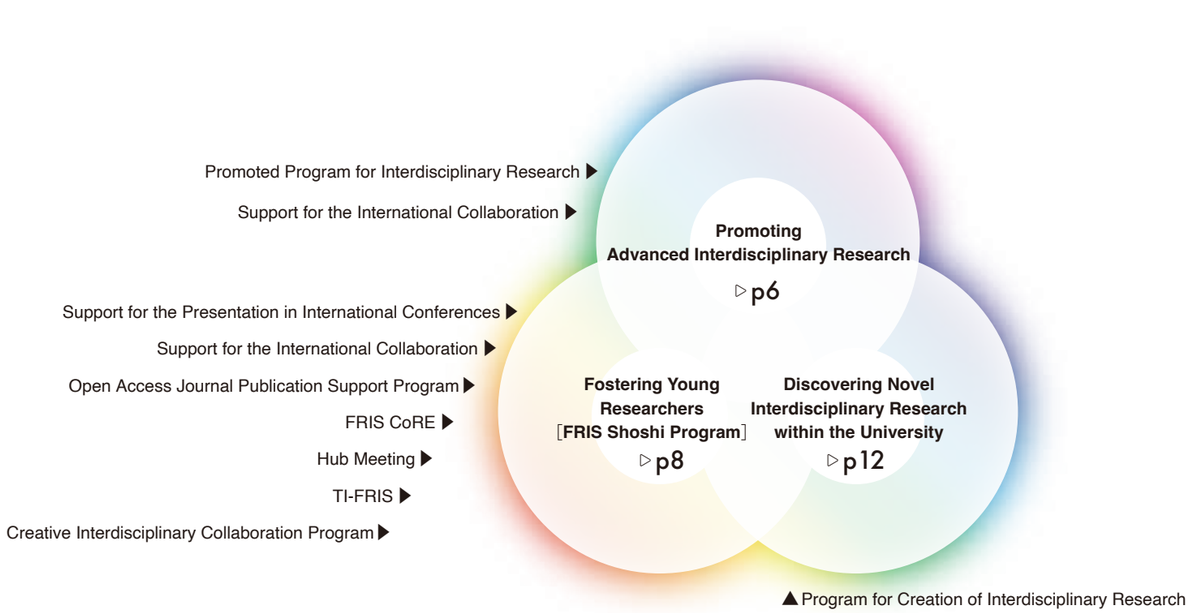
Fostering Young Researchers［FRIS Shoshi Program］

FRIS actively supports young researchers in the Creative Interdisciplinary Research Division from various perspectives in the planning, promotion, and development of new international interdisciplinary research as principal investigators (PIs), thereby fostering researchers with advanced research skills for the next generation.

Discovering Novel Interdisciplinary Research within the University

Working with young researchers within the Institute and various departments at Tohoku University, FRIS aims to create new research fields by discovering and supporting next-generation interdisciplinary research projects that are emerging, innovative, pioneering, and rich in individuality.

To realize these missions, FRIS has taken a unique initiative, whereby it implemented a variety of research support programs that are easy for researchers to utilize. The FRIS identity incorporates three missions: promoting interdisciplinary research, fostering young researchers, and discovering and supporting new interdisciplinary research.



Six Research Areas

FRIS has established six research areas covering almost all academic disciplines.

- **Materials and Energy**
- **Life and Environments**
- **Information and Systems**
- **Device and Technology**
- **Human and Society**
- **Advanced Basic Science**

FRIS researchers focus on their own research fields, but they also aim to go beyond their core research fields to pursue cross-disciplinary fusion and actively engage in exchange and collaboration with researchers in other fields.

Divisions

Two Research Divisions and the Managing and Planning Division

FRIS consists of the Advanced Interdisciplinary Research Division, in which full-time faculty members are assigned to each field of study; the Creative Interdisciplinary Research Division, in which young researchers conduct advanced research across disciplines; and the Managing and Planning Division, which supports the research divisions' activities.

Promoting Advanced Interdisciplinary Research

Full-time faculty members of the Advanced Interdisciplinary Research Division are assigned to various research areas, and by fusing different disciplines around their specialized research fields, advanced, highly interdisciplinary research is promoted internationally to create new knowledge and value.
Full-time faculty members in the Advanced Interdisciplinary Research Division aim to pioneer new academic fields by actively utilizing not only their own research resources but also various support programs within the Institute, and by collaborating with researchers from inside and outside the University to establish the necessary research organization.

Performance of FRIS
[Senior Researchers]

43	6.14	2.77	16.1%
Number of publications in 2022	Number of publications per researcher in 2022	Field Weighted Citation Impact by publications in 2016-2021	Ratio of publications in 2016-2021 in the top 10% of FWCI

When metals and ceramics are composited at nanoscale, they exhibit unprecedented functional properties. We have discovered new multi-functional properties such as the Tunneling Magneto-Dielectric (TMD) effect and the Tunneling Magneto-Optical (TMO) effect. Through interdisciplinary research in magnetic physics, medical engineering, and materials science, we are pioneering a new field of nano-composite thin films with new functions.

Professor
Hiroshi Masumoto
Materials and Energy

RESEARCH TOPICS
- Tunneling Magneto-Dielectric (TMD) and Tunneling Magneto-Optical (TMO) effect materials by metals-ceramics nano composite structures
- Development of osteoconductive implant materials by plasma oxidation of metallic titanium

Analyzing the interfaces between the electrolyte solutions and the electrodes for lithium secondary batteries, fuel cells, next generation batteries and molecular electronic devices is important for developing electrochemical energy conversion devices. Our present study investigates the behavior of molecules at the interface with In situ Raman spectroscopy and focuses on the dynamical changes in the Raman spectra at different battery conditions.

Associate Professor
Takashi Itoh
Materials and Energy

RESEARCH TOPICS
- In situ Raman spectroscopy for battery active materials
- Development of Zinc-air batteries, Lithium secondary batteries and fuel cells

I am a member of the theory team in the Event Horizon Telescope consortium, which captured the first-ever image of a black hole. Every day at FRIS, I am stimulated by chats with colleagues in other research fields. I also have published omnibus books with young researchers from FRIS and DIARE.

Professor
Kenji Toma
Advanced Basic Science

RESEARCH TOPICS
- Astrophysics: theory, simulations & observations

We have proposed an atomic diffusion bonding method for bonding wafers of different materials at room temperature using the rearrangement of crystal lattices at the contact interface of thin films. Using this method, we are developing research on new device formation. We are also working on research on functional thin films used in electronic devices using the thin film deposition technology that is the basis of the bonding technique.

Professor
Takehito Shimatsu
Information and Systems

RESEARCH TOPICS
- Atomic diffusion bonding technique for electric/optical devices.
- High density MAMR/HAMR recording media.

A unique feature of our laboratory is the control of materials and chemical processes using high-temperature, high-pressure fluids including supercritical fluids as reaction medium. Toward the goal of building a carbon-recycling society, we are developing multi-level hierarchical structure control processes for nanomaterials/nanocatalysts that take full advantage of their potential, to improve the efficiency of chemical conversion processes.

Professor
Takaaki Tomai
Advanced Basic Science

RESEARCH TOPICS
- Chemical conversion processes for carbon circulation
- Multi-level hierarchical structure control of nanomaterials based on science of dynamic interfaces
- Development and application of hydrothermal electrochemical process

We are interested in the relationship between nanomechanics in the cell and cellular morphogenesis. We are analyzing how and why disruption of the cellular nanomachines in our body, such as molecular motor proteins and cytoskeletal proteins, leads to human diseases such as neurodegeneration, infertility, and blindness.

Associate Professor
Shinsuke Niwa
Life and Environments

RESEARCH TOPICS
- Molecular motors
- Axonal transport

Random atomic structured materials such as amorphous or metallic glass have significantly different properties with those of conventional crystalline alloys and are anticipated to have industrial uses in the next generation. We address an important challenge by controlling the relaxation behavior of glasses to improve their mechanical properties and to contribute to their applications.

Professor
Junji Saida
Advanced Basic Science

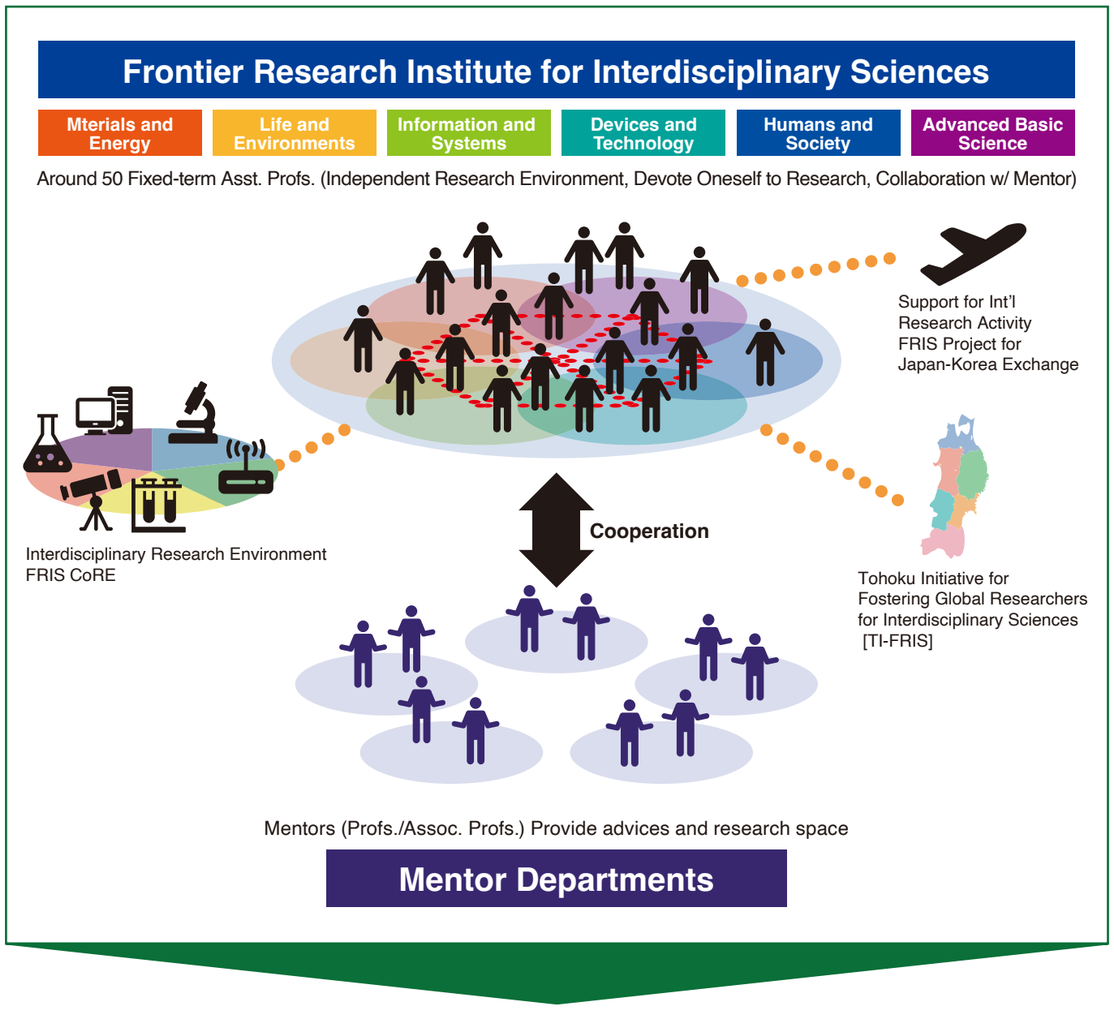
RESEARCH TOPICS
- Control of relaxation state in metallic glass
- Development of mechanical properties of metallic glass

Fostering Young Researchers

FIRS Shoshi Program

Through the FRIS Shoshi Program, young researchers selected through an international recruitment are employed as faculty members of the Creative Interdisciplinary Research Division, FRIS, and are supported in many ways to develop new international interdisciplinary research as Principal Investigators (PIs), thereby fostering researchers with advanced research skills for the next generation.

Promotion of world-leading interdisciplinary research and pioneering new academic fields by around 50 young researchers in all research areas



World-leading Interdisciplinary Research and Pioneering New Academic Fields

Publications in High Impact Journals	MEXT Young Scientists' Prize	JST PRESTO PIs
Single-authored Books	Tohoku U. Distinguished Researchers Tohoku U. Prominent Research Fellows	JST FOREST PIs

Performance of FRIS [Young Researchers]

222	4.67	1.39	15.8%
Number of publications in 2022	Number of publications per researcher in 2022	Field Weighted Citation Impact by publications in 2016-2021	Ratio of publications in 2016-2021 in the top 10% of FWCI

International Recruitment / Recruiting Fixed-Term Assistant Professors from All Research Areas

Recruiting ambitious young researchers who proactively promote international interdisciplinary scientific research and aim to pioneer new academic fields.

Every year, FRIS recruits about seven young researchers from all research areas as assistant professors in the Creative Interdisciplinary Research Division, with a term of five years. These researchers proactively promote international interdisciplinary scientific research as principal investigators (PIs) and actively collaborate with domestic and international researchers and research institutions to pioneer new academic fields.

Independent Research Environment / Promoting World-Class Research

Offering various research funds and sharing facilities for interdisciplinary research in addition to basic research funds.

☐**Basic Research Funds**
FRIS provides a total of 11 million yen over 5 years. Flexible execution is possible through carryovers.

☐**Support Program for International Collaboration / Support Program for Presentation in International Conferences**
FRIS supports expenses for overseas travel for presentations at international conferences and collaborative research.

☐**Open Access Journal Publication Support Program**
FRIS supports publication costs when young researchers publish their excellent results in high-impact open access journals.

☐**Frontier Research Institute for Interdisciplinary Sciences Cooperative Research Environment (FRIS CoRE)**
FRIS is establishing an interdisciplinary collaborative environment where researchers can access basic research facilities in different fields under one roof (→ p.11).

Mentor System / PI Fostering Support

Providing research space and advice from mentors through close cooperation and collaboration with graduate schools and institutes.

To ensure that young researchers at FRIS can promote world-class research in an independent environment, FRIS has a mentor system in cooperation with the departments in the university. Young researchers at FRIS regularly engage in interdisciplinary research exchanges and collaborative research at FRIS and conduct their unique research on a daily basis in the mentor's lab, receiving the following support from mentors (professors or associate professors of Tohoku University):

- ■Provision of an independent research environment and research support.
- ■Support in their career path.
- ■Support regarding safety, hygiene, and research ethics.
- ■Support for educational opportunities.
- ■Other requests made by the director of FRIS as needed.

Exchange of Researchers in Different Fields / Promoting Interdisciplinary Research

Events and consortium projects to encourage interdisciplinary exchange and fusion of research.

FRIS regularly holds seminars and workshops for interdisciplinary exchange and research promotion, in which members from all fields participate and thoroughly discuss their research. FRIS also plans and practices interdisciplinary exchanges with graduate students (→ p.10). Furthermore, FRIS implements the consortium project with universities in the Tohoku region, TI-FRIS (→ p.11), and the Creative Interdisciplinary Collaboration Program for young researchers at FRIS to promote interdisciplinary research activities (→ p.13).

Tenure Track System at FRIS

Supporting faculty's career advancement to focus on research and aim for higher positions both inside and outside the university.

The tenure track system at FRIS allows researchers to focus on research and aim to acquire higher posts both inside and outside the university after the tenure track period.

☐**Tenure Review / Promotion Review for Fixed-Term Associate Professor**
Tenure-track faculty undergo a tenure review between the third and fifth year of their employment. Those who pass become tenured assistant professors. Following that, those who pass the specific promotion review may become fixed-term associate professors if they so desire. If one fails the tenure review, they will be employed for up to an additional two years as a fixed-term assistant professor after a separate review.

☐ **Liaison with Mentor Department, etc.**
To help young researchers at FRIS acquire even higher positions inside and outside the university, our tenure-track system provides support to acquire higher posts within the university with the cooperation of the entire university.

Fostering Young Researchers

Seminars, Workshops, Omnibus Lectures

FIRS Shoshi Program

In an effort to promote proactive interdisciplinary research through the exchange of researchers fusing different fields of study, FRIS organizes and runs seminars, workshops, and omnibus lectures to help grow young researchers through open discussions.

Hub Meeting

Once a month, all FRIS members get together for a research presentation seminar. TI-FRIS Fellows and researchers and students from departments and institutes within the university also participate in the meeting, and breakthroughs are shared through cross-disciplinary discussions. The meetings are held in a hybrid of on-site and online.

FRIS Retreat

Once a year, all FRIS members and TI-FRIS Fellows meet off-campus to exchange ideas from different fields. The free discussions in a place apart from the usual university environment create opportunities for new discoveries.

Collaboration with the Division for Interdisciplinary Advanced Research and Education [DIARE]

DIARE is a graduate school education program for the practical fostering of human resources who will lead the next generation of academia. Receiving a range of support, graduate students selected within the university conduct research in new disciplines through the fusion of fields. In conjunction with research and education graduate students at DIARE, young researchers from FRIS present the Joint Interdisciplinary Research Seminar and the FRIS/DIARE Joint Workshop, promoting interdisciplinary exchange with graduate students through research and education.

Various Research Exchange Activities

FRIS supports the planning of seminars and workshops designed around the independent ideas of young researchers. A wide variety of events are held, including seminars that focus on a specific topic rather than aimed at all disciplines, symposia to discuss relationships between society and research activities as a whole, and symposia run in collaboration with the Tohoku Forum for Creativity at Tohoku University. Young researchers at FRIS gives lectures in an omnibus format as part of Tohoku University's educational programs.

Posters for various research exchange seminars

FRIS CoRE

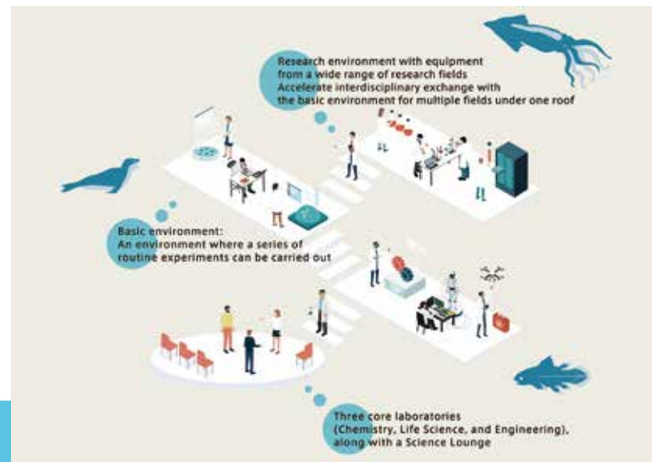
An environment where young independent researchers can take on the challenge of pioneering academic fields [FRIS CoRE]

An environment with basic research equipment in multiple fields is maintained to provide a "free-research environment" in which young researchers can take on difficult challenges with fresh sensibilities (FRIS Cooperative Research Environment = FRIS CoRE). FRIS CoRE will strongly accelerate the startups of young researchers, and by providing access under one roof to the infrastructure environment of multiple fields, it will increase daily exchanges between researchers from different fields and create research themes that transcend fields. To gain the understanding and support of FRIS CoRE from a wide range of society, FRIS established the "FRIS Fund for Early Career Independent Researchers" in FY2021. Additionally, we are strengthening information dissemination by establishing and renewing the Fund and FRIS CoRE websites.

TI-FRIS
| 学際融合東北拠点 |

Tohoku Initiative for Fostering Global Researchers for Interdisciplinary Sciences [TI-FRIS]

TI-FRIS is a program that aims to establish and demonstrate the effectiveness of a new researcher development program covering the entire Tohoku region to foster world-class researchers with interdisciplinarity, internationality, and sociability. Launched in 2020 in the "Strategic Professional Development Program for Young Researchers" of the Ministry of Education, Culture, Sports, Science and Technology, and led by Tohoku University, the Initiative has formed a consortium with Hirosaki University, Iwate University, Akita University, Yamagata University, Fukushima University, and Miyagi University of Education. In partnership with cooperating research institutions and companies in Japan and abroad, TI-FRIS Fellows, who are young researchers selected from participating universities, are actively participating in the program.



Discovering Interdisciplinary Research within the University

FRIS aims to create new research fields by discovering and supporting next-generation interdisciplinary research projects, led by young researchers of Tohoku University, that are emerging, innovative, pioneering, and rich in individuality.

To provide not only funds, equipment, and spaces, but also opportunities for active exchange with researchers in other fields, FRIS offers three open research programs at different stages ("Creative Interdisciplinary Collaboration Program," "Program for Creation of Interdisciplinary Research," and "Promoted Program for Interdisciplinary Research"). In addition, since international collaboration is indispensable for fostering world-leading research, the Support Program for International Core for Interdisciplinary Research has been implemented to support international collaborative research.

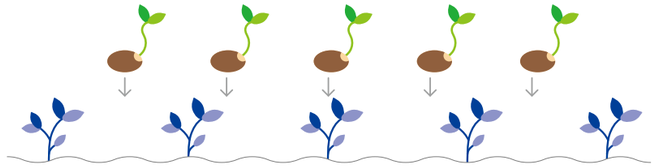
Process

〔Diverse research seeds〕

Programs

Creative Interdisciplinary Collaboration Program

Promoting Diverse Interdisciplinary Research by Young Researchers: A grant to promote interdisciplinary research activities by young researchers at FRIS. The program aims to respond to a variety of needs, such as research development in new fields, collaborative research with other institutions both in Japan and overseas, research exchanges, academic conferences and seminars, the publication of books and papers, and fieldwork.

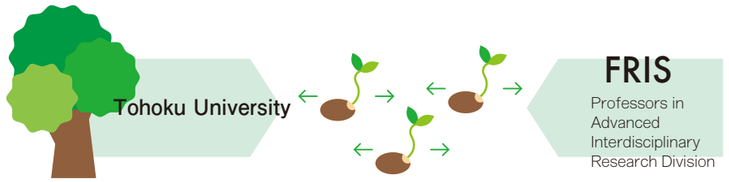


Program for Creation of Interdisciplinary Research

Exploring the Seeds of Next-generation Interdisciplinary Research: A two-year grant to support early-stage pioneering interdisciplinary research. It is open to young researchers in Tohoku University.

Promoted Program for Interdisciplinary Research

Developing Advanced Interdisciplinary Research: A three-year grant open to research groups led by faculty members of the Advanced Interdisciplinary Research Division, which supports research projects aimed at pioneering a novel interdisciplinary field with growth potential.



Support Program for International Core for Interdisciplinary Research

Forming International Hubs of Interdisciplinary Research: A program to support interdisciplinary research conducted with overseas partners that opens new frontiers of science based on FRIS's goal of "forming a network to promote international interdisciplinary scientific research." This program supports the implementation of interactive interdisciplinary joint research with overseas research institutions, thereby creating a future international research center. The principal investigator is a faculty member of the Advanced Interdisciplinary Research Division.

I will continue my research to produce results that are “clear at a glance”

● Could you tell us a little more details about your ongoing project?

Sure. One of my ongoing projects is about Amyotrophic Lateral Sclerosis (ALS). The majority of ALS cases don’ t have known genetic factors, but about 5% of cases are due to genetic factors. Multiple genes associated with ALS, and recent studies have revealed that mutations in a motor protein gene are also linked to ALS. Since the disease mutations are found in the “hand” part of the motor protein, scientists assumed that these mutations might result in motors losing the ability to transport cargos. However, in my experiments, cargo binding was not affected in those mutant motors. So, what was really going on? It turns out that the “hand” components were more likely to stick together, forming clusters. These aggregates appear to be the cause cell death.

● So, if the hands were disconnected from each other, would that result in a cure?

I think so. ALS is known to have various genetic factors as causative genes, aside from kinesin, but in many cases, aggregates form within cells. It would be great if we could unravel this, but there are no such drugs available yet. However, as we continue to gain a deeper understanding of the process of aggregate formation, drug development is certainly progressing. I conduct experiments with the goal of one day seeing the birth of a treatment for ALS.

Kinesin normally puts the brakes on itself. Think of it like your hands grabbing your own feet. But when some cargo show up, instead of your feet your hands grab that cargo, and the feet get to move freely. It's a fantastic system, isn't it? However, when ALS mutations occur, as I mentioned earlier, those hand regions end up sticking to each other. This means the brakes on the feet don’ t work anymore, and kinesin goes into overdrive. Under a microscope, you’ d see a mass of kinesin clusters running around crazy.

● Are there any internal collaborations you’ re hoping to have at FRIS?

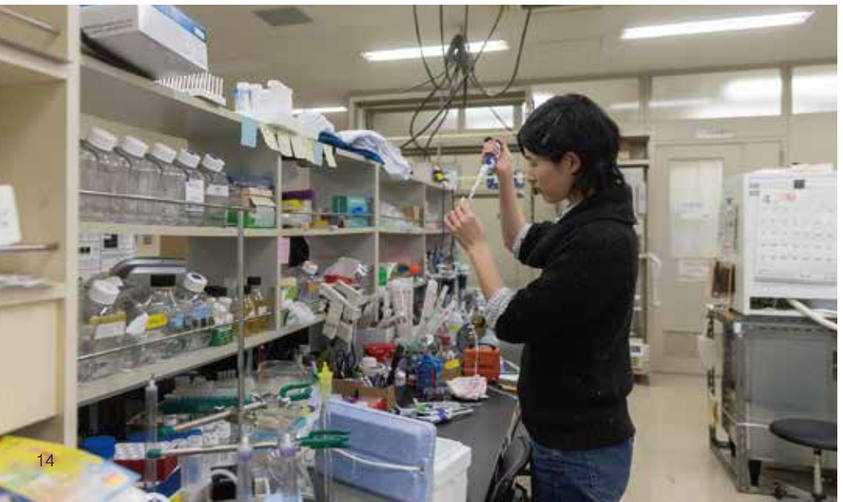
The thing I’ m most interested in is artificially connecting motor proteins with things other than proteins. FRIS has researchers who have that kind of technology, so I’ d like to collaborate with them.

Also, while I'm not working with living organisms just yet, there are many researchers at FRIS who do, and so I have thought that I’ d like to see how motor proteins function in living organisms. I’ m interested in contrasting observing functions within actual cells with the movement of motor proteins that I can view with my eyes. Working together with a researcher active in this area, I expect I’ d be able to get a clear picture of these functions. It would be wonderful if I could make connections with actual functions, such as an important role that motor proteins play in cell division or their role in synaptic transmission, for example. I’ m currently interested in nematodes, which are worms that live in the soil. The basic functions of nematodes are similar to those of humans, so I am planning to collaborate with a researcher who works with nematodes.

So far, I’ ve also had thoughts about working with mammal cells, nematodes, and flies. With flies, I have Drosophila in mind. I feel they would be very effective in the ALS research I mentioned earlier. These files have a head and legs. ALS damages motor neurons. Drosophila can help us see what kind of damage occurs on legs when there’ s a mutation in kinesin gene.

Kyoko Chiba
Assistant Professor

Research Area／Life and Environments
Research Fields／Biochemistry
Main Research Topics／Regulation of Intracellular Transport
Activation Mechanisms of Motor Proteins
Intracellular Transport in Neurodegeneration



Others
Outreach Activities, etc.

Outreach Activities, etc.

■ TI-FRIS/FRIS Symposium

The symposium is held jointly with TI-FRIS at the end of each fiscal year as an opportunity for interdisciplinary research exchange, and faculty members and principal investigators from research support programs of FRIS and TI-FRIS Fellows present their research results.

■ Katahira Matsuri Festival

FRIS participates in the Katahira Festival, a biennial public event jointly organized by Tohoku University’s research institutes and centers to present research activities and share the wonders of science. Researchers at FRIS use materials related to their research to create experiential exhibits covering themes such as pottery excavation, stereoscopic space travel, life science observations, or energy conversion, in addition to presenting a video message from researchers.

■ Lectures, etc.

FRIS members have individually organized a number of public events related to their research. These have included lectures by researchers as well as writers, artists, astronauts, and other celebrities, and hands-on research events for high school students.

■ Book Publication

FRIS has published two volumes of Hyakkaryoran: Young Researchers’ Interdisciplinary Frontiers (Tohoku University Press), omnibus collections of writing expressing the significance and joy of interdisciplinary exchange by young researchers at FRIS together with doctoral research and education graduate students from DIARE. In addition, young researchers at FRIS have also published books covering a range of disciplines.

TI-FRIS/FRIS Symposium

Katahira Matsuri Festival

Managing and Planning Division

Support and Dissemination of Interdisciplinary Research Activities

To strengthen its research capabilities and further increase its impact, FRIS promotes increasingly active cross-disciplinary research activities from the perspective of researchers, with Research Administrators (URAs) playing a central role. In particular, FRIS aims to contribute to the creation of new wisdom and value in FRIS by flexibly promoting the analysis and evaluation of research capabilities, the identification of challenges, the maintenance of a strong and multifaceted research support system, career planning for young researchers, the planning and management of events such as seminars, and publicizing research through press releases.

◀ Specially Appointed Associate Professor Hideaki Fujiwara

◀ Specially Appointed Associate Professor Kazuyuki Suzuki

Profiles
of young researchers

Materials and Energy

Assistant Professor
Hiroshi Ueno

Research Fields Physical organic chemistry, Nanomaterials science

Assistant Professor
Tuan Hung Nguyen

Research Fields Fundamental theory and simulation of materials intelligence for energy applications

Assistant Professor
Tom Welling

Research Fields Nanomaterials Science, Physical Chemistry, Colloidal self-assembly

Assistant Professor
Hideaki T. Matsubayashi

Research Fields Synthetic Biology, Cell Biology, Biophysics

Profiles
of young researchers

Information and Systems

Assistant Professor
Sai Sun

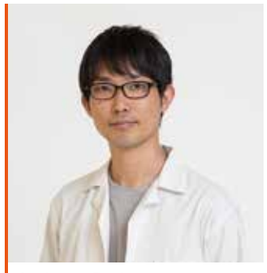
Research Fields Cognitive and Social Neuroscience, Psychephysics, Neuroeconomics

Assistant Professor
Yuka Fujiki

Research Fields Complex systems, Network science

Assistant Professor
Yuji Saito

Research Fields Micro-diffusion flame, Space propulsion, Metal/water combustion, Data-driven sparse sensing



Assistant Professor
Kohei Shimokawa

Research Fields Energy materials, Electrochemistry

Assistant Professor
Takuya Mabuchi

Research Fields Quantum engineering, Molecular fluid engineering, Material science and engineering

Assistant Professor
Linda Zhang

Research Fields Materials science and engineering

Assistant Professor
Le Bin Ho

Research Fields Quantum foundation, Quantum measurements, Quantum computing

Assistant Professor
Kotaro Yasui

Research Fields Bioinspired robotics

Profiles
of young researchers

Device and Technology

Associate Professor
Yuanyuan Guo

Research Fields Bioelectronics, glia-neuron interaction

Profiles
of young researchers

Life and Environments

Assistant Professor
Toshiharu Ichinose

Research Fields Behavioral genetics, Memory consolidation, Dopamine modulation

Assistant Professor
Hiroyuki Uechi

Research Fields Cell Biology, Developmental Biology, Condensate Biology

Assistant Professor
Yuta Kudo

Research Fields Natural product chemistry, Organic chemistry, Biochemistry

Assistant Professor
Hiroya Abe

Research Fields Biosensor, Energy catalysts, Polymer chemistry, Biomaterials, Bioinspired materials

Assistant Professor
Chao Tang

Research Fields Terahertz optics, 2D materials and devices

Assistant Professor
Takuro Ishii

Research Fields Medical ultrasound imaging, Biofluid dynamics, Computer-aided diagnostics, Urology

Assistant Professor
Takahiro Chiba

Research Fields Spintronics, Topological Materials, Thermoelectrics

Assistant Professor
Fumi Murakoshi

Research Fields Parasitology and Virology

Assistant Professor
Shinichi Sato

Research Fields Synthetic Organic Chemistry, Chemical Biology

Assistant Professor
Kozue Shiomi

Research Fields Behaviour, Movement Ecology, Cognitive Ecology

Assistant Professor
Kyoko Chiba

Research Fields Biochemistry

Assistant Professor
Kaoru Hiramoto

Research Fields Analytical electrochemistry

Assistant Professor
Chrystelle Bernard

Research Fields Dynamics behavior of polymers, cold-spray

Assistant Professor
Yuta Yamane

Research Fields Condensed Matter Physics and Spintronics

Profiles
of young researchers

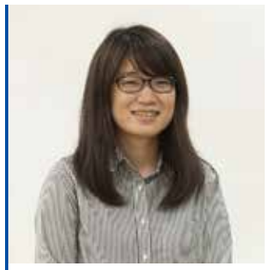
Human and Society

Assistant Professor
Yueh Hsuan Weng

Research Fields AI and Law, Legal informatics, Social robotics, Robot ethics

Assistant Professor
Kexin Xiong

Research Fields Psycholinguistics, Neurolinguistics, Second Language Acquisition



Assistant Professor
Sakura Kiuchi

Research Fields Preventive dentistry, Public health

Assistant Professor
Shigeo S. Kimura

Research Fields Astrophysics, Astroparticle physics

Assistant Professor
Hakuto Suzuki

Research Fields Unconventional Superconductivity, Quantum Magnetism, Resonant Inelastic X-ray Scattering

Assistant Professor
Aseel Mahmoud Suleiman Marahleh

Research Fields Osteoimmunology, Molecular and cell biology

Assistant Professor
Atsushi Tahara

Research Fields Organometallic/Organic Chemistry, Computational study

Assistant Professor
Yuta Nakayasu

Research Fields Materials processing engineering, Eco-friendly lifestyle creation

Assistant Professor
Yuka Hatano

Research Fields Anthropology, Dentistry, Forensic medicine, Three-dimensional analysis

Assistant Professor
Izumi Matsudaira

Research Fields Neuroscience, Developmental psychology, Biological

Assistant Professor
Masaki Yamada

Research Fields Particle physics, Cosmology

Profiles
of young researchers

Advanced Basic Science

Associate Professor
Masaki Okumura

Research Fields Structural biology, Protein Science, Biochemistry

Associate Professor
Kohei Ichikawa

Research Fields Observational astronomy, Astrophysics

Assistant Professor
Satoshi Iihama

Research Fields Magnetism, Spintronics, Photo-spintronics

Assistant Professor
Yasunori Okamoto

Research Fields Bioinorganic chemistry, Protein engineering, Systems catalysis

Assistant Professor
Yohei Kawazura

Research Fields Plasma physics, Turbulence, Hamiltonian mechanics

Assistant Professor
Daniel Pastor-Galan

Research Fields Geology

Assistant Professor
Naoya Kitajima

Research Fields Physics of the early universe, Particle physics beyond the standard model

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