

NOTEBOOK

Tohoku University 2019-2020



Celebrating Japan's first female students who came to Tohoku University in 1913 and opened the door for millions of others.

Collaborate, Innovate, Activate

History of Tohoku University

Located in Japan's picturesque Northeast region, Tohoku University is one of the country's top institutions, developing future leaders through academic excellence and inspiring, innovative research.

Located in the cosmopolitan city of Sendai in Japan's Northeast region, Tohoku University is renowned for its innovative research and dynamic global network. It was among the first to be conferred the status of a Designated National University by the government in 2017, and currently ranks number one on Times Higher Education's 2020 list of Japanese universities.

A trailblazer since its founding in 1907, Tohoku University was the first university in Japan to admit female students. Chika Kuroda, Raku Makita and Ume Tange joined the university in 1913 before going on to be the first female baccalaureates and enjoying prominent academic careers.

Tohoku University has continued to attract talented researchers who have put their findings towards improving the quality of life around the world. Among

the inventions that were born at Tohoku University are the split-anode magnetron used in microwave ovens, the steel-wire recorder and the Yagi-Uda antenna.

More recently, in the aftermath of the 2011 Great East Japan Earthquake, Tohoku University pioneered research in next-generation medicine and disaster science, giving local and global communities the necessary tools and knowledge to fight illnesses and be better prepared for natural disasters.

There are some 18,000 students - about 10 percent of whom are international - across 10 faculties, 16 graduate schools and six research institutes. Away from the classrooms, there are about 80 student clubs and circles, as well as numerous opportunities for community outreach.

Collaborate

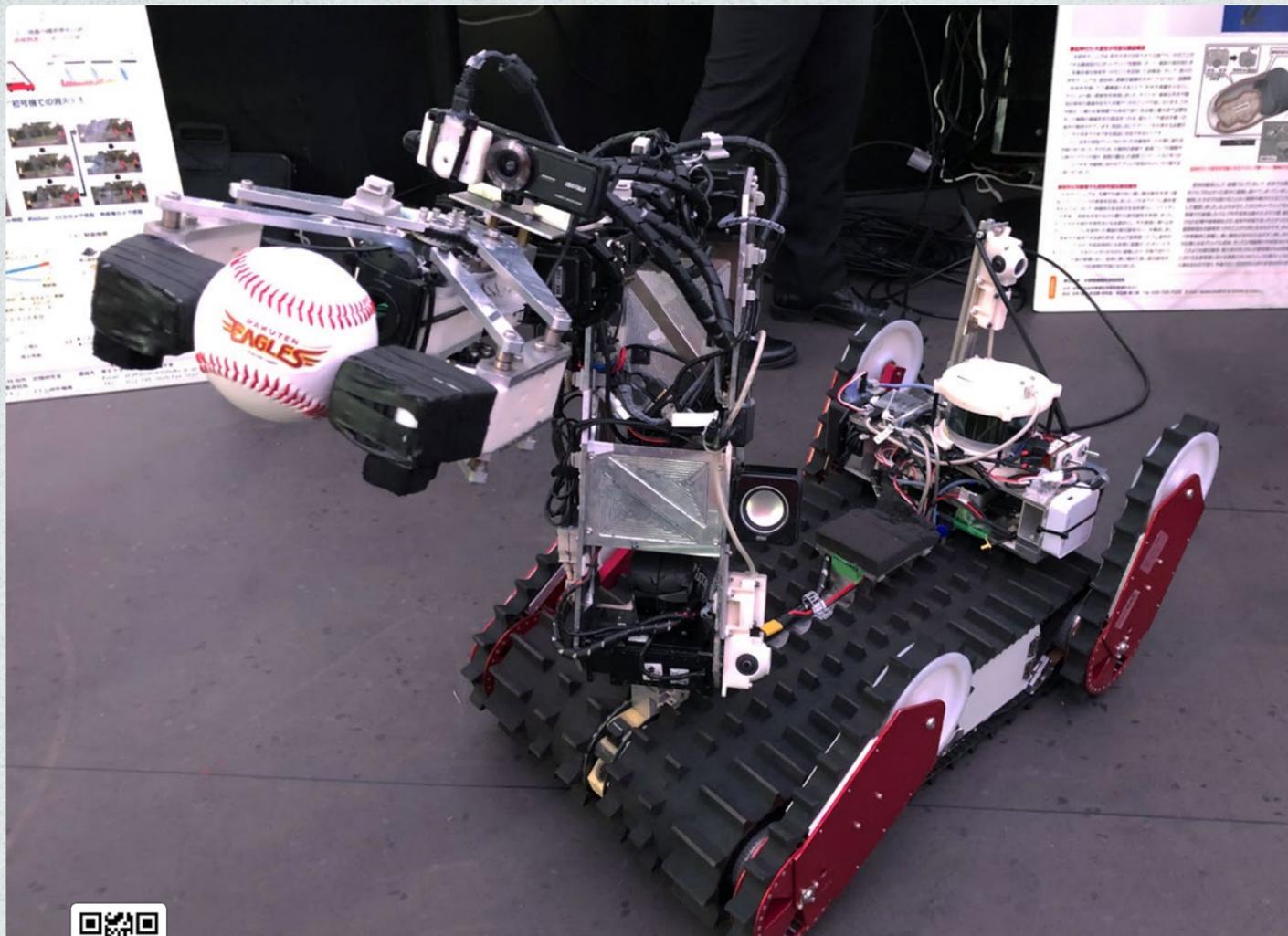
By working with academic and industry partners, Tohoku University's researchers contribute to global solutions, and take innovation to higher levels through shared resources and expertise.

Tohoku University x Rakuten, Inc.

Tohoku University has signed a collaboration agreement with Rakuten, Inc. to give the university an avenue for the practical implementation of its research, and more direct feedback on consumer needs. Speaking at the signing ceremony, Rakuten CEO Hiroshi Mikitani described Tohoku University as an "optimal partner" due to its interdisciplinary approach to

research, and its large campus which is conducive to various types of tests and experiments.

Early collaboration will focus on health and medical care, as well as robotics. There are also plans to establish a human resources development program, where Tohoku University students will have the opportunity to learn entrepreneurship.



Want to learn more?
Scan the QR code to read further details.

Frontier Research in Duo (FRiD)



Tohoku University established the Frontier Research in Duo (FRiD) program in September 2019, aimed at promoting early stage research on emerging ideas that can lead to new research areas not bound by existing concepts.

The research period is five years, and successful applicants get up to 10 million yen per year per project. Nine projects were chosen for the first round.

As a reflection of the university's academic diversity and global network, the program requires that each project group contains an element of international collaboration with a partner institution, and that core researchers within each group belong to different departments.

"Japanese research activity has been slowing down in recent years. Many researchers tend to stay in their field, work on things they know and are comfortable with," said Executive Vice President of Research Tadahiro Hayasaka.

"What we're trying to do with this program is give our researchers a chance to work with people from different fields, with different backgrounds and different ways of thinking. Our hope is that this mix of different strengths and ideas will be the impetus to creating exciting new research fields and even higher quality research in the future."

Tohoku University x Dai-ichi Life Insurance Co., Ltd. x NTT DATA Corporation

Tohoku University, Dai-ichi Life Insurance Co., Ltd. and NTT DATA Corporation signed a comprehensive partnership agreement which will leverage the partners' strengths in research, AI-related technologies and big data analysis.

The high level industry-academia collaboration - which aims to improve quality of life through creative innovation and regional revitalization - includes the development of a large pool of data scientists and experts, and investment in the commercialization of advanced technologies and venture companies.

"We are entering an era of change so we need new solutions to address new problems," said University President Hideo Ohno.



Tohoku University x JX Nippon

A new materials science research facility is being built on Aobayama campus as part of an agreement with JX Nippon Mining & Metals Corporation to do joint research and development, particularly in the field of non-ferrous metals. JX Nippon is funding the center's construction, which officially began with a ceremonial blessing in August 2019.



Next-Generation Synchrotron Radiation Facility

With construction of Japan's first-ever next-generation synchrotron radiation facility underway at Aobayama campus, Tohoku University hosted a forum in spring 2019 that brought together stakeholders from government, business and academia.

In open discussions, researchers from the world's top universities and institutes, as well as representatives from leading international synchrotron research facilities, shared their experiences and discussed ways to promote strategic research collaborations.

The new facility is scheduled to be operational in 2023, and will feature a huge circular particle accelerator measuring 325-425 metres in circumference and 100-135 metres in diameter. The soft X-ray radiation generated by the accelerator will be used to perform observations for visualizing the functions of materials subjected to various methods.

The core strategy of the Sendai project will be in line with the global trend of building "research complexes," consisting of companies and academic research institutes, around large synchrotron radiation facilities. Tohoku University, with its strong research capabilities and reputation, is expected to play a central role in the new complex.



Innovate

Tohoku University has a strong reputation for innovation, having invented the technology behind some of the world's most recognizable appliances.

Sugar Delivered to Earth from Space

The first evidence of bio-essential sugars in meteorites has been found. An international research group led by Yoshihiro Furukawa of Tohoku University had investigated bio-essential molecules in primitive meteorites and found ribose and other sugars.

The team found that the carbon in the sugar molecules had distinct carbon-isotope compositions, making them different from terrestrial biological sugars, and indicating their extraterrestrial origin. The results suggest that the sugars had formed in the early solar system and made their way to Earth via meteorites.



Jellyfish's Superpowers Gained Through Cellular Mechanism

Jellyfish are animals that possess the unique ability to regenerate body parts. A team of Japanese scientists has now revealed the cellular mechanisms that give jellyfish these remarkable "superpowers."

Cnidarian jellyfish form part of a unique group of animals that are not bilaterally symmetrical and also possess the capacity to regenerate body parts – a trait most complex animals, including humans, have lost. The researchers believe that these early-diverging primitive animals could help us better understand the evolutionary biology of bilaterally symmetrical animals, like human beings.



Want to learn more?
Scan the QR code to read further details.

Activate

Research is not done in a vacuum, but with people and application in mind. The impact of Tohoku University's research can be felt not just within the local communities but worldwide.

New Cognitive Training Game to Improve Driving Skills Among the Elderly



Researchers at Tohoku University's Institute of Development, Aging and Cancer have developed a new cognitive training game aimed at improving road safety among elderly drivers. The game, "Cognitive Training for Car Driving" (CTCD), requires only a set top box and a TV, and for users to play it regularly.

This new training game comes at a time when the number of older car drivers worldwide is increasing, leading to accidents caused by age-related cognitive decline among drivers. The game was subsequently developed into an app, with MS & AD Insurance Group and Telematics Automobile Insurance utilizing it to help their customers. Taxi companies and driving schools across Miyagi Prefecture are also expected to employ the app in the future.

AI and Data Science Courses for All Undergraduates

Big data analytics and AI have been a growing priority for Tohoku University in recent years. A Center for Data-driven Science and Artificial Intelligence was opened in October, offering practical education to undergraduates to boost their AI and data science literacy.

The new center comprises four departments: practical data science, advanced AI, transdisciplinary digital education and data foundation/security. Students have access to specialized

lectures, corporate internships and Project Based Learning (PBL) opportunities.

While AI and data science literacy courses are compulsory for first-and second-year students from 2020, it is hoped that senior undergraduates and graduate students will go on to acquire advanced skills that can further help them in their research.



Researchers Map Malaria Parasites that Proliferate in Human Blood Cells

Malaria parasites transform healthy red blood cells into rigid versions of themselves that clump together, hindering the transportation of oxygen. The infectious disease affects more than 200 million people around the world and causes nearly half a million deaths every year, according to the World Health Organization. It's a disease that's been difficult to control because of the lack of information on how the parasite infiltrates a system's red blood cells.

Now though, researchers have detailed a comprehensive interaction network map of how malaria traffics between human host cells, providing a reliable dataset of the interactions connecting dozens of proteins the parasite exports to continue infecting the host cells. The research paves the way for further study and discussion on the molecular mechanism of infections that affect human red blood cells.



Want to learn more?
Scan the QR code to read further details.

New Graduate Program in Japanese Studies

In 2019, Tohoku University launched the Graduate Program in Japanese Studies (GPJS), one of nine International Joint Graduate Programs which implement education collaboratively through strong alliances with leading overseas universities.

The GPJS promotes a multidisciplinary approach to addressing contemporary issues facing society. Students enrolled in the GPJS can take a wide array of humanities courses such as history, linguistics, philosophy, anthropology and politics.

Students have the freedom to pursue research topics relevant to their academic interests and backgrounds, but all undergo a relevant methodology course. Part of what makes the GPJS unique is that all students get at least six months of overseas training at one of Tohoku University's many partner institutions to broaden their academic network and be exposed to different cultural and academic environments.



2019-2020 News Highlights

An Evening with the President

Tohoku University President Hideo Ohno held a small, 90-minute town hall style meeting with students, to answer questions and hear candid thoughts on student life.



TEDx Tohoku University

Under the theme of Palette, 11 speakers at TEDxTohokuUniversity explored a range of social issues, including gender roles, the need to listen and the importance of chasing dreams.



Tsunami Inundation Damage Forecast System Adopted by the Japanese Government

The Real-time Tsunami Inundation and Damage Forecast system, developed by a team led by Shunichi Koshimura at the International Research Institute of Disaster Science (IRIDeS), won the 2019 Japan Open Innovation Prize.



Suzume Odori at Aoba Festival

The university's Sparrow Dance Team, comprising mostly foreign students, once again brought its international flair to Aoba Matsuri. The annual street festival, which attracts about a million people from around the region, is a celebration of Sendai's rich history and culture.



Keeping the School Spirit Hot

Tohoku University collaborated with Thermo Mug to produce a 300ml flask featuring the bush clover logo. The flask is part of the university's Plastics Smart campaign to reduce the amount of one-use plastic products, such as PET bottles, on campus.

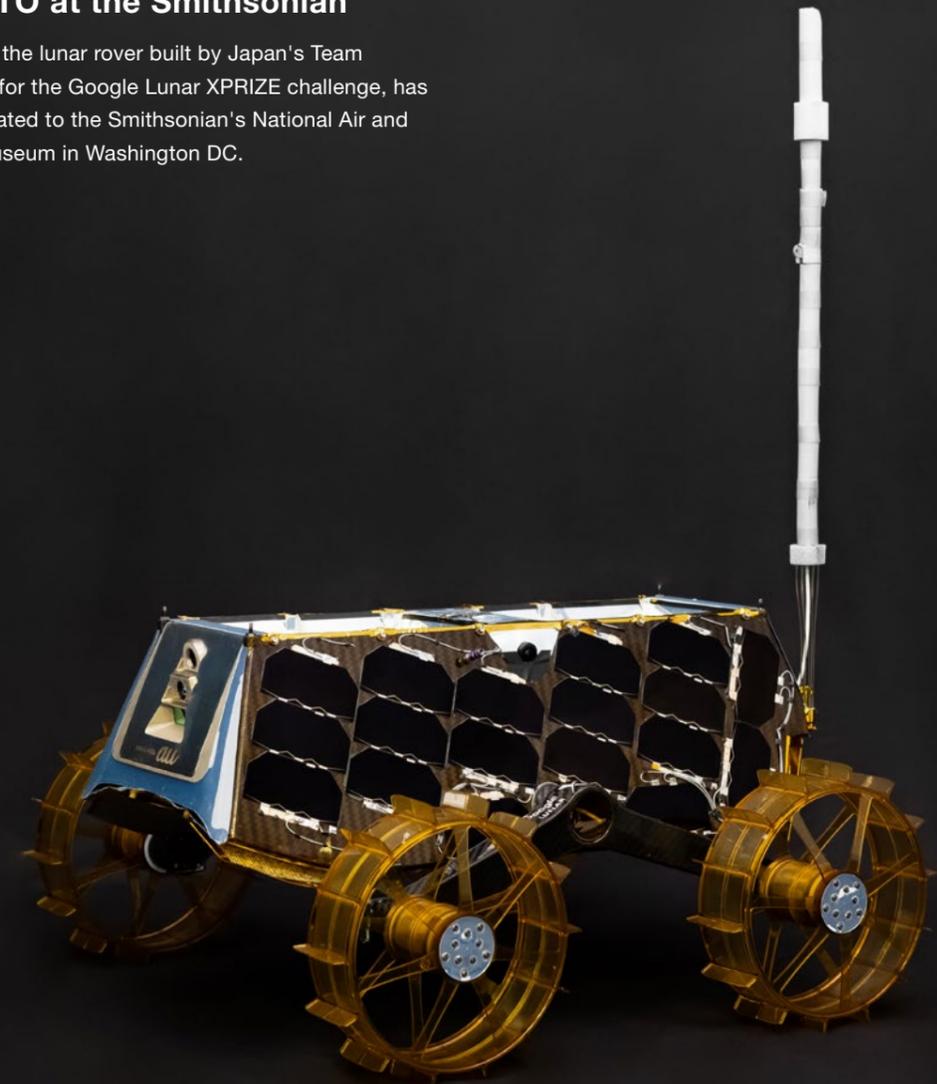
The Crown Prince's Visit

Crown Prince Akishino, the brother of Japan's new emperor, visited Tohoku University and toured the Botanical Gardens during an official visit to Miyagi in May. The crown prince is known for his love of botany and the university's Botanical Garden is home to a famous willow collection.



SORATO at the Smithsonian

SORATO, the lunar rover built by Japan's Team HAKUTO for the Google Lunar XPRIZE challenge, has been donated to the Smithsonian's National Air and Space Museum in Washington DC.



Community Outreach

Tohoku University considers itself part of the community, and holds public workshops and events for local residents throughout the year. Students and staff engage in volunteer work and are active in various community outreach programs.



Kawatabi Blueberries and Jam

As part of Tohoku University's extensive community outreach, the Kawatabi Field Center hosts several activities each year, giving local residents a chance to learn more about nature and some of the work being done by the Graduate School of Agricultural Science.

Among the most popular activities are the jam and butter-making workshops, which include fruit picking at the center's blueberry orchard and rhubarb patch. The center grows about 500kg of blueberries each year, two-thirds of which goes into jam that is sold at selected branches of Co-op supermarket.

The center is also well known for hosting nature walks in the spring and autumn, guided by trained staff and professors who can explain the local fauna and flora.



Science Angels

The Science Angels program is a cornerstone of Tohoku University's on-going efforts to promote the role of women in science and technology. Members serve as a support network for each other and as role models for children, especially young, school-age girls. Since 2017, the Science Angels and students from MIT have co-hosted a popular science-based summer camp for elementary school children.



International Festival

The Tohoku University International Festival (TUIF) celebrated its 34th year with the theme "Harmony through Diversity." The festival's main stage featured all-day entertainment and some 20 food stalls offered delicacies from around the world – all prepared, cooked and served by students and alumni.



Volunteer Work

One of the best ways to learn is through giving back, and Tohoku University offers many opportunities for students to volunteer, to make a difference to the lives of people less fortunate, and to gain a better understanding of the communities in the region.

An active, student-run volunteer group is SCRUM, which organizes activities year round, especially in towns and cities affected by the 2011 Great East Japan Earthquake and Tsunami.

Following the devastation of Typhoon Hagibis at the end of 2019, dozens more students joined SCRUM and Japanese non-profit organization Gakuvo in Marumori-machi, to help the town clear debris.



Education and Exchange Programs

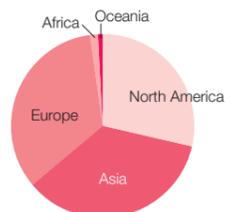
Tohoku University's popular exchange programs attract hundreds of new students each year from around the world. They also provide local Tohoku University students with the chance to study abroad.

Summer:

For a quick taste of student life in Sendai, summer is a great time to visit.

The Tohoku University Engineering Summer Programs feature two weeks of graduate-level classes taught by renowned professors in the fields of robotics (TESP), electrical and electronic engineering (EEE), structural materials engineering (SMEC) and bio-materials engineering (BMEC).

At the undergraduate level, there is the Tohoku University Japanese Program (TUJP), where participants attend lectures on Japanese language, history, economy and the arts; and the Tohoku University STEM Summer Program (TSSP) for a more science-based experience.



In-coming:

For degree seeking students, the Future Global Leadership (FGL) Program includes three undergraduate and 21 graduate degree courses taught in English.

For shorter exchange opportunities, the Junior Year Program in English (JYPE) and the Cooperative Laboratory Study Program (COLABS) have research-oriented curricula that allow students to explore topics in science. While the International Program in Liberal Arts (IPLA) offers subjects like economics, literature and intercultural communication, aimed at promoting the understanding of Japanese culture. Participants in the Direct Enrollment Education Program for the humanities and social sciences (DEEP-Bridge) take Japanese language and co-learning classes alongside local students.

Intellectual exchanges between professors and students, as well as hands-on participation in local festivals and community events, are integral parts of the exchange experience.



Out-going:

There are myriad short-term and double degree options for Japanese or domestic students keen to go abroad.

These options include the popular Faculty-led Programs (FL) which provide thematically-focused alternatives to the traditional language-driven Study Abroad Program (SAP). "The faculty members who lead these programs have a personal connection. They are either from that country or graduates of the partner institutions and have contacts there with whom they can co-design dynamic curricula," says Kazuko Suematsu, deputy director of the Global Learning Center (GLC). There are currently six countries in the FL series – Canada, China, Germany, Spain, Switzerland and the U.S.

Tohoku University's Alumni Association – Home and Away

The Alumni Association provides members with the opportunity to stay connected with Tohoku University.

In Japan, the Alumni Association hosts four main events each year in the Kansai, Kanto and Kyushu areas. There are also regional events run by local alumni groups, as well as regular campus activities – such as Homecoming Day - that all alumni are welcome to attend.

For alumni who don't live in Japan, the association also has several overseas chapters.

To learn more about joining a chapter or how to take part in alumni activities, please contact the Shuyukai Alumni Association: alumni@grp.tohoku.ac.jp



Countries with Tohoku University alumni branches

The Four Main Campuses

Tohoku University has four main campuses, each accessible by public transportation and surrounded by nature. They provide the perfect environment for research, learning and a fulfilling student life.



Katahira Campus

Conveniently located downtown and an easy 15-minute walk from Sendai Station, Katahira campus is home to the main administration building and the University Archives. World-leading research institutes like the Advanced Institute for Materials Research and the Research Institute of Electrical

Communication are also located here, alongside the TOKYO ELECTRON House of Creativity. The park on campus is also popular with local residents, especially during the cherry blossom season in the spring when many come to admire the beautiful trees dotted around campus.

Seiryō Campus

Students of the School of Medicine and School of Dentistry study at this campus. Located nearby is the Tohoku University Hospital, which seeks to serve both the local community and residents throughout the region with superior healthcare and leading-edge medical technologies. The campus also boasts the Advanced Medical Care Center, the Institute of Development, Aging and Cancer, the Center for Basic Aging Research and the Seiryō Auditorium.



Aobayama Campus

Aobayama is Tohoku University's largest campus and, like the city of Sendai itself, is a unique balance of urban infrastructure and magnificent nature. Easily accessible via Aobayama Station on the Tozai subway line, Aobayama campus has an impressive array of research institutes, such as the Multidisciplinary Research Laboratory for Agricultural Science and the International Research Institute of Disaster Science.

The campus has undergone significant expansion since

2017, and now includes University House Aobayama, the largest student housing complex to be built at a Japanese national university. There is also the Aobayama Ground, a sports facility equipped with a running track and a football field; and the newest of the university's three nursery schools offering childcare services to students and staff. A Science Park and a next-generation synchrotron radiation facility are all also scheduled to be completed in the coming years.

Kawauchi Campus

Kawauchi campus is situated to the east of Sendai Station and is served by the Tozai subway line. Tohoku University's Main Library, the Graduate School of Arts and Letters, the Kawauchi Hagi Hall auditorium, and the Education and Student Support Center can all be found on this campus. Tohoku University's undergraduates begin their academic journey here and the campus is lively with club activities and student festivities. The annual school festival, the biggest university festival in the Tohoku region, takes place every autumn, usually as the campus trees are at their peak autumn foliage. The Miyagi Museum of Art, Sendai City Museum and Sendai International Center are all within walking distance.



Welcome to Sendai

The City of Trees



Tohoku University's four main campuses are spread across the cosmopolitan city of Sendai, the cultural, political and economic center of Japan's Northeast (Tohoku) region.

Located some 300 kilometers - and a short 90-minute bullet train ride - from Japan's capital, Tokyo, Sendai is a city of fascinating contradictions.

It's a big, sophisticated metropolis with museums and arenas, trendy shops and cafes, and a home team in every major professional sport. But it also has a small-city charm, easy friendliness and magnificent nature. In fact, for its Zelkova-lined streets and rivers that flow downtown, Sendai has the well-deserved nickname of Mori no Miyako, or the City of Trees. Through four distinct seasons, the city enjoys a temperate climate, with especially beautiful autumn colors and snow-covered landscapes in the winter.

A day trip away from Sendai are many of the region's other famous attractions, such as Matsushima Bay, known as one of Japan's three most scenic locations. For the more athletic, nearby Mt. Zao is a popular ski and hot springs resort.

Sendai is home to a million people - many of whom are students and academics. Anchored by Tohoku University, the city boasts some of the best research facilities and institutes in the world. With a vibrant and energetic population, the city celebrates colourful events throughout the year, while retaining many old traditions. The Aoba Street Festival, the Sendai Tanabata Festival, the Jozenji Street Jazz Festival and the winter Starlight Pageant are some examples of annual events that draw millions of visitors and participants from all across the country and globe.

It's a great place to live and an inspiring place to study. Come join us!





TOHOKU
UNIVERSITY

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