Mini NOTEBOOK

Tohoku University 2021-2022

Tohoku Imperial University, circa 1907

Celebrating 115 years of academic excellence, ground-breaking research and social outreach!

115th Anniversary Edition

Introducing Tohoku University

Located in the city of Sendai, in Japan's picturesque Northeast region, Tohoku University is one of the country's top institutions, renowned for its innovative research and dynamic global network.

This year marks the 115th anniversary of Tohoku University's founding, and 100 years of it being a comprehensive university, following the establishment of the Faculty of Law and Letters in 1922.

Always a trailblazer, the university was the first in Japan to accept women and one of the first to welcome foreign students, while holding true to its three original guiding principles of putting research first, having an open-door policy and committing to the spirit of practice-oriented research and education.

These days, Tohoku University is home to 18,000 students across 10 faculties, 15 graduate schools and six research institutes. About 10 percent of the students come from abroad, contributing to one of the most cosmopolitan academic environments in Japan.

Tohoku University's excellent learning environment, international outlook and research influence, has led to it being conferred the status of a Designated National University by the Japanese government in June 2017. It has also ranked number one on Times Higher Education's annual list of Japanese universities for the past three years.

Tohoku University's talented researchers are behind some of the 20th century's most lifestyle-changing innovations, such as the split-anode magnetron used in microwave ovens, the steel-wire recorder and the Yagi-Uda antenna.

Now, looking at the century ahead, the university is embracing new challenges and opportunities to make a positive difference. Strategies include a Green Goals Initiative to address sustainability; and the promotion of diversity, equity and inclusion, to ensure the participation of different voices at all levels of the university community.

In the News

Tohoku University is committed to improving communities at home and abroad, and to finding solutions to global issues such as natural disasters, pandemics and geopolitical conflicts.

NanoTerasu

The next-generation synchrotron radiation facility that is being built at the new extension of Aobayama campus has a nickname – NanoTerasu.

The name – the winning entry in an open contest – is a combination of "nano" (the scale of observation at the facility) and "terasu," the Japanese word for shining a light on something. Often likened to a giant microscope, synchrotron radiation facilities are used to observe materials at the atomic level using extremely bright light.

This is the first facility to be maintained in regional private-public partnership with the National Institutes for Quantum and Radiological Science and Technology (QST) as primary organizer. When operational in 2023, NanoTerasu will be the centerpiece of a research complex that will comprise the R&D sites of major universities and companies from around the world.

Going Green

The Green Goals Initiative aims to realize a green and resilient future by leveraging the university's research capabilities, extensive international network and experience in disaster mitigation. It also shines a spotlight on the university's myriad research projects that promote the United Nations' Sustainable Development Goals (SDGs).

Under the initiative, Tohoku University is engaged in joint research with top institutes and companies from around the world, and promotes industry-academia-government collaboration, especially in the field of sustainability. On campus, the university is working towards carbon neutrality by 2040.

Diversity, Equity and Inclusion

Through its DEI Declaration, the university has made a commitment to develop a more inclusive environment on campus by ensuring that diversity is respected.

Goals include addressing the gender gap by stepping up the recruitment of qualified female faculty and staff, promoting them to appropriate positions of higher responsibility, and supporting the younger generation of female academics. Activities to raise awareness and dispel unconscious biases have also been increased, to provide an environment where all students, faculty and staff can feel accepted, supported and valued.

Student Council

Tohoku University established its Student Council in 2021, the first national university in Japan to do so. It is part of the Connected University strategy, which aims to facilitate communication between students and university management.

Each new 10-member council serves for a year and comprises undergraduate, graduate and international students. They hold regular roundtable talks and direct dialogue with members of the Education and Research Council, to reflect the concerns and opinions of the student body.

Digital Transformation

In 2020, Tohoku University announced major reforms to its business operations, to adapt to the pandemic that was forcing students and staff to stay home. First it upgraded its connectivity and expanded its online tools to facilitate online classes. Then it adopted flexible working styles and remote work, to allow administrative services to continue online without disruption.

Through digital transformation, enhanced classroom technology now allows for a combination of in-person learning and limitless online resources; and hybrid classrooms that enable students on campus, at home and even in other countries, to interact in a virtual environment. Foreign employees and visiting researchers too, can remain connected to their home institutions while in Sendai.

International Support Center

The newly established International Support Center provides information and consultation services to foreign researchers and students before, and after, they arrive in Japan, to help them settle smoothly into life at Tohoku University.

The center also offers language support and help navigating official customs and procedures such as visiting the ward office, setting up a bank account and procuring necessities.To learn more about the center, please visit:
https://sup.bureau.tohoku.ac.jp/supportcenter/en/index.html

In the Lab

Tohoku University's pioneering research continues to be at the forefront of innovation. With people and application in mind, researchers are addressing society's most pressing issues to create a brighter, sustainable future.

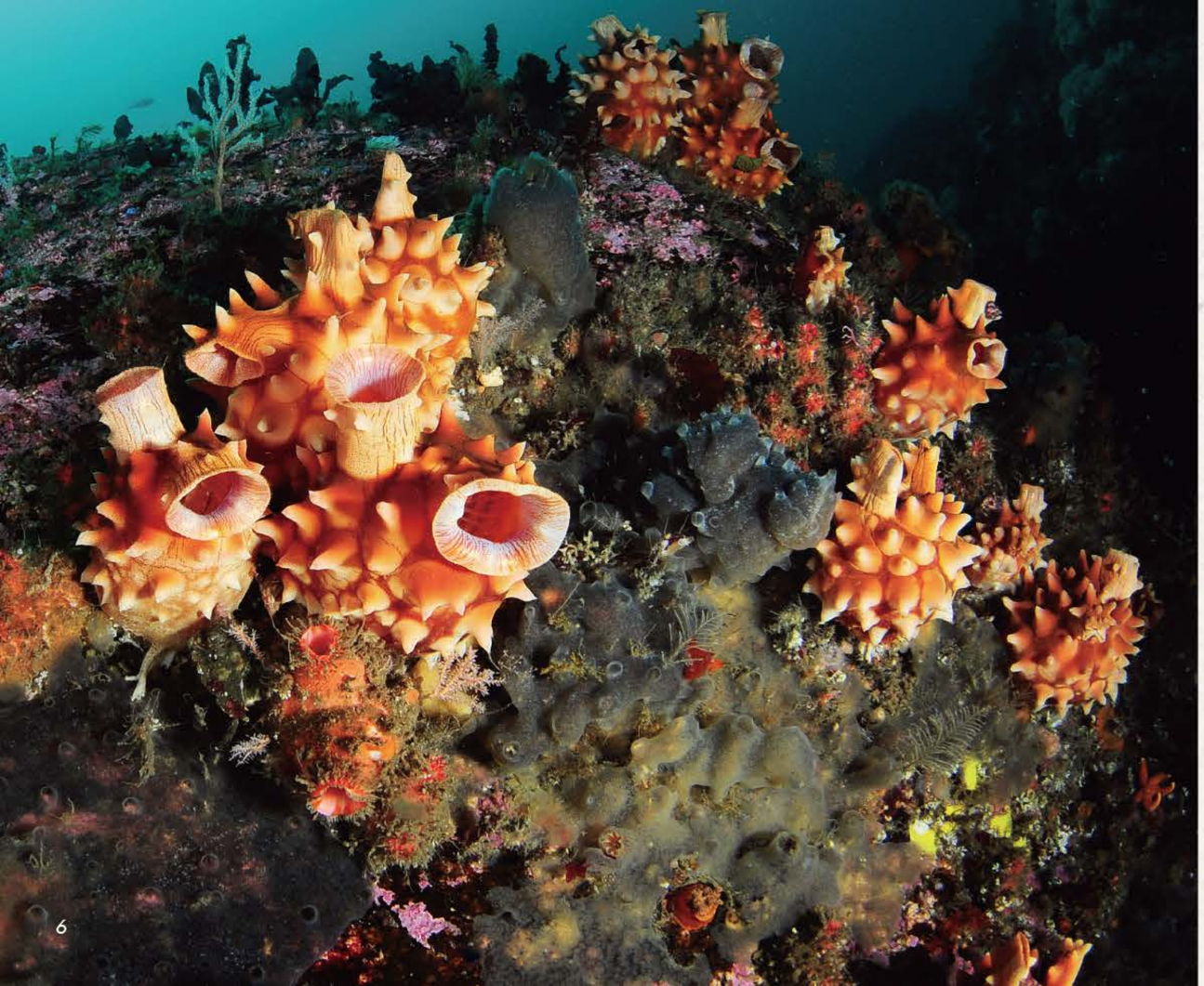
Sea Pineapples Could Help Power the Future

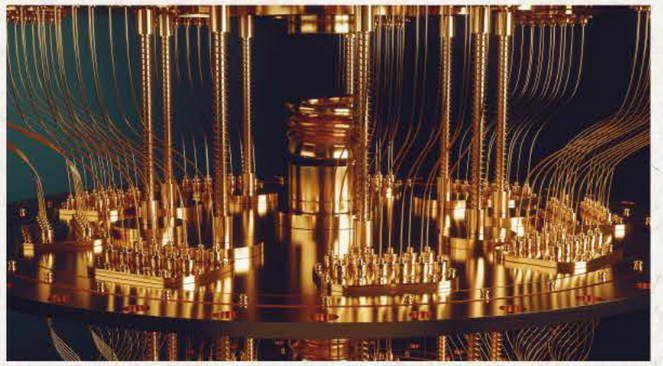
Sea pineapples, an edible ascidian, are a delicacy in Japan. The Tohoku region is famed for its sea pineapple production – known locally as hoya.

A research group, led by Professor Hiroshi Yabu from Tohoku University's Advanced Institute for Materials Research, has established a new use for the scores of sea pineapple shells discarded every year.

The carbonization of cellulose nanofibers in sea pineapple shells produces high-quality carbon that, when mixed with livestock blood waste, boasts electrical performances similar to that of rare metals.

This sea pineapple shell/blood waste mixture could be applied to next-generation energy devices such as fuel cells and metal-air batteries.





Bits to p-bits

Tohoku University scientists have developed a mathematical description of what happens within tiny magnets as they fluctuate between states when an electric current and magnetic field are applied.

Their findings could act as the foundation for engineering non-volatile memories with ultralow power consumption, as well as more advanced computers that can quantify uncertainty while interpreting complex data.

Maternal Exercise

Exercise during pregnancy induces the placenta to release the protein SOD3, which prevents the negative effects of obesity being passed from mother to child, and inhibits high-fat diet-induced abnormalities in the offspring's glucose metabolism.

Joji Kusuyama, from Tohoku University's Interdisciplinary Institute for Frontier Sciences (FRIS), was part of a research group that revealed the underlying mechanisms behind this process.

Fish Biodiversity

Tohoku University Professor Michio Kondoh has spearheaded a new public database of fish diversity called ANEMONE DB. The database employs eDNA and is the culmination of combined efforts between researchers, citizens, local governments and industry.

Unlike traditional biological surveys, where fish must be collected to be observed, eDNA surveys are straightforward and inexpensive. A simple sample of water picks up DNA left behind by organisms and reveals crucial information, like population sizes and distribution.

Vitamin K

A team of researchers at Tohoku University has discovered that the fully reduced form of vitamin K acts as an antioxidant efficiently inhibiting ferroptotic cell death—a natural form of cell death characterized by extensive lipid peroxidation in cellular membranes.

Ferroptosis has been implicated as a driver of Alzheimer's disease and acute organ injuries, among many other diseases, and the findings suggest vitamin K treatment might be a new powerful strategy to ameliorate ferroptosis-related diseases.

Microgravity Worms

With astronauts spending more time in space, understanding the health impacts of microgravity has never been more pressing. Atsushi Higashitani, a molecular biologist at Tohoku University, together with an international team, investigated microgravity's impact on nematode worms, which share similar molecular and physiological effects to humans during spaceflight.

The lack of physical contact during near-weightlessness reduces dopamine levels, causing neuromuscular impairments. Future treatment strategies could promote physical contact through massages, to maintain neuromuscular health in astronauts.

In the Classroom

Tohoku University's growing global network creates a culturally diverse learning environment. Enhanced digital technology has also led to hybrid classrooms, and more programs with online / in-person options than ever before.

Summer and Online Programs

Summer School and online programs offer a quick taste of student life in Sendai.

The Tohoku University Engineering Summer Program (TESP) features two weeks of classes and laboratory activities taught by professors renowned in the fields of robotics, 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 learn Japanese language and culture; and the Tohoku University STEM Summer Program (TSSP) which is designed to showcase the university's cutting-edge science and technology.

In-coming

For degree-seeking students, Tohoku University currently offers 10 International Joint Graduate Programs in five leading fields such as spintronics and materials science; and five emerging fields, such as Japanese studies and disaster science.

There are also 21 graduate and three undergraduate degree courses taught in English as part of the Future Global Leadership (FGL) Program.

For shorter exchange opportunities, there are four programs open to students from partner universities. 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) promotes the understanding of Japanese language and culture.

Participants in the Direct Enrollment Education Program for Natural Science Students (DEEP) take Japanese language and co-learning classes alongside local students.

Out-going

A key element of Tohoku University's Vision 2030 is promoting a global mindset among its students through exposure to different perspectives, so that they may become leaders of the future. To that end, there are myriad short-term and double degree options for Japanese or domestic students who are interested in studying abroad.

These include the Study Abroad Programs (SAP) which focus on improving practical language and communication skills; and Faculty-led Programs (FL), which explore a single theme through problem-solving projects, fieldwork and other activities. SAP and FL programs have dynamic curricula co-designed by faculty members of Tohoku University and the partner institutions involved.

In the Community

Students and staff engage in various outreach programs throughout the year. Alumni in Japan and around the world are also active members of the Tohoku University family.

Tomatoes and Mangoes a Go-Go in Fukushima

The Katsurao Plant Factory is an initiative by Tohoku University's Graduate School of Agriculture and the Fukushima Innovation Coast Framework, to cultivate clean tropical fruits, in response to concerns about the safety of local produce after the Dai-ichi Nuclear Power Plant accident in 2011.

The facility comprises three greenhouses, each fitted with high-tech devices that automatically control the temperature, humidity and carbon dioxide concentration in the air.

Tohoku University researchers and staff at the plant regularly donate their crops to local events and festivals, and host mango tasting sessions. Elementary school students also often visit, to learn how mangoes and tomatoes are cultivated.

SCRUM Volunteers

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 others and to gain a better understanding of the communities in the region.

An active student-run volunteer group is SCRUM, which organizes activities mainly in towns and cities affected by the 2011 Great East Japan Earthquake and Tsunami. Recognizing the importance of having diverse opinions and cultural influences, SCRUM has been encouraging more international students to get involved.

TomoPro Crowdfunding

The Tohoku University Fund supports students and the community, through a range of fundraising programs.

This past year, the Tomoni Program (known colloquially as TomoPro) was launched to give students the chance to impact their own future by crowdsourcing their ideas and building a project with sponsors who share their vision. Students were invited to submit original proposals to realize a dream, tackle a social problem or engage in positive activism to improve their community.

The eight diverse projects that were selected for the university's crowdfunding platform included digital agriculture with AI robots, bringing live music to hospitals for moral support and the revival of student theatre.

Breakfast and Buns

As part of the university's Support Student Life! campaign, aimed at helping students who might be financially impacted by the COVID-19 pandemic, several rounds of affordable breakfast were offered. For 100 yen, students were able to have a cooked meal at the Kawauchi no Mori Dining cafeteria.

There was also the "melon pan" project, which saw the popular custard-filled buns available for just 50 yen each, twice a week during the summer.

Alumni Network

Tohoku University has alumni in over 145 countries and the Alumni Association provides the best ways to stay connected. In Japan, the Alumni Association hosts four main events each year in the Kansai, Kanto and Kyushu areas, as well as regular campus activities like Homecoming Day.

For alumni who don't live in Japan, the association also has several overseas chapters which can be accessed through the Tohoku University Alumni Network. The online platform, launched in 2021, serves as a hub for the latest university news and provides a place for alumni across the globe to connect, network, and deepen their ties with the university and with each other.

To learn more about alumni activities, contact;

Alumni Network
https://overseas-alumni.bureau.tohoku.ac.jp/

Shuyukai Alumni Association
alumni@grp.tohoku.ac.jp

TOHOKU UNIVERSITY

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Editorial Adviser: Noriko Osumi

Produced by the Tohoku University International Public Relations Section
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https://www.tohoku.ac.jp/en/