



2019 

NTU  
Social  
Responsibility and  
Sustainability  
Report



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## About the USR Report

The Sustainable Development Goals (SDGs) established by the UN in 2015 set out an ambitious agenda for addressing key challenges and mobilizing all sectors of society towards building peaceful, just and sustainable societies by 2030. Universities play a key role in the creation of a sustainable future through their research and teaching activities. At National Taiwan University, we are committed to upholding our core values described in the NTU motto, “Integrity, Diligence, Fidelity and Compassion,” in line with our vision of being a leading university that promotes a sustainable agenda. We issued our first University Social Responsibility and Sustainability (USR) Report in June 2020, as part of our commitment to publish a USR report on a regular basis that will enable us to continuously review and improve our performance. This report details our campus operations and social contributions.

### Reporting Framework

This report has been prepared in reference to the Sustainability Tracking Assessment & Rating System (STARS) framework developed by the Association for Advancement of Sustainability in Higher Education (AASHE).

### Reporting Period

The data and contents disclosed mainly regard the time period from January 1 to December 31, 2019. The information referring to the Academic Year (AY) regards the entire AY 2018-2019 (i.e., from August 1<sup>st</sup>, 2018 to January 13<sup>th</sup>, 2020). Additionally, for completeness, some data also includes information before 2019 or AY2018-2019 or latest information in 2020.

### Scope

This report primarily covers the activities of NTU, with some performance data also relating to our affiliated institutions.

### Basis for Calculations

All information and statistical data in this report have been collected and compiled by NTU. The financial data is expressed in New Taiwan Dollars (NTD). Our data is based on survey and calculation methods that follow regulatory requirements. Where no local regulations apply, international standards are referred to instead.

### Assurance

This report has been assured by the independent third-party provider PwC Taiwan with a level of Limited Assurance, in accordance with ISAE 3000. The assurance report is attached in the Appendix.

### Publication

This report is our first USR report, to be published regularly. The report is available for download on our website.

Current issue: Published in June 2020

### Feedback

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## A Word from the President

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Priding itself as Taiwan's oldest and most comprehensive research university, National Taiwan University (NTU) actively takes on its responsibilities to society to further the cause of social progress with its unwavering commitment to truth and excellence.

While social contribution should be viewed as a core responsibility of every higher learning institution, NTU holds it in especially high regard. In 1949, then university President Ssu-Nien Fu, stated in a speech that the university shall aim to "dedicate itself to the Spiritus Universalis," while also underscoring the virtues of "Integrity, Diligence, Fidelity, and Compassion." These four terms were subsequently adopted as the university motto. Seventy-one years after President Fu's speech, the first edition of the "NTU Social Responsibility and Sustainability Report" is published in response to the United Nations' 17 Sustainable Development Goals (SDGs). This report highlights NTU's activities and efforts in the areas of research, education, social services, and governance.

The report provides a complete and accurate account of the institution's practical efforts in fulfilling its commitment to social responsibility along with its promotion of sustainable development for humanity. As NTU marches toward its 2028 centennial celebration, it bears the vision of "implementing sustainability to propel the future." With NTU's blueprint for sustainability constituted by five goals -- "Sound Campus Governance," "Nurture Talent in Innovation," "Pursue Elite Teaching and Research," "Link Local Communities to the World" and "Towards a Sustainable Future"-- we actively strive to carry out each objective outlined in our social responsibility agenda, which demonstrates not only our ability in terms of autonomy but also our competence in contributing to the development of a sustainable society.

The relationship between institutions of higher learning and society is one of mutual support and interdependence. We firmly expect this year's "NTU Social Responsibility and Sustainability Report" to be far-reaching in its social impact. On one hand, it appeals to an even greater number of educational institutions to actively fulfill their responsibilities to society. On the other, it reflects our influential role in leading people from all social spheres to attach greater importance to social responsibility. By coalescing our efforts, we are certain to secure a healthier society and a brighter future.

NTU President

Handwritten signature of the NTU President.

# 01 About NTU

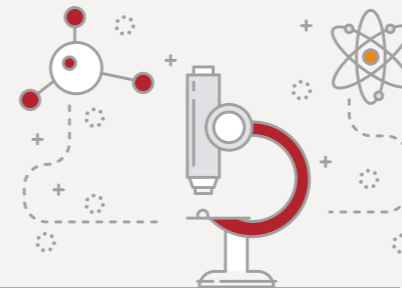
National Taiwan University (NTU) was originally established in 1928, when Taiwan was under Japanese rule, as Taihoku Imperial University. The current name dates back to 1945. As Taiwan's oldest and most prestigious university, we are also the largest comprehensive higher education institution (HEI) in the country. The academic freedom that we cherish and our excellent faculties attract both domestic and international students. Throughout our 90-year history, we have nurtured many talents, including leading academics and leaders in the public and private sectors. Our campus is vast, and spans across multiple locations, including Taipei, Yilan, Hsinchu, Yunlin, and mountainous areas in central Taiwan – accounting for nearly 1% of Taiwan's total land area. This provides teachers and students with an environment rich in biological and ecological diversity.

As the leading university in Taiwan, we are strongly committed to social responsibility as we strive to drive sustainable development and influence positive change in society. This was also reflected in the first University Impact Rankings launched in 2019 by Times Higher Education (THE), which measure the contributions of HEIs to the United Nations' Sustainable Development Goals (SDGs). We were ranked 70<sup>th</sup> in the world overall, and 1<sup>st</sup> in the world for SDG 16: Peace, Justice, and Strong Institutions. Starting from creating a sustainable culture on campus, we aim awareness about sustainability throughout the university, through innovative teaching and research, environmental protection and recycling efforts, and a school administration that supports equality and wellbeing. Our sustainability efforts extend beyond our campus through industry-academia collaborations and service teams deployed to remote areas. In the near future, we will continue to reinforce the spirit of innovation and sustainability thinking among all faculty members and students. We will also continue our efforts to address economic, environmental, and social challenges through interdisciplinary collaboration, as we create connections between the local and the international community.

## NTU at a Glance

72 College-Level Research Centers

51 University-Level Research Centers



11 Colleges



56 Departments



128 Graduate Institutes



16,606 Undergraduate Students

15,141 Graduate Students

2,031 Full-time Teachers

5,477 Staff Members<sup>1</sup>

12,007 Full-Time Equivalents (FTE)<sup>2</sup>

294,636 Alumni



(As of December 31, 2019)

Number of visitors to NTU Museums in 2019 = 101,841

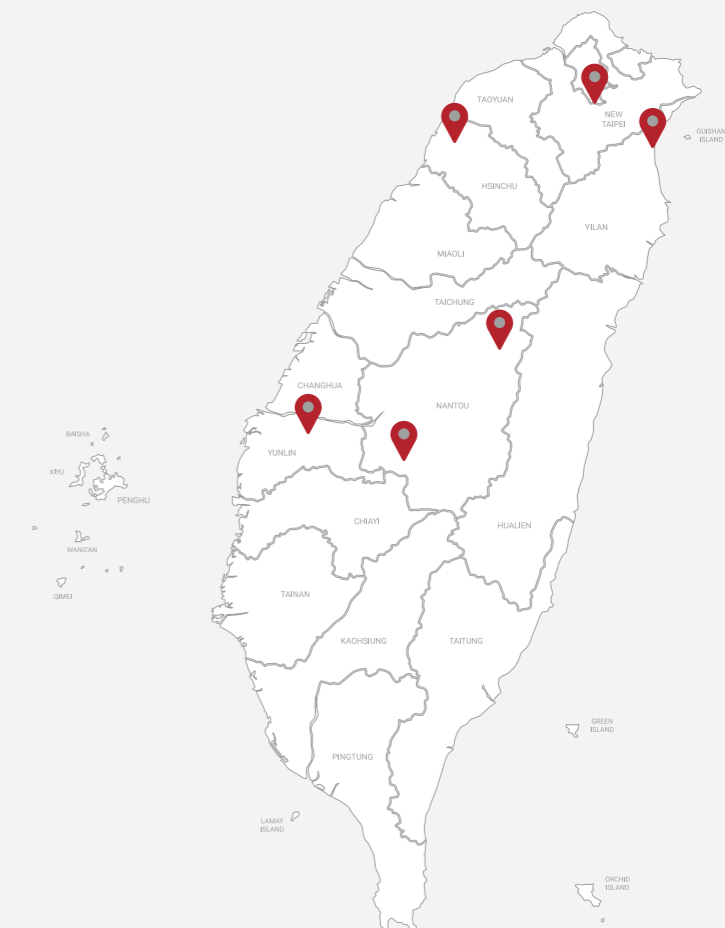
Campus tour service provided to 8,684 people in 2019



Number of university-level collaboration agreements<sup>3</sup> 717



## Total Campus Area



A total of 34,000 hectares

spread across Taipei, Yilan, Hsinchu, and mountainous areas in central Taiwan

Note 1: Staff members include: administrative support personnel, guards, messengers/janitors, contract staff, and research assistants.

Note 2: FTE includes: Full-time staff, full-time and adjunct teachers, part-time research assistants and teaching assistants.

Note 3: University-level collaboration agreements are written agreements that the NTU has signed with overseas educational research institutions. The number includes all written academic cooperation agreements which remain effective in 2019.



# 02

## Sustainability Governance at NTU

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## 2.1 NTU Sustainability Governance Structure

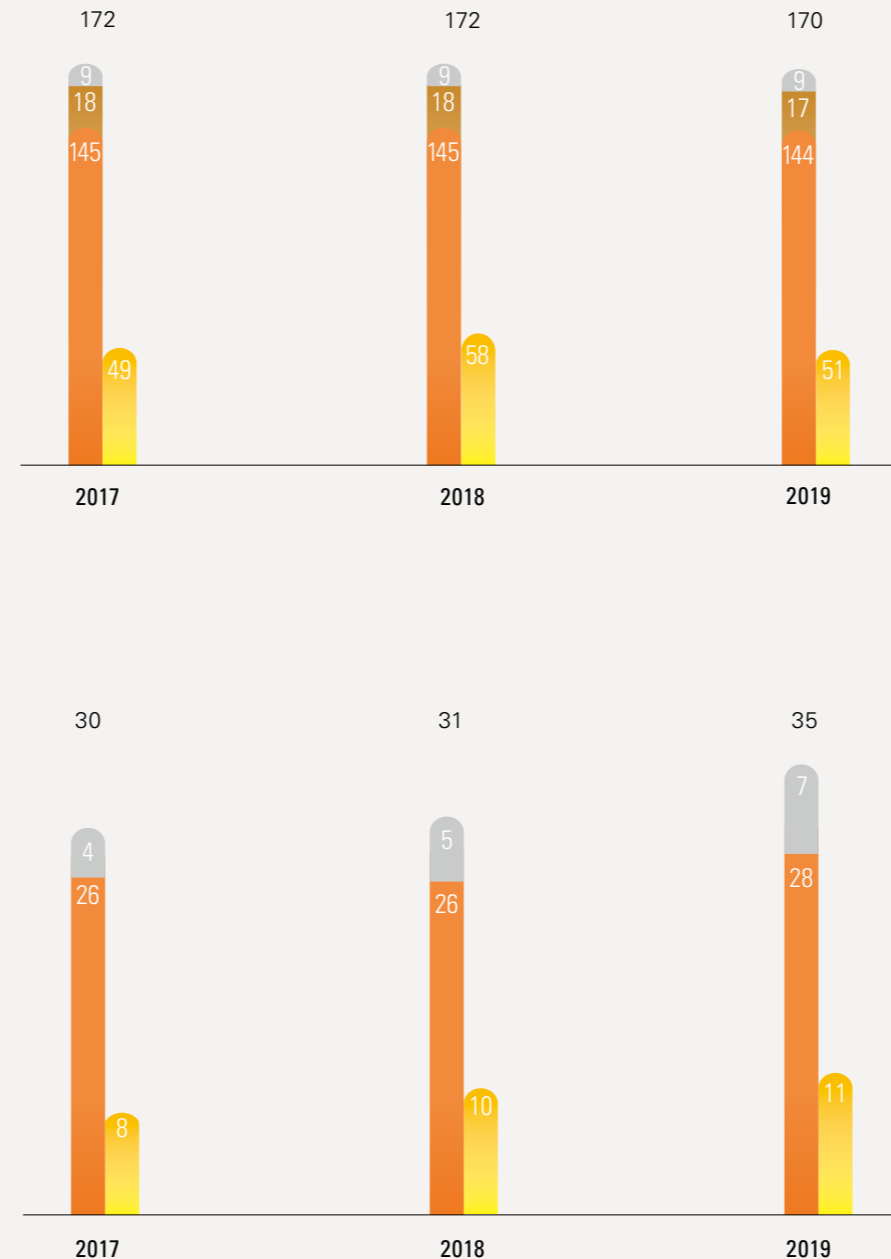
### I. Governance Structure

In order to implement the university autonomy and academic freedom granted by the national University Act, we adhere to the highest standard of ethics and integrity, while striving for administrative efficiency. Our governance framework (stipulated in the ‘National Taiwan University Organization Regulations’) comprises several decision-making bodies, including the leadership in NTU affairs, various decision-making councils and meetings, as well as academic and administrative units. The NTU Affairs Meeting is our highest-level decision-making unit. Members include the campus administrators, faculty members and other employees, as well as student representatives, in order to ensure that balanced decisions are made, where the opinions of all parties have been considered.

#### Important Decision-Making Units and Meetings at NTU<sup>1</sup>

Level	Name	Responsibilities
 Leadership in NTU affairs	NTU Affairs Meeting	Reviewing developments and budgets for NTU affairs, changes and abolishment of important agendas in colleges/ departments/institutes and affiliated institutions, important matters and rules for NTU affairs, matters instructed by the president, and other important proposals.
	NTU President Selection Committee	Selecting the new president.
 Decision-making councils	Administrative Meeting	Making decisions on matters specified in these regulations and other important administrative affairs.
	Academic Affairs Meeting	Discussing important academic matters and related rules.
	Other Committees	Exercise various responsibilities as stipulated by Law.

Note: Please refer to ‘NTU Organization Regulations’ for the members of each meetings.



#### Participants in NTU Affairs Meetings

Unit: Number of People

Representatives	2017	2018	2019
Total <sup>1</sup>	172	172	170
● Academic staff <sup>2</sup>	145	145	144
● Non-academic staff <sup>3</sup>	9	9	9
● Student representatives	18	18	17
● Female representatives	49	58	51

Note 1: The numbers for 2017 and 2018 are based on the number of delegates attending the last NTU Affairs Meeting of AY 2017-2018 and AY 2018-2019. The numbers for 2019 are based on the number of delegates attending the most recent (2020.1.4) NTU Affairs Meeting during AY 2019-2020.

Note 2: Academic staff includes campus administrators, representatives from college and non-college units, teachers, researchers, and teaching assistants.

Note 3: Non-academic staff includes staff members and messengers/janitors.

#### Participants in Administrative Meetings

Unit: Number of People

Representatives	2017	2018	2019
Total <sup>1</sup>	30	31	35
● Academic staff	26	26	28
● Non-academic staff	4	5	7
● Student representatives <sup>2</sup>	-	-	-
● Female representatives	8	10	11

Note 1: The numbers for 2017 and 2018 are based on the number of delegates attending the last NTU Affairs Meeting of AY 2017-2018 and AY 2018-2019. The numbers for 2019 are based on the number of delegates attending the most recent (2020.1.4) NTU Affairs Meeting during AY 2019-2020.

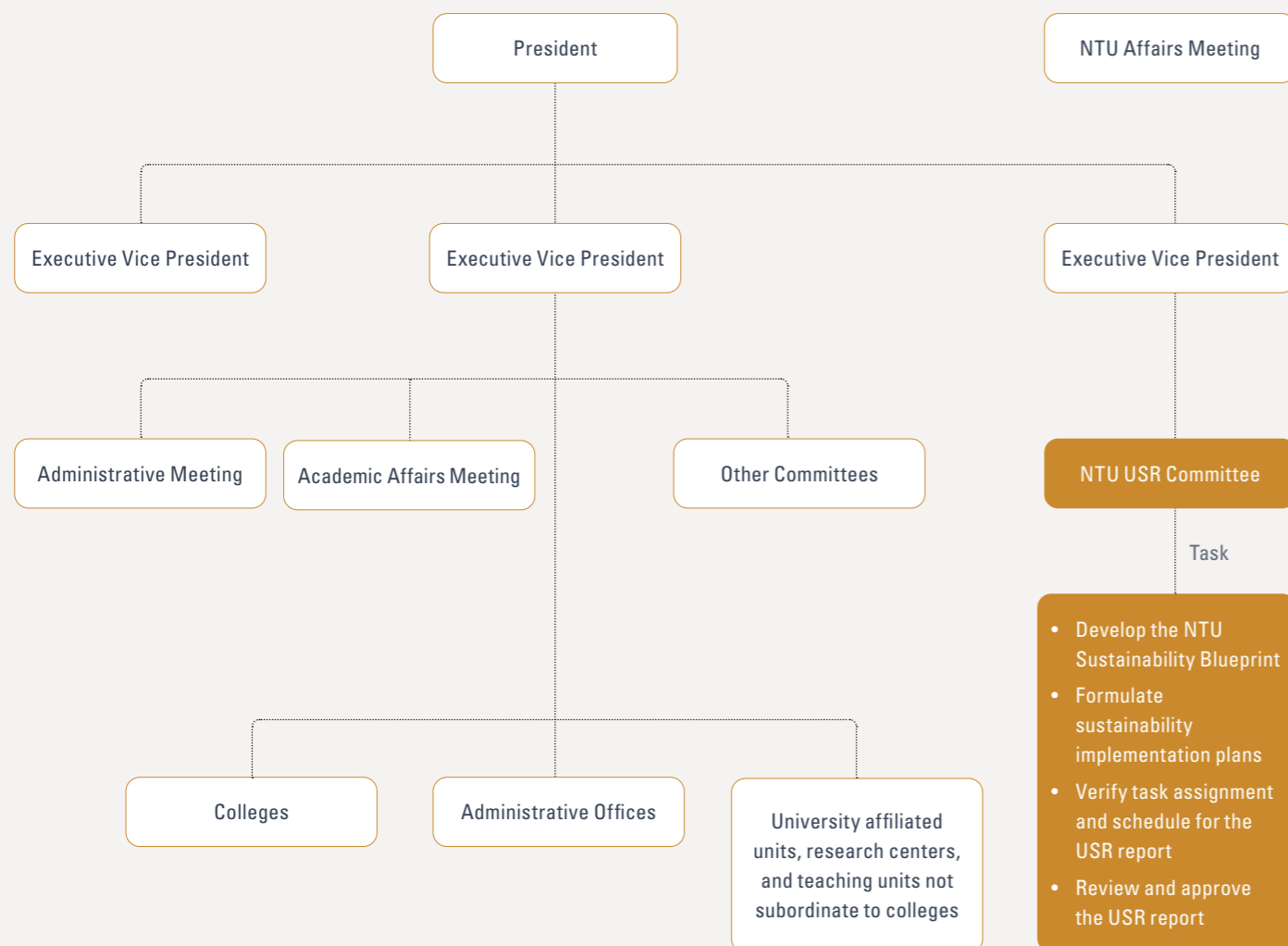
Note 2: Student representatives are invited to attend meetings without voting rights when the motions to be discussed concern student rights and obligations.

## II. Sustainability Governance

In 2019, we established the NTU University Social Responsibility (USR) Committee to reinforce our USR efforts. This committee is chaired by the Executive Vice President and comprises nine members, including Executive Vice President, college deans, and vice presidents of administrative units. The committee is mainly responsible for planning the NTU Sustainability Plan (please refer to Chapter 3 of this report for details) in order to formulate sustainability plans and review the USR report.

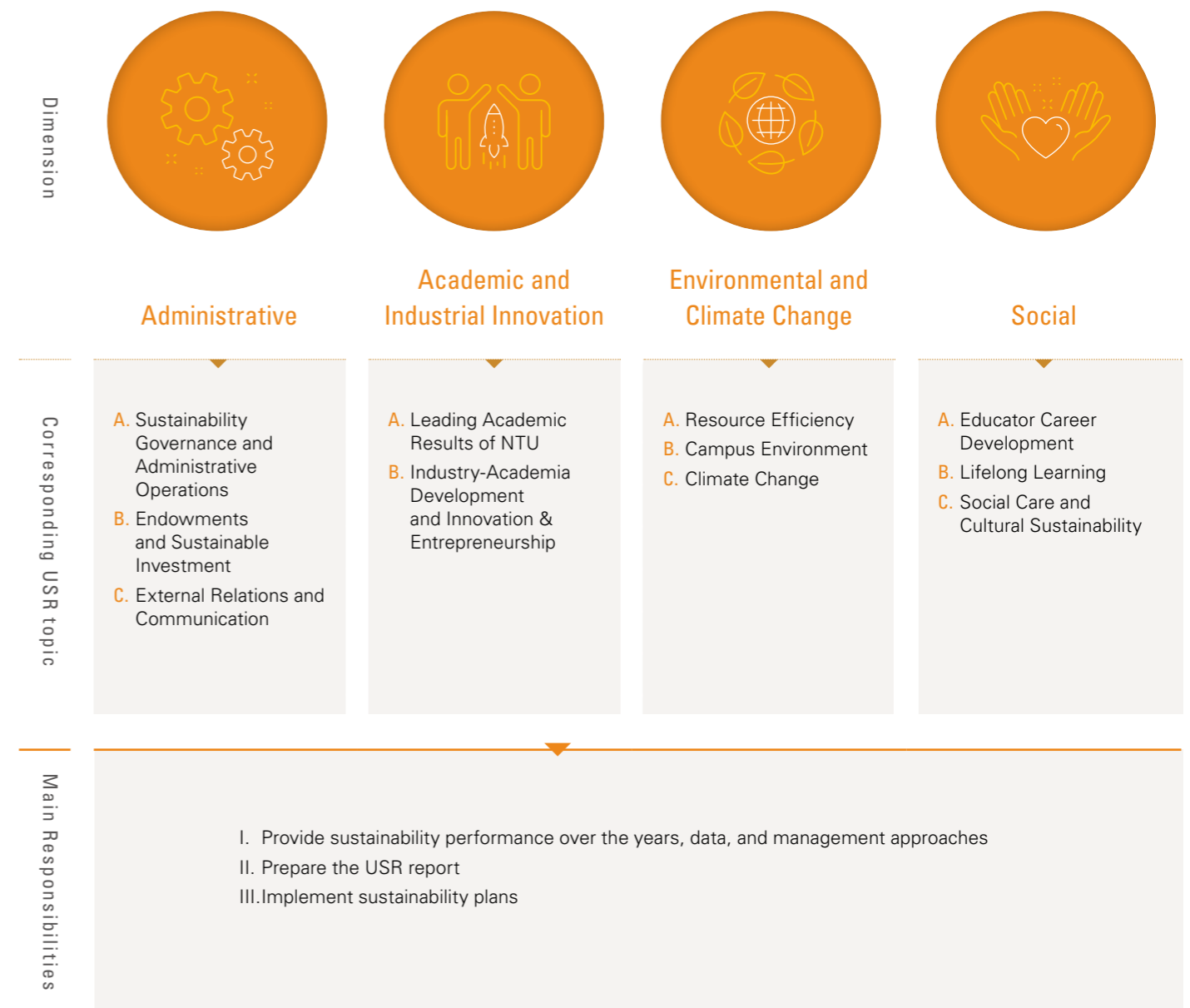
The USR Committee is coordinated by the Office of Institutional Research and Social Responsibility, and includes four task forces responsible for key aspects of our social responsibility. Members of these task forces include representatives from the students' union, various academic and administrative units. The task forces execute sustainability plans, track our social responsibility and sustainability performance, and assist with the preparation of USR reports.

### NTU Sustainability Governance Framework



### Members and responsibilities of USR task forces

#### Office of Institutional Research and Social Responsibility<sup>1</sup>



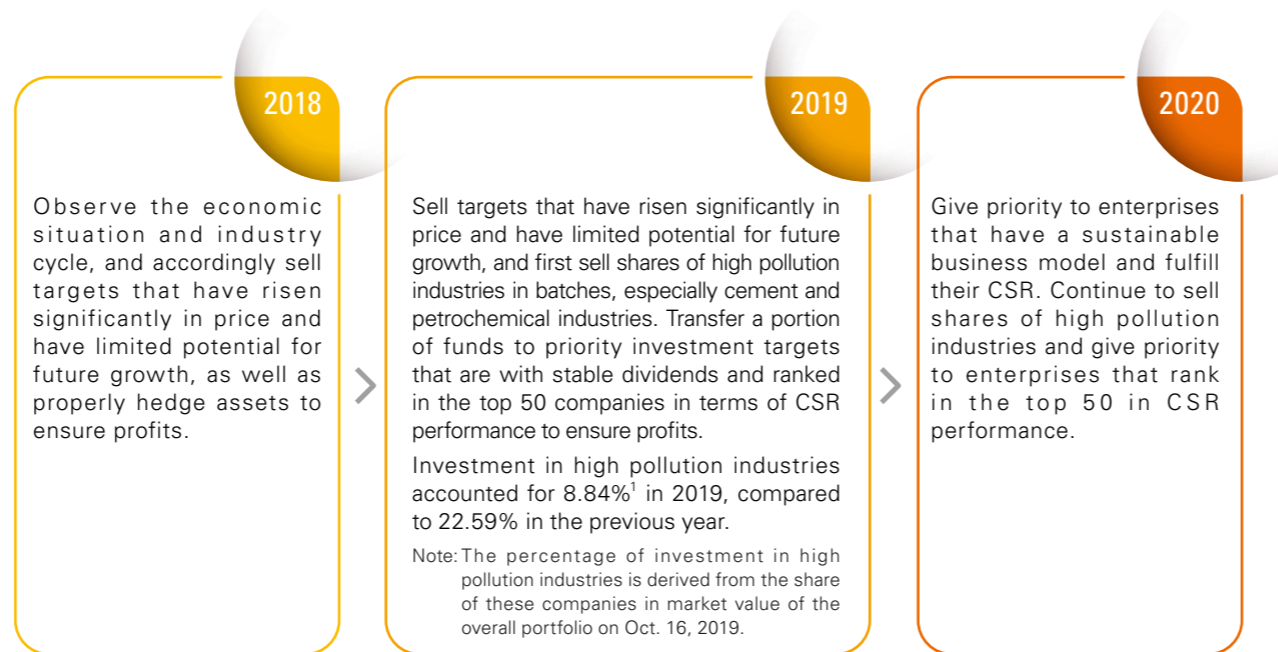
Note: The office's main tasks are as follows: I. Conduct data-based, empirical research on topics related to the development of NTU affairs, and provide the results as references for decision-making. II. Systematically collect, integrate, manage, and make good use of the achievements of USR and sustainable development of NTU. III. Implement USR related projects and assist in the assessment of participation in international sustainable development related organizations and initiatives to increase international visibility.



## 2.2 Endowment Management and Sustainable Investment

### I. Endowment Management Committee and Investment

The Committee for Investor Responsibility comprises eight internal and external members who have expertise in investment management and/or are reputed professionals in wealth management. Members include 3 members of the campus administration, 1 member of faculty, and 4 external members. The committee draws up our investment guidelines, policies, and asset allocation principles for the following year based on the 'NTU Directions for Investment Income and Expenditure Management'. Please see the [NTU financial planning report](#) for each year for details.



### Endowment Investment Listing

Unit: NT\$1,000

		2017		2018		2019	
		Amount	Percentage	Amount	Percentage	Amount	Percentage
Type of investment target and amount invested	Electronics	441,958	23.7%	436,311	24.4%	575,644	30.8%
	Telecommunications	426,796	22.9%	438,930	24.5%	440,258	23.6%
	Food Distribution	134,162	7.2%	143,914	8.0%	147,920	7.9%
	Raw Material Manufacturing <sup>1</sup>	414,679	22.3%	404,191	22.6%	228,914	12.2%
	Financial	392,049	21.0%	324,455	18.1%	430,484	23.0%
	Automobile Manufacturing	24,837	1.3%	19,994	1.1%	17,353	0.9%
	Fund	28,060	1.5%	21,780	1.2%	28,420	1.5%
<b>Total<sup>2</sup></b>		<b>1,862,541</b>	<b>100%</b>	<b>1,789,576</b>	<b>100%</b>	<b>1,868,993</b>	<b>100%</b>

Note 1: Raw material manufacturing includes manufacture of rubber products, cement and basic iron and steel.

Note 2: This amount only includes investments in equities and funds.

### II. Sustainable Investment

As of 2019, we are committed to divesting from high pollution industries, becoming the first university in Asia to do so. Consequently, we have begun to sell shares in such industries, especially the cement and petrochemical industries. A portion of the funds have been directed to enterprises with stable dividends and exceptional corporate social responsibility (CSR) performance, in order to ensure profits and improve the sustainability of investments.

This year (2020), we established the 'Principles for Selecting Domestic Stocks for Sustainable Investment', with the aim of targeting primarily such enterprises that have a sustainable business model and fulfill their CSR goals. Currently, we prioritize enterprises that are included in the CSR ranking compiled by the *CommonWealth* Magazine. In the near future, in accordance with the Principles for Responsible Investment (PRI), we will incorporate environmental, social, governance (ESG) issues into all investment decisions. In 2019, sustainable investment accounted for nearly 75% of our endowment funds – demonstrating our resolve to promote sustainable development through our investment decisions.

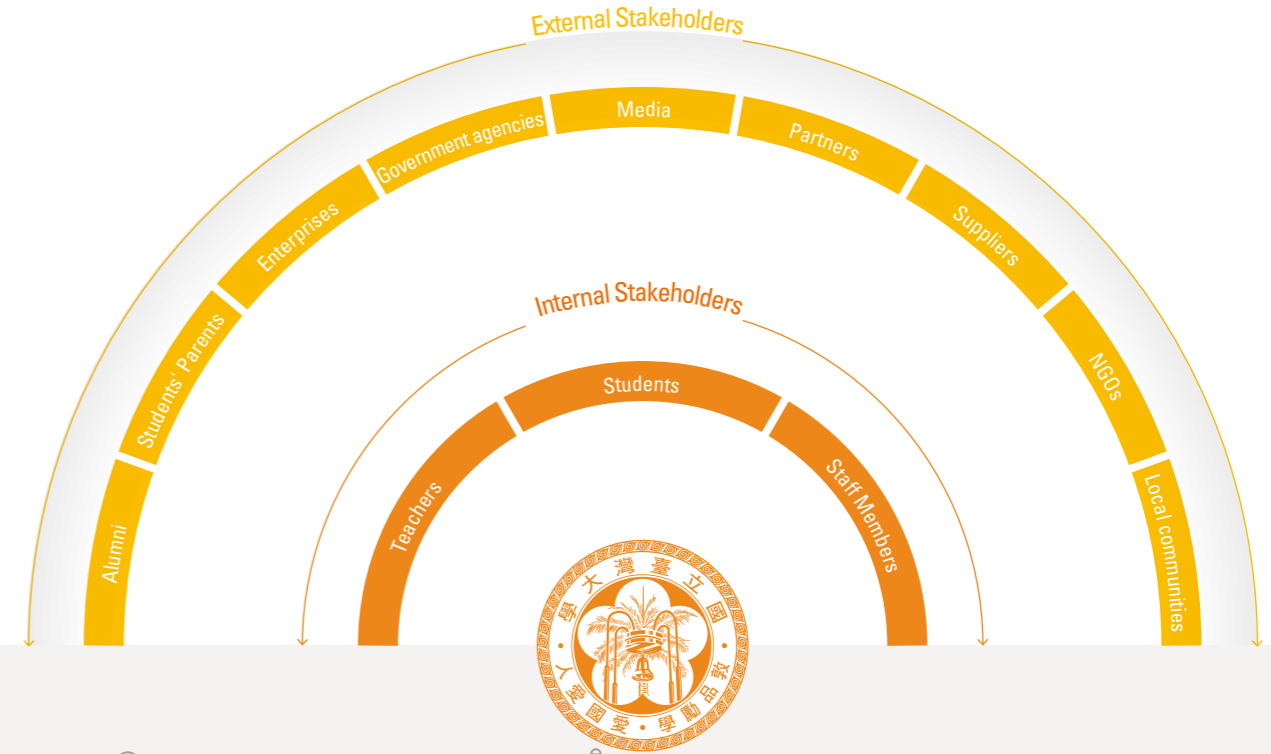


## 2.3 Stakeholder Communication

We define our stakeholders as all internal and external groups or individuals who affect or are affected by our operations, teaching and research, as well as our environmental and social impacts. We value transparency, and communicate with our stakeholders through a variety of channels, making sure to provide them with the information they need in a timely manner, giving them the opportunity to offer their opinions and to participate in campus decision-making. This is essential for creating a better campus with greater diversity.

**Important public communication channels of NTU**

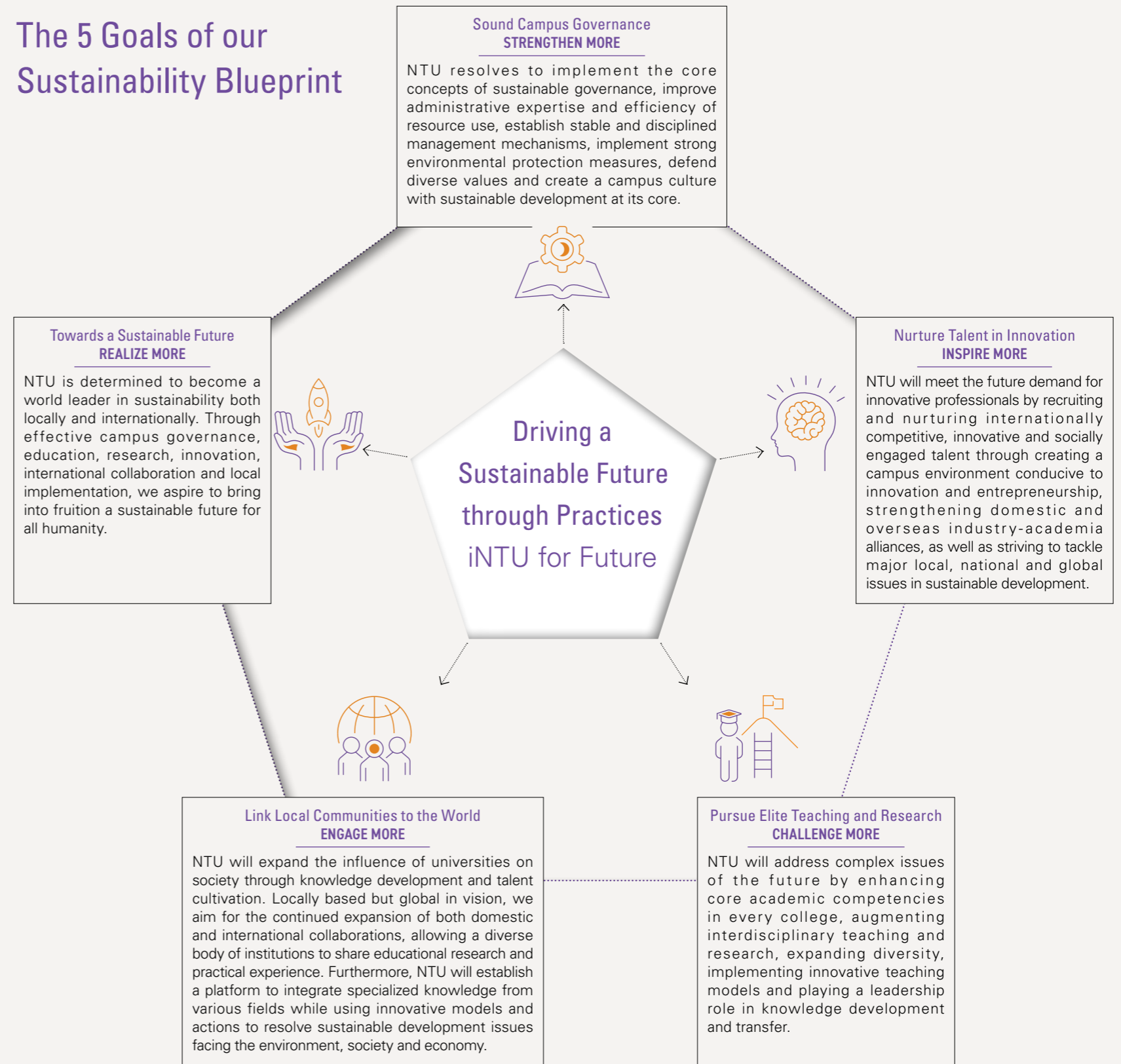
- Official website of NTU
- NTU news in spotlight
- NTU information disclosure/ annual report
- NTU community
- NTU e-newsletter



Stakeholder Group	Teachers	Staff Members	Students	Alumni	Students' Parents	Enterprises	Government Agencies	Media	Partners	Suppliers	NGOs	Local Communities
Main Contact Person	Related Administrative Offices College and Department Offices	Personnel Office Secretariat	Office of Student Affairs Campus Safety Center Student Association & Graduate Student Association Center for Teaching and Learning Development, Office of Academic Affairs	NTU Alumni Center Career Center, Office of Student Affairs	College/Department/Institute Career Center, Office of Student Affairs Center for Teaching and Learning Development, Office of Academic Affairs	Career Center, Office of Student Affairs Center for Teaching and Learning Development, Office of Academic Affairs	Office of Academic Affairs Secretariat Office of Research and Development	Center for Public Relations, Secretariat	Office of Research and Development	Office of General Affairs	Extracurricular Activities Section, Office of Student Affairs	Office of Student Affairs Office of General Affairs
Form of communication	<ul style="list-style-type: none"> <li>• University/Department/Institute Affairs Meeting</li> <li>• NTU Suggestion System</li> <li>• Related committee meetings (e.g., Academic Affairs Meeting, Curriculum Committee, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Labor-Management Council</li> <li>• NTU Suggestion System</li> <li>• Administrative Meeting</li> </ul>	<ul style="list-style-type: none"> <li>• University/Department/Institute Affairs Meeting</li> <li>• NTU Suggestion System</li> <li>• Annual Freshman Survey, Learning Experience Questionnaire for Freshmen/Juniors, Annual Senior Survey</li> <li>• Advisor Time</li> </ul>	<ul style="list-style-type: none"> <li>• NTU Alumni Center Website</li> <li>• NTU Alumni Bimonthly</li> <li>• Alumni Association</li> <li>• Graduate Student Career Survey</li> <li>• College graduate career destination questionnaire survey</li> <li>• Alumni and employer questionnaire</li> </ul>	<ul style="list-style-type: none"> <li>• NTU Internship Program (IP)</li> <li>• NTU Campus Recruitment Job Fair, Company Presentations, Company Visit</li> <li>• Alumni and employer questionnaire</li> </ul>	<ul style="list-style-type: none"> <li>• NTU Internship Program (IP)</li> <li>• NTU Campus Recruitment Job Fair, Company Presentations, Company Visit</li> <li>• Alumni and employer questionnaire</li> </ul>	<ul style="list-style-type: none"> <li>• Academic Unit Evaluation</li> <li>• Official correspondence and on-site visit</li> <li>• National Conference of University &amp; College President, Dean of Academic Affairs Meeting, etc.</li> <li>• Ministry of Education Higher Education Database Report</li> </ul>	<ul style="list-style-type: none"> <li>• Press Release</li> <li>• Press Conference</li> </ul>	<ul style="list-style-type: none"> <li>• Project Collaboration</li> <li>• Academic Collaboration Contracts (Academia Sinica, National Health Research Institutes, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• Requisition Operations</li> <li>• Procurement Operations</li> </ul>	<ul style="list-style-type: none"> <li>• Student Volunteer Service</li> </ul>	<ul style="list-style-type: none"> <li>• Student Volunteer Service</li> <li>• Activity Sponsorship</li> </ul>

# 03 NTU Sustainability Vision and Blueprint

## The 5 Goals of our Sustainability Blueprint



## NTU Sustainability Vision

### Driving a Sustainable Future through Practices

NTU is committed to fulfill social responsibilities at both local and global level. We aim to make key contributions in civil society development, socio-economic expansion and environmental sustainability by leveraging our talent and resources.

Our university was founded in 1928 in the spirit of uncovering the truths of the universe. Ever since, we have aspired to be a “university for the universe”, through the collective efforts of our presidents, faculty, students, and alumni over the years. In line with our core values of “Integrity, Diligence, Fidelity, and Compassion,” incorporating diversity, inclusiveness, liberty and university autonomy into the implementation of USR in teaching, research, serving society, innovation and entrepreneurship. We believe this is the foundation of our excellence.

Human civilization has now reached the point where the sustainability of the planet, which we all rely on for survival, is in jeopardy. Looking toward the future, we will continue to play our part in the global community. With resilience relying on diversity and inclusion as well as a visionary and pragmatic outlook, we strive to lead innovative efforts in teaching, research and related services across temporal, spatial and disciplinary boundaries. We fully believe that through such efforts, a sustainable future for all humanity will be possible!

Based on the vision for our 100<sup>th</sup> anniversary in 2028 of “Driving a Sustainable Future through Practices” we have established a “NTU Sustainability Blueprint”, which integrated the four pillars of our med-term objectives of iNTU: Innovation Development, Nurturing Student, Talent Recruitment, and United Globalization. We aim to lead Taiwan’s society, culture, economy and environment towards a sustainable future, by leveraging and integrating internal and external resources, developing interdisciplinary solutions, and our efforts fulfilling USR.



# 04

## Our Social Impact

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## Align Social Impact with Sustainable Development Goals

In response to the needs of our times, and to further social development, we have established a number of forward-looking credit programs and research centers, which cultivate talents for different fields. Besides developing professional knowledge and capabilities, this allows our faculty and students to cultivate a sense of social mission and urges them to fulfill social responsibility. Accordingly, teachers and students from every college and department at NTU not only pursue excellence in their specialized field, but also use what they learned to respond to needs at home and abroad.

In our aim to lead Taiwan towards a sustainable future, we bring together brilliant minds and pool resources from various disciplines in order to find good solutions to the challenges of our times, in such diverse domains as climate change, public health and medicine, ecosystem and environment, agriculture, disaster prevention and mitigation, smart city and social inclusion.

The following section presents our current achievements related to various aspects of sustainable development. In the future, we will continue our efforts to exercise good CSR and contribute to sustainable development in the international sphere as well as in Taiwan.

Chapter Name	Primary SDGs	Secondary SDGs
4.1 Establishing International Connection with Strength in Public Health and Medicine	3, 17	1, 2, 5, 6, 8, 10, 16
4.2 College of Bioresources and Agriculture Promotes Satoyama Initiative	2, 8, 15	1, 4, 10, 12
4.3 Trans-disciplinary Training and Global Exchanges to Implement Sustainability	4	1, 2, 3, 6, 7, 9, 11, 12, 13, 14, 15, 17
4.4 Student Volunteer Service in Rural Areas across the World	1, 4, 17	2, 3, 8, 10
4.5 Promoting the Development of Sustainable and Smart Cities	11	2, 6, 8, 9, 12, 17
4.6 Protecting Food Security by Agricultural Control	2, 15	1, 8, 9, 11, 13
4.7 Establishing an Inclusive Society	16	3, 10
4.8 Mitigating the Impacts of Natural Disasters via Cutting-Edge Technology	13	3, 9, 11, 17
4.9 Improving Local Healthcare for the Elderly	3, 10	1, 2
4.10 Integrating Research Capabilities for a Better Future	9, 13	4, 6, 7, 11, 12, 14, 15, 17



# 4.1

## Establishing International Connection with Strength in Public Health and Medicine




Taiwan enjoys excellent healthcare, as evidenced by its top ranking on the global Health Care Index (Numbeo, 2020). NTU is well known for its contribution in the fields of medicine and public health, as evidenced by our world-class research achievements and swift responses to the challenges of epidemic outbreaks. In the spirit of solidarity, we are bringing care for human wellbeing via cutting-edge medical technology from our small country to all parts of the world, building international friendships in the process.

### Promoting Public Health in West Africa

The Republic of Malawi in Africa is one of the ten poorest countries in the world, with 70% of the population living on US\$1.9 or less per day. For many years, our College of Public Health has been sending interns to the country, in order to help fight diseases such as AIDS, tuberculosis, malaria, and cholera.

From 2011 to 2019, a total of 19 students from our Department of Public Health went to Malawi to serve through internships. There, they joined forces with Taiwan's Bjorgaas Foundation, Pingtung Christian Hospital, and Luke International Norway, taking up work in local communities. Working conditions were complicated by the lack of adequate infrastructure, with frequent power outages that disrupt work or cooking, and poor quality water. The students conducted epidemiology surveys and data analysis, assisted in epidemic prevention, helped assess prevention effectiveness, and organized public health programs – such as teaching women about the importance of menstrual hygiene and how to use cloth sanitary pads correctly. With their experience in Malawi, many students join WHO or other global NGOs afterwards and exert their expertise.

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From 2011 to 2019, a total of  students from our Department of Public Health went to Malawi to serve through internships.





The trainees were on field research in local community in 2013.

It takes long-term efforts to improve public health. In effect, much of the work does not yield quick results. Results are achieved through patience and systematic validation of both research and practice. Through persistent efforts, results will not only improve the lives of a few individuals, but also affect the health of entire communities. Just like the malaria research conducted by our scientists in Malawi: although serum analysis is a laborious process, this work has been critical in clarifying the true malaria prevalence rate, allowing medical resources to be allocated to where they are most needed.

### Responding to Medical Challenges Around the World

NTU is known internationally for its efforts on malaria prevention and control. For more than ten years, many experts from our College of Public Health have dedicatedly led teams from Taiwan to help combat malaria in the island state São Tomé and Príncipe in West Africa. There they have trained local communities and healthcare workers in prescribing and administering medications, spraying, blood sampling, blood testing, case logging, and administering questionnaires. Thanks to their efforts, the malaria prevalence rate in the country has fallen from 50% to 1%, leading to repeated recognitions from the African Leaders Malaria Alliance.

Besides Africa, our faculty members are also actively involved in improving health in Latin America. Located in Central America, Guatemala suffers from



Malaria Prevalence Rate in the Country has Fallen from



a shortage of medical facilities, and a lack of sufficient training for medical personnel. This had led to higher maternal and neonatal mortality rates than the average rates in Latin America. Since 2016, through the International Cooperation and Development Fund, we have been sending down a team of gynecologists, obstetricians, and neonatologists to Guatemala, working closely with local public hospitals to improve maternal and newborn health.

As part of this collaboration, we brought medical technologies to Guatemala, in order to strengthen the capacity of medical institutions at all levels. We also provided caregiving training, including training local seed instructors. We sent a professional team to the country, in order to advice on how to equip the medical personnel with both the necessary techniques and the ability to provide necessary care to patients. In this process, our partners learned, for instance, how to lower the infection rate among newborns with aseptic techniques, and how to discover complications caused by low birth weight at an early stage, so that the follow-up and treatment can be planned in advance. These cooperative exchanges are planting seeds of hope for the future health of Guatemala.

Over the years, our scientists have shouldered the responsibility of our times, devoting themselves to the fields of medicine and public health and achieving results that have impacted the world: from snake venom research that led to a major breakthrough in neurobiological research methods, to the development of clinical trial and treatment guidelines for hepatitis and cancers, to taking up key roles in the national epidemic command centers to control the outbreak of diseases like SARS and COVID-19. Our dedicated faculty members are willing to lead and use their profession to respond to the needs of people and society, with world-class research achievements contributing to the protection of people's health and wellbeing. Although Taiwan is a small country with a population of just over 20 million, we have dedicated medical and public health service teams who are deployed to developing countries to find ways to improve the quality of medical care in these countries and improve people's wellbeing. Thanks to the efforts of our NTU volunteers, many people among Taiwan's diplomatic allies can enjoy the benefits of greatly improved medical care.



The trainees were in exchange with the students of local medical center in 2015.



The trainees were in discussion with project members in 2019.

# 4.2 College of Bioresources and Agriculture Promotes Satoyama Initiative



## Sustainable Yunlin

Botanists from NTU occasionally appear in the rural villages of Yunlin, solemnly discussing matters with farmers in the fields.

Why did the leaves of green onions turn yellow? That may be caused by pests. After using the right pesticides, you'll have to properly manage the irrigation and drainage in your farms and remove rotting leaves to prevent puddles from causing plant diseases in the future. Why are the leaves of cucumbers sagging and the fruits oddly shaped? That was caused by excessive use of nitrogenous fertilizers, which leads to severe soil salinization. Decreasing the amount of fertilizer used will not only lower costs, but also improve harvest quality. Why are the colors of the tomatoes in the greenhouse uneven? This may result from poor temperature control. It can be improved by adjusting the temperature and switching to an organic fertilizer.



The NTU botanists were deployed to be on the inspection of crops in Yunlin.



Just as people need to see the doctor when they get sick, plants need a botanist when they get sick. Since we began the ‘Project of Pest Prevention and Control Tour Service in Yunlin,’ there have been an endless stream of farmers seeking answers for how to deal with a particular plant disease or pest, seeking help with soil diagnosis and modification, and the appropriate use of fertilizers and pesticides. There is a plethora of issues that may occur in the field, but our botanists have much advice to offer to ease the anxiety of farmers.

The pleasant experiences of working with botanists from NTU have led to more extensive and in-depth collaborations with Yunlin County, where agriculture is the main economic activity. When the century-old, ornamental trees in the countryside were harmed by pests, we led a team to inspect each tree and provide the appropriate fungicide injections. Our outreach work extends also to the pig pen, with veterinarians collecting blood samples for molecular biology diagnosis, microorganism isolation and identification, and drug sensitivity tests. These measures help maintain and improve the health of pigs. In the future, new teams from NTU are ready to contribute their expertise to areas such as poultry farming, herbivore farming and aquaculture.

Food security has become a more prominent problem due to climate change, with industries such as agriculture, forestry, fishery, and animal husbandry receiving more attention in recent years. At NTU, we are working actively to develop sustainable management models that can secure food supply in the face of such challenges. For farmers, their knowledge of agriculture has been accumulated through experience, but with the impact of climate change, this experience is suddenly no longer applicable. Therefore, professionals from academia are needed even more at this time – experts with the right equipment who can use scientific methods to reduce the ecological impact and help ease the burden on farmers.

## NTU Experimental Forest Flourishing with Local Communities

Turning inwards towards Nantou County neighboring Yunlin, you would find this is also a place plagued by various social problems, such as poor economic development, an aging population, and a gap in the labor force and culture. Our Experimental Forest is located in this county. Besides forestry research and environmental education, we are addressing the challenges of rural development in line with sustainable development thinking. Our scientists engage in various aspects of community development, providing advisory services to local employers, helping develop the local tourist industry, promoting food and agriculture education etc.

Most of the inhabitants in the Nantou townships belong to the less-privileged indigenous population. Drawing on the indigenous craftsmanship



NTU Experimental Forest engages in flourishing local businesses to actively realize its University Social Responsibility.

traditions, our Experimental Forest Team provides vocational training for indigenous people to help them set up carpentry workshops and obtain a professional certificate after learning wood and bamboo craft techniques. This helps the indigenous communities to make a living and preserves their cultural heritage.

Also, for people engaged in farming, our team provides guidance for how to enhance the value of their products by adopting environmental-friendly ways. For example, the team helped rice farmers to use Tainan No. 16 rice to brew a special sake (Japanese rice wine) that would generate greater profits. The team also helped tea farms transition to organic farming, which increases biodiversity and produces safer tea. Other examples like beekeeping in the woods, planting jelly figs, and growing mushrooms in

basswood combine sustainable forest management with creating economic value for local residents.

Our students also actively participate alongside their professors in caring for the development of rural areas. Every year, NTU students organize summer camps in nearby townships to pique children’s interest in learning with diverse topics such as exercises in calligraphy, dance, or Japanese. In addition, due to an interest in fighting inequalities and promoting a more inclusive and sustainable society that was perhaps born during the university years, many of our alumni have devoted themselves to agriculture and community development, producing environmental-friendly teas, rice, and wine, which take into account both what is good for consumers and nature.

# 4.3 Trans-disciplinary Training and Global Exchanges to Implement Sustainability



The Executive Vice President of NTU Chia-Pei Chou was in group photo with GIP students of NTU.

What kind of trees in Daan Forest Park have the highest risk of falling during a typhoon? Which part of Daan District is the most suitable for installing rooftop solar panels? Is wastewater from pig pens in Huwei, Yunlin County, suitable for biogas power generation? Why does the amount of microplastic particles along the coast of Fulong significantly increase after torrential rains? Must water quality in the Greater Taipei region come at the expense of the economic wellbeing of residents in Pinglin?

These are the questions brought up by our students, as they went into communities and engaged with practical, social issues – challenging the stereotype that academia cannot relate to the practical realities of everyday life. At NTU, we believe that climate change demands urgent action, both in terms of adaptation and mitigation. We therefore encourage our students to gain experience of practical problems in society first-hand. Classroom teachings about various aspects of climate change – the causes of climate change, climate justice etc. – must be applied to practice, in order to gain the kind of knowledge that can help inform policy, generate new technical solutions and innovative thinking on the ground, thus bridging the gap between research and practice. Further, because many of the challenges related to sustainable development extend beyond national borders, engaging with the international community through various programs and exchanges is essential.

## Promoting Interdisciplinary Innovation for Sustainability

In the 21<sup>st</sup> century, climate change has emerged as a structural issue that impacts all aspects of life. Accordingly, no single discipline alone – be it atmospheric science or geography – can provide the kind of knowledge that is required to work effectively with such a challenge. Our International Degree Program in Climate Change and Sustainable Development was established with the aim to train future talents in cross-disciplinary thinking around a broad range of issues. Spanning across the natural and social sciences and humanities, the program brings together faculty from the College of Science, College of Law, College of Engineering, College of Bio-Resources & Agriculture, and College of Social Sciences. In this program, students are brought to consider issues from different perspectives, as they are led to integrate knowledge from multiple disciplines into their thinking. Equipped with solid, evidence-based methods,

they then uncover problems and challenges in local communities that are not visible in other statistical data. Based on this research, students of the program propose realistic interventions ranging from action monitoring, climate services, disaster management to managing environmental sustainability.

Besides our interdisciplinary degree program, we promote climate change education in primary and secondary education through our collaboration with the Ministry of Education's 'Education for Climate Change' project. To this end, our faculty held a pedagogical workshop aimed at strengthening the ability of teachers in elementary and junior high school and let them understand the pervasive influence of climate change and learn a comprehensive perspective about sustainable development. This workshop resulted in a number of creative lesson plans, with anything from kitchen waste barrels, algae, and mosquitoes providing interesting content for climate change teaching.



Class of mock conference on international climate negotiations.

Topic-related research centers:

• MOHW-NTU Infectious Diseases Research and Education Center

• National Center for Food Safety Education and Research

• Health Science and Wellness Center

• Global Changer Research Center

• Research Center of Climate Change and Sustainable Development

## Global Innovation Joint-Degree Program



To create a borderless campus across the European and Asian continents, with our partner schools the University of Tsukuba in Japan and the University of Bordeaux in France.

## Global Challenges Require Borderless Collaborations

In view of the shocks brought about by climate change, disasters like increasingly severe typhoons, snow storms, and floods, as well as food security and health crises are not limited to any one country or region; rather, these are challenges that require global or regional collaboration. Recognizing the importance of joint efforts to address sustainability issues, our faculty members are actively engaged in various collaborations across universities. Examples include teaching or cross-border research in other countries, ranging from India to Jordan.

A concern with global cooperation is also reflected in our programs. Besides its cross-disciplinary design, our International Degree Program in Climate Change and Sustainable Development encourages international exchanges, attracting a number of international students, and hosting foreign students to conduct climate change research in Taiwan. Our Global Innovation Joint-Degree Program (GIP-TRIAD) is the very first program in Taiwan to create a borderless campus across the European and Asian continents, with our partner schools the University of Tsukuba in Japan and the University of Bordeaux in France. This program aims to cultivate talents in innovation, creativity, and entrepreneurship, with a specific focus on addressing global challenges.

At NTU, we believe in cultivating talents who will engage with local and global sustainability issues across both disciplines and borders. Our colleges provide students with solid professional skills, and many of our programs encourage students to go deeper into communities and consider innovative solutions that can enhance well-being. Besides, interdisciplinary training, it is also necessary to bring different regions of the world closer together in terms of exchange of information and international cooperation. We value our many partnerships with prestigious universities around the world, which offer numerous opportunities for students and faculty alike to engage with the global community and cultivate a global perspective on the challenges of our time.

# 4.4 Student Volunteer Service in Rural Areas across the World



## Bringing Warmth to Remote Corners of the World

Ladakh, a remote Tibetan settlement in the Himalayas, is surrounded by snow-covered mountains and barren land, punctuated by small oases where cows and donkeys can be seen lazily grazing. Due to its remote location, infrastructure is inadequate and development has generally been neglected. Power outages are frequent – often many times a day – and sanitary conditions are poor, with many residents using pit latrines. Despite these conditions, students from NTU’s World Volunteer Society have repeatedly taken on the laborious journey to this faraway place, bringing educational supplies and other resources to children who have few opportunities to interact with others from the outside world.

Our student volunteers come from Taiwan, a place where they do not need to worry about clothing or food. The World Volunteer Society at NTU was formed in 2007 in the spirit of equality and sustainability, with the aim of bringing what students have learned to less privileged parts of the world where resources are lacking.

Perseverance is the most challenging aspect of the volunteer work in rural areas. While many non-profit organizations adopt more ad hoc approaches, the World Volunteer Society sees its service program as long-term. The society strives to deepen the exchanges year by year, thus accumulating experience that enables a better understanding of the local needs of a particular community. In the fifth year of service in Ladakh, the volunteer group responded to the lack of ICT resources of the local partner school. The students initiated a campaign to collect computers from major organizations around Taiwan. After being turned down countless times, they finally secured 15 laptops from ASUS Foundation, and brought these laptops to Ladakh.

That trip left a particularly vivid impression. The local teachers were overwhelmed by the sight of so many computers. Up until then, for lack of equipment, computer classes had been taught only through words. Now they had the hardware for students to actually learn by doing. The equipment brought by our volunteer team was an important upgrade for the classes, improving education quality. The volunteer team has also prepared matching teaching plans, so they could teach school children in Ladakh various computer skills –



Group photo after class in Ladakh

from how to operate a computer, such as opening files, creating a folder, and changing the wallpaper, to more advanced classes on using Microsoft software, such as Word and Powerpoint. The efforts of the student volunteers really paid off, as they witnessed the children's passion for learning and curiosity about the world outside their own.

### The Resource Gap in Biping Township

The NTU World Volunteer Society now counts over 250 members, and continues to send out volunteer teams to rural communities in Taiwan and overseas who bring educational resources and support, and help with community development. During the semester, members meet regularly to devise teaching plans that will be used by the volunteer teams, and volunteer with after-school programs at elementary schools and elderly care institutions. During the summer and winter vacations, members will implement the teaching plans that have been tailored to different age groups in the various domestic and overseas education institutions that they work with. Ladakh in India is only one of the rural areas that these NTU students regularly visit. Members of the World Volunteer Society can also be seen in India's Mumbai, Nepal, and Taiwan's Hualien Shuilien, Jingpu, Gangkou, Qimei, Ruimei Elementary School, and Fengbin Junior High School.

Because the student volunteers come from different colleges and departments, the lesson plans they design are rich and varied, with care taken to adapt them to local conditions and to take into account local needs. The lessons cover such various subjects as music, art, science, geography, and career exploration. In

most of the overseas communities that the World Volunteer Society works with, sanitary conditions are poor. Here, health education and first-aid classes will be included in the teaching plans. For example, local students will be taught the Heimlich Maneuver and how to make a sling, or guidelines on diet and nutrition. This kind of education is applicable to one's daily life, and helps improve the knowledge of healthcare in these communities.

Although it first started with volunteering overseas, the members of the society are mindful that there are also many rural areas in Taiwan which need assistance. In Taiwan, however, it is not the equipment itself that is lacking, but rather there is a need for human support. In these domestic communities, our volunteer teams will organize summer and winter camps, engaging the children in different activities. Thanks to after-class programs, sports meetings, community-based care service, and home visits, more is learned about the status and needs of local communities. This information is meticulously recorded so the team may improve its service year by year. Activities are adjusted in order to best meet local needs, based on the

understanding that is gained through the experience. Feedback from local teachers and students revealed that in order to help them keep up with the world, it is just as important to train the children's ability to express themselves as to provide knowledge. With this feedback in mind, cultivating independent thinking and good communicative ability has been incorporated into the teaching plans, in the hope that this will inspire the children to have dreams of their own.

Social Devotion Special Awards from NTU, as a recognition of their spirit of altruism, and their willingness to care about more than their own academic performance; giving back to society by serving others and caring for the underprivileged. The society hopes that although the social and economic situation will not immediately change, they are planting seeds of hope, so that the children may remember how someone once taught them to see things from a different perspective. And hopefully, one day, the seeds that have been planted will blossom and thrive.

The NTU World Volunteer Society now counts over

**250** members,

and continues to send out volunteer teams to rural communities in Taiwan and overseas who bring educational resources and support, and help with community development



The NTU World Volunteer Society received Social Devotion Special Awards.

# 4.5 Promoting the Development of Sustainable and Smart Cities



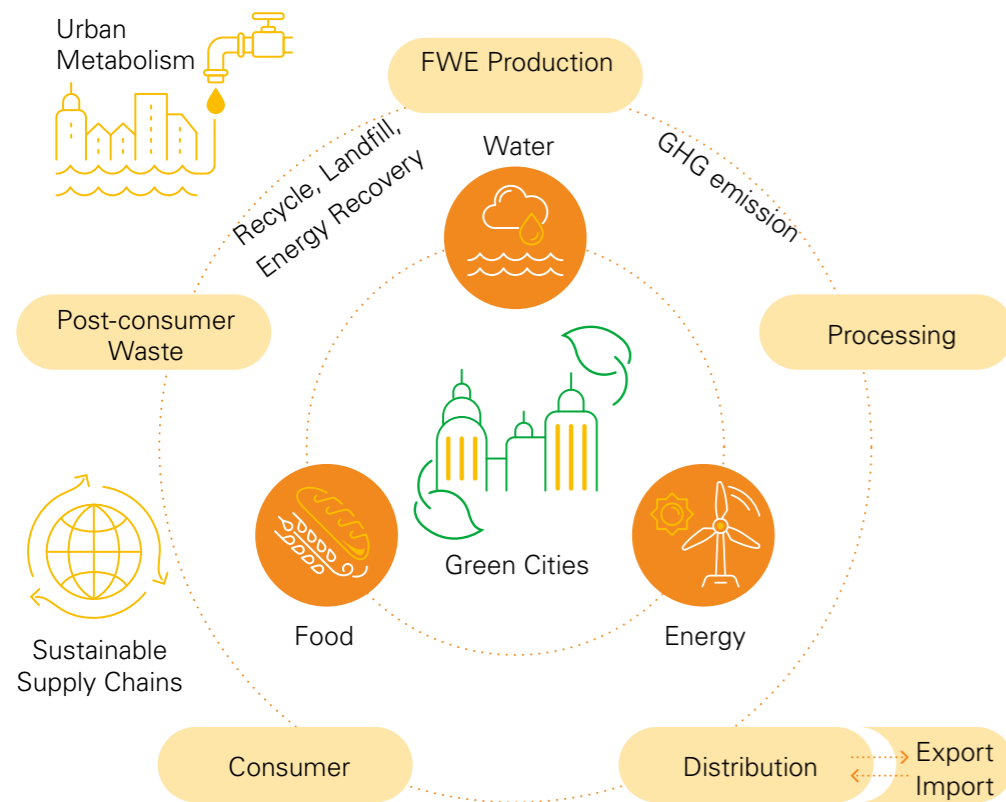
OmniEyes received 2019 CES Innovation Award Smart City. The founder of OmniEyes Co., Ltd. and the NTU Professors Chun-Ting Chou (middle), Ai-Chun Pang (left), and Shou-De Lin (right)

More than half of the global population is living in urban areas, and, according to a report published by the UN, two-thirds of the world's population will become urban residents by 2025, with megacities likely to grow. Rapid urbanization has made urban management more important now than in any other era in history. At NTU, we believe that with proper management, cities can transform from environmental culprits to playing a leading role for sustainable development, for instance in terms of providing adequate food, drinking water, energy, and quality of life.

## Smart Decision-Making Mechanism for Sustainable Development

At NTU we are at the forefront of technological innovation and integration, and are leading the development of sustainable cities in Taiwan. More than a decade ago, the very first eco-house demonstration project (in Taiwan and in China) was erected on our campus, next to Keelung road. Conceived by our faculty and built by experts in different fields, it consists of over 80% recyclable and reusable building materials. The building was designed with both safety and power saving in mind; it is earthquake-proof and energy-efficient, with heat and sound insulation. This project marked the beginning of the green building trend in Taiwan.

Water-Food-Energy Nexus (WFE Nexus)



At our College of Bioresources and Agriculture, faculty members have long engaged in research related to sustainable development. One recent project aimed to support the green economy and smart city transformation is the focus on the 'Water-Food-Energy Nexus (WFE Nexus),' a topic that is recognized as critical to sustainable development. The group developed indicators reflecting the sustainability and management of these three critical resource, and provided a decision making tool for government to apply to the development of smart, green cities. This innovative forecasting model is different from previous research, in that it relies on artificial intelligence, data mining, big data, material flow analysis and other advanced techniques to analyze WFE interconnections.

The model allows decision-makers to consider multiple aspects and increase supply efficiency in order to achieve a 'Smart Supply Chain'. For example, the decision-making model based on lifecycle assessment allows decision-makers to evaluate different environmental factors that affect agricultural cultivation systems. Another application is food security, where the model allows decision-makers to effectively allocate water and energy in order to optimize public resources and drive the development of green economy and smart city.

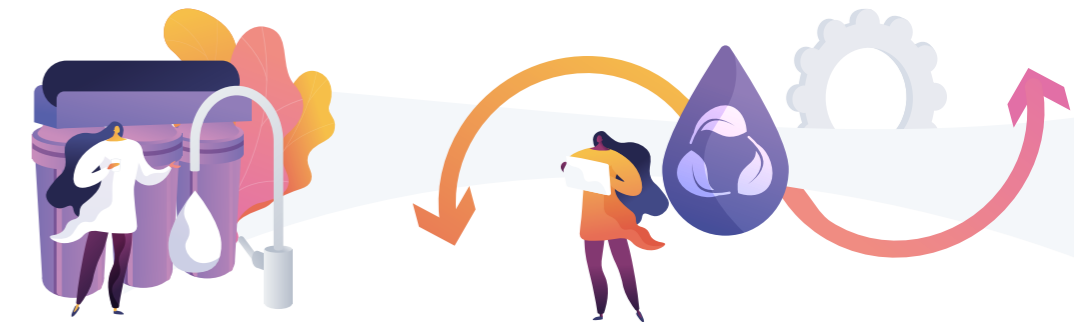
Research that Protects Citizens' Health and Safety

Water safety, air quality, and residential safety are key factors that determine the quality of life of urban residents. Due to geography and climatic conditions, Taiwan is one of the most affected countries in the world in terms of water shortages. Good water management is a priority, especially in the face of climate change. For the general public, it is important that resources not only meet demand, but also are safe for use. At NTU, we have a long history of developing new solutions through our research that help solve real life problems. We have thus consistently played a crucial role in assisting the government to improve well-being. Examples can be traced back to the 1950s, when Professor Gong-Bei Chen of the Department of Public Health discovered the relationship between blackfoot disease and contaminated groundwater, research which helped the government improve water safety. More recent examples include the work of scientists at our Graduate Institute of Environmental Engineering on the old lead pipes used for tap water, and research confirming the relationship between PM 2.5 and lung cancer among Taiwanese citizens from our College of Public Health. This important research urges the government to take health risks seriously and reexamine its related laws and systems.

At our College of Electrical Engineering and Computer Science, faculty and students are working on ways to improve the safety and convenience of urban life, and develop the infrastructure of smart cities for the next generation. In the domain of IoT and cloud computing, OmniEyes is developing a 'fog computing' technology that is embedded in hardware devices, and can better grasp user information. If such technology is applied to dashcams in the future, it will permit the collection and analysis of real-time street views, enable AR navigation, and make other smart tools available, such as smart logistics and dynamic maps. In the domain of face recognition technology, the CMLab formed by faculty members and students from the Department of Computer Science & Information Engineering won the championship in the CVPR Disguised Face Recognition Challenge. This team has developed deep learning algorithms to overcome the bottleneck of recognition failure when important facial features are disguised. The algorithms have an impressive

accuracy rate of more than 90%. If properly developed and deployed, be it to combat terrorism or help police identify suspects more quickly, then this technology will be important to help maintain urban security.

Urban life brings not only convenience but also many potential risks. From the perspective of our faculty and students, however, these very real challenges also open up multiple opportunities to serve society. As the leading university in Taiwan, our technological development and research achievements in agriculture, energy, wireless communications technologies, and smart epidemic prevention devices are widely recognized across sectors. With the power of innovation and transformation, talented professionals cultivated at NTU will continue to contribute to Taiwan's smart city development. Through extending our innovative efforts and technical expertise, we hope that Taiwan's experience in smart city management may become a role model in the future.



With passion and persistence, CMLab successfully turned academic achievements into competitive and valuable products in market.

# 4.6 Protecting Food Security by Agricultural Control



Globalization has not only accelerated the international flow of people, finances, and goods, but also brought in viruses and pests that spread at an unusually fast pace. The containment of viruses and pests is not just an important issue that the Taiwanese are concerned about; it is also a challenge that the NTU scientists are willing to take on as part of our social responsibility.

In recent years, NTU faculty and students have worked on projects from lychee stink bugs (*Tessaratoma papillosa* Drury), fall armyworms (*Spodoptera frugiperda*), to African swine fever to mitigate the effect of pests and disease and protect Taiwan's food security.

## Swift Response Team to Prevent Pests

The shield-shaped, reddish or orange lychee stinkbugs began to invade Taiwan in 2008 and gradually became a disaster. Lychee stink bugs infest lychee and longan trees, as well as other plants of the Sapindaceae species during spring and summer. Unless appropriate control strategies are adopted, these parasites will significantly reduce harvests, ruining six months of work for the farmer. Preventing lychee stink bugs, however, is a delicate task, as any overuse of pesticides would also kill the bees, thereby causing an even greater ecological crisis.

Instead, a research team from our Department of Entomology participated in efforts to identify environmental-friendly methods to control this pest. The team succeeded in breeding the bugs' natural enemy – *Anastatus japonicus*.



Protecting card for the eggs of *Anastatus japonicus*



This wasp is a parasite that infests the lychee stink bugs' eggs. An integrated prevention strategy was proposed together with various local agricultural organizations all around Taiwan, based on this biological approach. Further, after experimenting with different materials, the team found that soap water could be a relatively safe and accessible control method, as it effectively kills the parasite while reducing pesticide use. Thanks to these efforts, farmers have a new solution to solve a problem that has plagued them for a long time. Also, consumers are now able to enjoy fruits grown in way without that does not damage the ecosystem.

The outbreak of fall armyworms and African swine fever posed a huge threat to the crops of the *Poaceae* family, such as rice and corn, as well as to the health of pigs which are an important source of protein for humans. Our scientists were quick to respond to these national crises, dedicating their time to develop effective prevention strategies and solutions.

During the outbreak of fall armyworms, NTU's team worked around the clock, collaborating with several institutions on a project to assess the effectiveness of prevention methods for this pest. More than 60 field experiments of insecticide were conducted in Kinmen, where sightings of fall armyworms had been reported. This resulted in two new standards for insecticide efficacy for corn and sorghum, as well as 10 assessment reports. The team also provided training and materials: a total of 20 different prevention techniques were taught, 15 training sessions were organized, and 40 pieces of technology or materials were provided.

These results were not easy to achieve. This invasive pest has spread from the Americas to Africa and Asia, causing a decline in corn and sugar cane harvests by 20% to 30%. In some parts of Africa, up to 70% of crops have been destroyed by fall armyworms. Because the fall armyworm is highly mobile, it was critical to develop a prevention plan quickly. The distribution of hotspots had to be quickly assessed to guide effective application of insecticide and physical prevention measures. With the joint efforts of our scientific team and other pest prevention units, Taiwan was able to declare a first-phase victory against this pest, thus safeguarding its food security.

### Early Prevention Ensures Agricultural and Ecological Safety

Another recent threat to food security in Taiwan is the highly contagious African swine fever virus, which attacks pigs of all ages and species. With mortality rates up to 100%, no effective vaccines currently exist against this virus. Upon learning of cases of swine fever in neighboring countries, scientists at our College of Bioresources and Agriculture immediately organized relevant seminars and on-site visits. They invited international experts on African swine fever, as well as local experts on animal husbandry and veterinary science, to these events to ensure that crucial information



The International Symposium on Prevention and Control of African Swine Fever held by College of Bioresources and Agriculture, National Taiwan University on 7th to 8th of March, 2019

and effective prevention measures could be quickly adopted by the industry, government and academia. The knowledge thus disseminated served as a basis for formulating appropriate strategies.

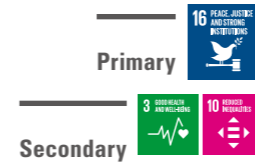
Pig farmers in Taiwan remember well the impact of the 1997 foot-and-mouth disease outbreak, when the nation's pig industry collapsed almost overnight. It was only after years of efforts that Taiwan was finally removed from the list of infected areas and was able to resume its pork exports. With this in mind, our scientists took swine fever prevention very seriously, and recognized its urgency for the industry. In the event of any loopholes, the farmers' efforts would all be in vain. To this end, our scientists also

conducted investigations and drills directly on site with the farmers in the rural areas of Yunlin County, known for its pig farming industry.

Over-exploitation and damage to the environment lead to ecological imbalance, which not only impacts the natural ecosystem, but also poses a challenge to the epidemic prevention for countries around the world. Closer human contact with wildlife, especially with species and ecosystems that used to be far from human society, increases the risk of spillover of novel infectious diseases. In this fast-moving, globalized society, our research and efforts at NTU to safeguard local agriculture while conserving the natural environment will continue, in line with a sustainable direction.

# 4.7

## Establishing an Inclusive Society



After peacefully ending its period of authoritarian rule, Taiwan is now recognized by the international community for its openness and inclusiveness, specifically its civil liberties, accessibility to information, and gender equality. Many scholars refer to Taiwan as a role model for direct democracy in Asia. The transition that has been achieved has not been without its difficulties, however. Driven by their ideals, members of NTU play a vital role in promoting important reforms of the justice, healthcare, and social systems, and help the underprivileged who have been ignored – longstanding efforts that bring hope the country.

### Embarking on a Path Rarely Taken by Others to Become Angels in the Lives of Others

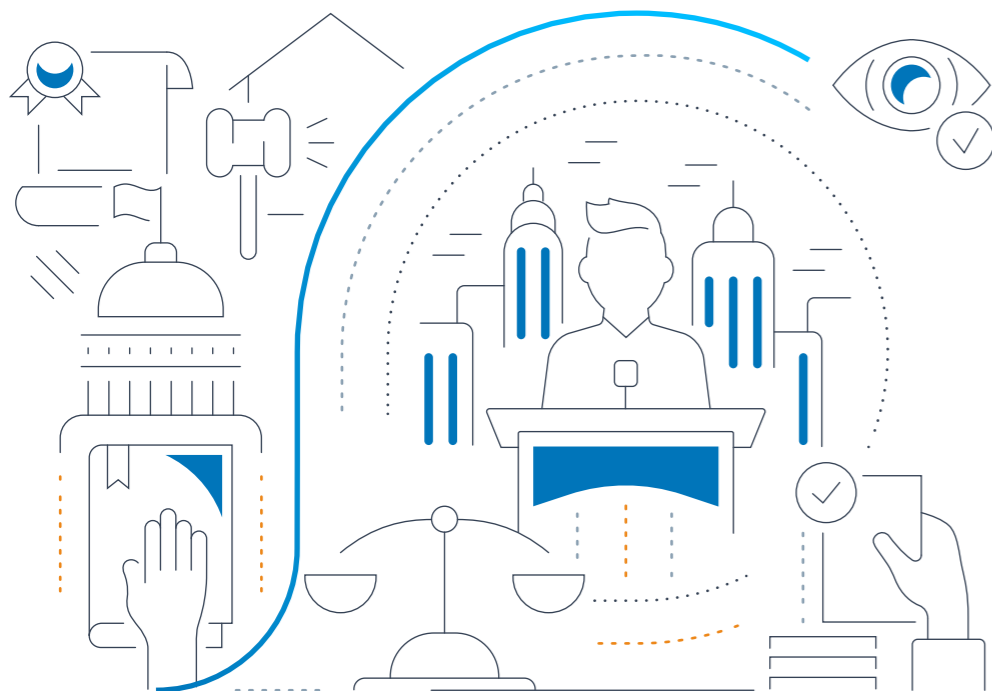
After more than ten years of hard work, the amendment to the Juvenile Delinquency Act was finally passed in 2019. This amendment removes the stigma of juvenile offenders and protect their rights, while securing important counseling resources, thus helping maintain equality in Taiwan’s society. Professor Mau-Sheng Lee at the College of Law played an important role in the successful amendment to the Juvenile Delinquency Act. He has been focusing on juvenile delinquency issues for many years and has created a juvenile correction school system. He led faculty and students of the College of Law to take part in defending inmates’ human rights and protecting juvenile delinquents, who are



Professor Mau-Sheng Lee

Topic-related research centers:

- Center for Population and Gender Studies
- Center for Indigenous Studies
- National Taiwan University Children and Family Research Center Sponsored by CTBC Charity Foundation



the most vulnerable and often subject to discrimination and violence. The school system provides them with valuable learning opportunities as they improve their academic ability and learn to make a living. This has allowed young people who lost their way to return to society and be accepted by the public.

Few people in the judiciary have chosen the same path as Professor Mau-Sheng Lee. Meanwhile, another of NTU members, this time of the College of Medicine, has also chosen a path that is rarely taken by others, a decision that has greatly benefited society.

Professor Fung-Rong Hu at the College of Medicine is an authority in ophthalmology, a field to which she has dedicated herself for decades. While she was an emergency medicine resident, she noticed that many patients' corneas were injured due to a variety of accidents and illnesses and in need of a transplant. However, at that time, the success of corneal transplants was considered to depend mostly on luck because organ donors in Taiwan were few, and the standards and procedures insufficient. Professor Hu began actively promoting organ donation, which eventually led to the establishment of the National Eye Bank of Taiwan. She also established comprehensive standard operating procedures and systems. Over the years, she worked with other colleagues at the college to improve organ harvesting and transplanting technologies. In this way, the trust



Professor Fung-Rong Hu

of family members was secured, resulting in organ donations that have helped many patients regain their eyesight.

### Lighting up all Corners of Society, Promoting System Reform

As society evolves, it is essential to amend the law to keep it applicable and ensure that the underprivileged are adequately protected. Speaking up for the weak is a civic duty that our faculty embraces. For many years, Associate Professor Shu-Chiung Liu at the College of Social Science has been actively engaged in the formulation of policies related to domestic violence and child protection by providing social services on the front line. After reviewing many serious child abuse cases, she began to advocate for early interventions by the authorities in major child abuse cases, and retroactive analysis of the cause of death of children under the age of six. In 2019, her arguments were incorporated into the amendment of the Protection of Children and Youth Welfare and Rights Act. Following this amendment, childcare centers are now required to install surveillance equipment to protect against sexual predators and abusive babysitters. Such changes ensure the physical and psychological safety of Taiwan's future generations.

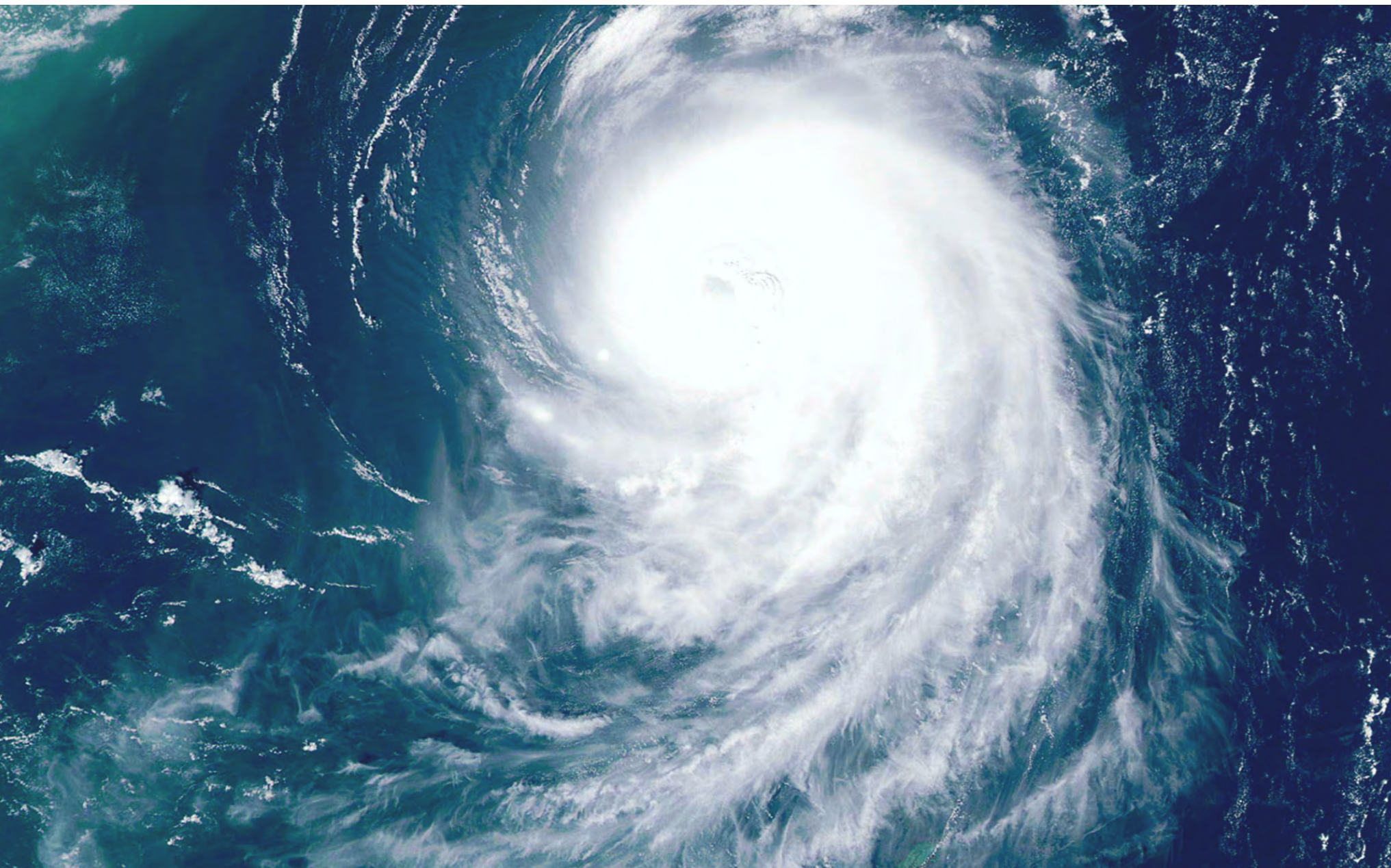


Associate Professor Shu-Chiung Liu

Citizen participation is the foundation of a democratic society; and a sustainable society also requires an inclusive decision-making system that reflects public opinion. Our faculty members are leading the way in many of these areas. For example, Professor Tay-Sheng Wang's research on the history of Taiwan's legislative system, and the concerns raised by faculty and students at the Institute of Journalism about the influence of fake news on the election process, have helped optimize Taiwan's public opinion system. Further, the Hu Fu Center for East Asia Democratic Studies of our College of Social Sciences is an important center for global democracy. This center has followed and investigated democratic issues for decades. Through extensive collection of multinational empirical data, and cooperation of international networks, the center has been exploring the global phenomenon of democratic decline, investigating specifically why the confidence in the democratic system is fading in major Asian countries. The work of the center helps solidify the foundation of a political system that can support sustainable development in Taiwan.

Through local efforts and international cooperation, our faculty have been instrumental in bringing sustainability thinking into Taiwan. By pinpointing key issues based on their practical work and empirical research, they have led several reforms – making the system fair and inclusive enough to continue to grow and mature in the future.

# 4.8 Mitigating the Impacts of Natural Disasters via Cutting-Edge Technology



Taiwan is located in the Circum-Pacific seismic belt, with many active faults and frequent typhoons. Due to the effects of climate change, extreme rainfall events that used to occur once in a century are now becoming more frequent, exacerbating the threat of landslides and debris flows. The prevention and mitigation of natural disasters such as earthquakes and flooding have therefore become a priority for the twenty-first century.

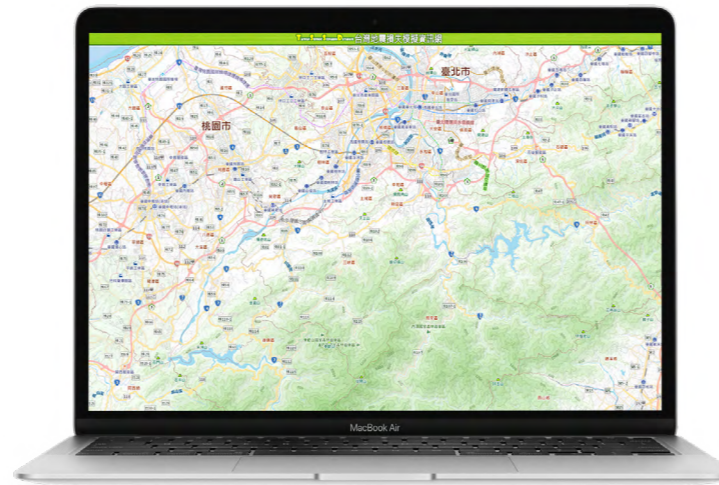
## Earthquake Early Warning Systems: gain valuable response time

For most natural disasters, potential losses to life and property can be mitigated through early warning and prevention. After the earthquake disaster of September 21<sup>st</sup>, 1999, building safety inspections needed to be conducted all across Taiwan. Our faculty and students with expertise in civil engineering and geology were quick to respond to this urgency, working closely with the National Center for Research on Earthquake Engineering to help the government improve the earthquake resistance standards and test specifications. Moreover, they proposed a more elaborate system for earthquake damage and liquefaction assessment, and conducted a complete review and classification of the earthquake risk tolerance for all areas in Taiwan. The team also developed new disaster prevention technologies. One of the most significant contributions was to assist the public high (vocational) schools around Taiwan with assessments of the earthquake resistance and reinforcement needs of old buildings. In the numerous earthquakes that have since occurred, the effect of these reinforcements has become apparent. The stronger earthquake resistance of these buildings has improved safety for 2.65 million teachers and students around Taiwan.

**2.65** The stronger earthquake resistance of these buildings has improved safety for **million** teachers and students around Taiwan.

Our school has also developed technology to monitor the status of bridges with high traffic volumes. This optical fiber monitoring system will emit a warning whenever poor conditions are recorded, prompting an early response from management that can prevent a disaster from happening. When bridges in remote areas are damaged, a lightweight bridge developed by NTU out of composite materials can be assembled by residents in short time. In this way, access to affected areas can be quickly restored, and disaster relief provided more efficiently.

In the event of an earthquake, Taiwan's citizens will immediately receive an emergency alert by text message. This warning system, which was developed by Professor Wu, Yih-Min at our Department of Geosciences, analyzes the properties of a P-wave within three seconds after detecting the wave so that it can issue an alert to citizens more than 10 seconds before the S-wave, which is most likely to cause damage arrives. This early warning system is accurate and fast, giving people valuable seconds to escape to safety. Because it is also much cheaper to manufacture



Taiwan Earthquake Loss Estimation System (TELES)

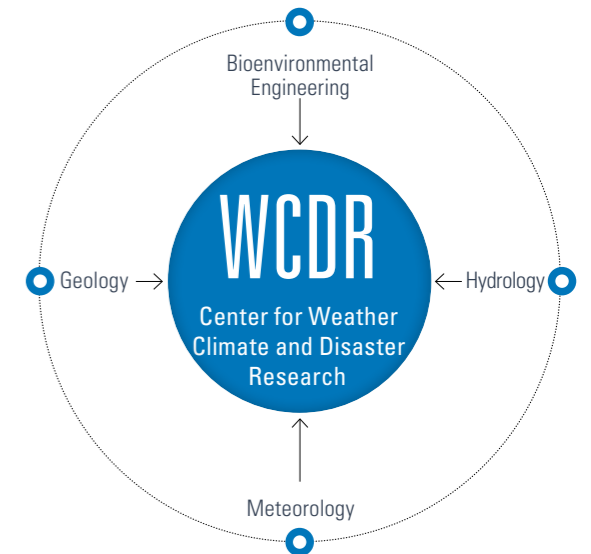
than previous seismographs, it could be rapidly rolled out to several hundred elementary and junior high schools, ensuring better protection of our country's younger generation. Moreover, this system has been successfully introduced in other earthquake-threatened countries, such as Indonesia, India, Vietnam, Nepal, and Mexico. The research and efforts of Professor Wu, Yih-Min are a good example of how crucial systems developed by our scientists also benefit people beyond Taiwan's borders.

### After the Flood: Rapid Mobilization and Improved Ability to Provide Relief

Another critical area is flood disaster prevention. Also here, our faculty and students are actively involved in key activities ranging from early warning and response during the disaster, to raising the awareness of, and capability for, disaster prevention among citizens more generally. Our Center for Weather Climate and Disaster Research comprises experts in meteorology, hydrology, bioenvironmental engineering, and geology etc. This center helped New Taipei City and Keelung City establish an extreme weather and flood monitoring & warning system. Other projects include combining advanced deep learning with the analysis of radar data, which allows for closer monitoring of rainfall data in hydrologically sensitive areas. The improvement of flood models increases the accuracy of flood warnings and provides disaster prevention units with valuable information for them to rapidly formulate response strategies.

From past experiences outside of Taiwan, we know that self-help and mutual support account for the largest share of the relief effort (90%) in the event of a disaster. In other words, even if flood warnings are effective, people in the affected area still need to be able to take own measures to protect themselves. At NTU, we actively participate in the community-level disaster relief preparations around the country, as well as in the training of disaster relief officers. Our experts provide citizens with the most up-to-date knowledge in disaster prevention, operate independent disaster relief systems, and evaluate the safety of shelters. These efforts contribute to the resilience and ability of local communities to mitigate impact, helping them recover more quickly. A plan for how to improve the disaster relief ability in the country proposed by our experts is another example of how we help make sure that the best disaster response capacity is in place.

After improving the ability to respond to disasters, NTU's team also contributed to disaster prevention infrastructure around Taiwan, such as seismic isolation technology for buildings and equipment, or detention ponds in communities at risk. Our work and efforts in these areas help protect lives and property. As climate change continues to impact the world, we hope to leverage our technologies and expertise in these domains even further, and help strengthen the capacity to prevent and withstand natural disasters throughout the world.



NTU Professor Yih-Min Wu (first from right) received the 2019 Executive Yuan Award for Outstanding Science & Technology Contribution

# 4.9 Improving Local Healthcare for the Elderly



One day, the medical team at NTU Hospital Hsin-Chu Branch received an encouraging telephone call from an elderly woman, who had previously been hospitalized for a urinary tract infection. The woman wanted to express her gratitude for the fact that her hypertension, diabetes, and urinary symptoms could be followed up by the family physician in her community. The medical care thus provided meant that she no longer had to make the arduous journey to the hospital—a journey made more difficult by her limited mobility.

In Taiwan, elderly people who are economically disadvantaged and suffer from multiple chronic illnesses often need to make frequent visits to the hospital. Yet, many counties and cities across Taiwan still lack convenient public transportation systems, which means that elderly people must take several trains and buses in order to get to the hospital. Moreover, once they arrive, they often need to visit several hospital departments and see different specialists, who will prescribe medications for their various ailments. This practice leads to the risk of over-medication. With Taiwan turning into an aging society, the number of chronically ill patients is increasing day by day. We must therefore help this group of elderly enjoy as good quality of life in their old age as possible.



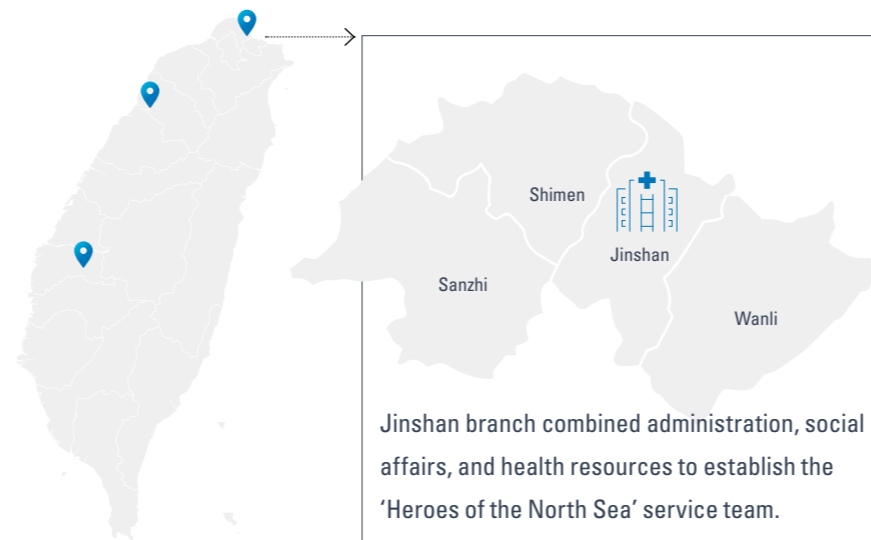
NTU Hospital Yulin Branch offers Integrated Gerontology Medicine Clinic One-Stop Service Area.

### Integrated Healthcare Services Benefit the Elderly in Rural Areas

Over the years, NTU has established hospital branches in several rural areas such as Jinshan, Yunlin, and Zhudong. By combining the expertise of our university hospital with community resources, this helps address the limited healthcare resources in these areas, where elderly care is the most critical aspect of healthcare. In the current healthcare system, patients with multiple chronic illnesses often lack access to continuous care, and must therefore make repeated trips to the hospital. In response to this, we have established one-stop medical services that integrate different specialties, with geriatricians supported by physicians from our departments of Physical Medicine and Rehabilitation, Neurology, and Psychiatry. After patients are discharged from the hospital, a mechanism is in place to help hospital physicians to coordinate follow-up treatments with local clinics. Case managers play an important role in this long-term care system, as they follow up on and care for the physical and mental health of patients after they return home. This collaborative model thus provides complete and continuous care for the elderly.

At our Yunlin Branch, elderly patients do not need to wait in line to see the doctor, have their prescriptions filled, or to pay at the cashier. Volunteers are at hand to assist with wheelchairs and canes, and experienced pharmacists provide professional consultation on the use of medication. These efforts ensure that elderly patients are well taken care of. We have also started going into local communities and visiting patients in their homes, in order

NTU has established hospital branches in several rural areas such as Jinshan, Yunlin, and Zhudong.



to further improve the quality and access of healthcare for these groups. Our Jinshan branch services mainly the Wanli, Jinshan, Shimen, and Sanzhi districts, where the problem of an aging population is the most severe. In these districts, most elderly are in the care of their children. Here, we combined administration, social affairs, and health resources to establish the 'Heroes of the North Sea' service team. This team recruits and trains professionals in long-term care to care for and assist both caretakers and those being taken care of, and further promotes health knowledge among the general public. The team brings health education into families to improve the quality of long-term care and increase the value of services.

### Community Engagement around Preventive Health

Another important healthcare project is NICE, which is based on the belief that 'Prevention is better than cure'. This project brings together physicians and social worker. It is active in the Wanhua and Nangang districts in Taipei City, where there are important communities of elderly and disadvantaged people. The NICE team provides routine healthcare and checkups for elderly people in these communities, as well as activities, games, and muscular endurance training. The purpose of such activities is to increase their mental capacity, prevent disability, and delay aging.

The NICE interdisciplinary team consists of members with specialties in public health, social science, and medicine, as well as personnel from the Bei-Hu Branch of NTU Hospital. The team has built strong local connections and trained volunteers and community development planners. The latter help care for the physical health of residents, and bring residents together to work out long-term development goals for the community. The trainees include many of our current students, who choose to gain valuable practical community experience, rather than stay only in the classroom. The experience thus gained through NICE has awakened their ambition to serve society in the future.

Working actively towards WHO's vision for healthy aging is not just about helping people live longer lives, but also making sure people can lead healthier lives. Topics around psychology, everyday life, care, disease, and well-being in an aging society are issues that all people must face together. In line with our concern for the future of geriatric care, we established a Research Center for Geriatrics and Gerontology in Yunlin. Here, we draw on our medical expertise to integrate internal and external resources and conduct research, develop healthcare and long-term care services, as well as strengthen the ability of local communities to care for the various aspects of public health. We strongly believe that people should be able to spend their days in joy and peace no matter where they live, and are actively committed to this vision.



The senior health and wellbeing seminar held by Yulin Branch.



The press conference on the establishment of the "Heroes of the North Sea" service team held by Jinshan Branch.

# 4.10

## Integrating Research Capabilities for a Better Future



The year of 2019 saw many natural disasters happening around the world. Australia was ravaged by forest fires of an unprecedented scale, with great destruction to the local ecology. The Victoria Falls, one of the three largest waterfalls in the world, was reduced to a trickle in what was called the worst drought of the century. And Italy’s Venice suffered the worst flooding in half a century, with extensive damage to property and cultural heritage.

As the threat of climate change draws closer, extreme climate conditions, such as a drought occurring in one place while flooding occurs in another, will only become more frequent. As a member of the global community, Taiwan is on its way to realize its goals of energy transition and GHG reductions. At NTU, we are mobilizing our resources in research to contribute to the planning of relevant policies, in order to help promote this important agenda.

### Rigorous Policy Research to Pragmatically Gain Public Trust

Sustainable Energy is a complex challenge, and needs to be well understood for any energy transition to be successful. The public can easily be misled by the vast amounts of information available on the internet – information that is often incomplete and piecemeal, and does not help people see the whole picture. At NTU, we are conducting rigorous policy research in order to shed light on the multiple and intricate aspects of the issue. Our Research Center for Future Earth brings leading scholars to Taiwan to share the latest research in sustainable energy-related fields with think tanks in our country. Likewise, Taiwan’s own research on climate change and disaster prevention is shared with other academic institutions around the world, so that Taiwan’s experience in this regard can contribute to the global agenda.

Another important center working on policy research in this domain is the Risk Society and Policy Research Center, established by our College of Social Sciences. A successful energy transition requires not only good planning of electricity demand and supply, but also the development of related industry, financial instruments, and even regional planning. This center seeks to bridge the gap between academics, practitioners and policy-makers, by



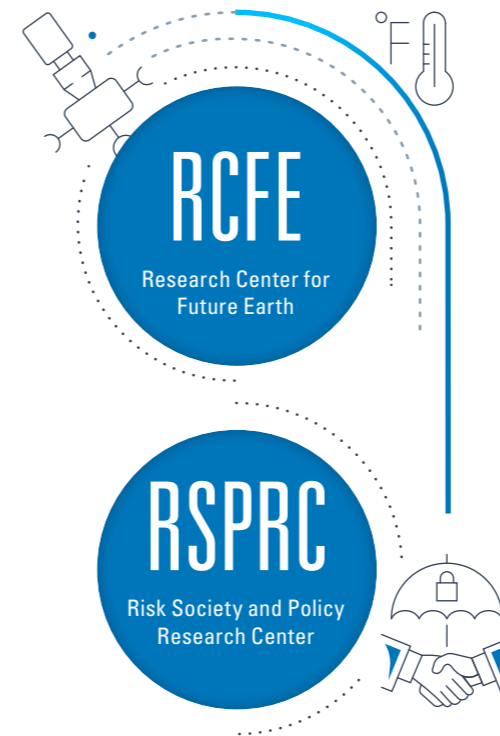


The Forum on “Taiwan in Transformation: Initiating a Long-Term Energy Transition” held by the NTU Risk Society and Policy Research Center on 12<sup>th</sup> of November, 2019.

making scientific research more accessible to the general public. Interdisciplinary discussions are facilitated with various stakeholders around the multiple impacts caused by such a transition. This allows public discussions to be initiated with the correct knowledge basis, and helps build trust between the government, academia and the private sector. In late 2019, following three years of researching the issue, the Risk Society and Policy Research Center published the whitepaper “Taiwan in Transformation: Initiating a Long-Term Energy Transition”, which proposes a number of policies, including prioritizing energy conservation in the industry, promoting green capital, and developing participatory governance that will help ensure that the energy transition in Taiwan is successfully accomplished.

### Development of Cutting-edge Technology for Clean Energy and Pollution Reduction

Besides recommending new policy to facilitate the transition to a more sustainable future, we are also driving the development of new technology. As one example, the iAuto team formed by faculty members and students of our Department of Mechanical Engineering have been working on self-driving car technology for several years, and the development of both solar-powered and hybrid vehicles. Their design of a hybrid driverless bus was awarded the second prize in the 2019 Dubai World Challenge for Self-Driving Transport. This environmental-friendly bus of the future is able to handle challenges such as adapting to different traffic conditions, and transporting supplies in



extreme environments like deserts. If promoted more extensively, such innovations will greatly contribute to the reduction of air pollution and GHG emissions.

In effect, for the energy transition to be successful, it must be supported by more green technologies. Our Water Innovation, Low-Carbon and Environmental Sustainability Research Center is dedicated to high-energy-efficient water technologies like membrane separation and environmental photochemistry, as well as carbon reduction technologies including carbon capture, storage and reuse. The latter may become a game changer in the development of sustainable energy. If successfully developed, this has the potential to significantly reduce the environmental impact of air pollution generated by conventional coal-fired power plants and provide clean and efficient energy supply.

To build a sustainable future, we need to step out of our comfort zone, and start transforming both policies and values so that they align with this future. At NTU, we are proud to have initiated the first steps of change towards better production systems, ecological health, and sustainable lifestyles for future generations.



The iAuto team participated in the 2019 Dubai World Challenge for Self-Driving Transport.

# 05

## Campus Sustainability

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# 5.1

## Teaching and Research

In recent years, with the rise of issues such as climate change, environmental protection, and social responsibility, we have leveraged our extensive teaching resources in a wide range of disciplines to create opportunities for cross-disciplinary learning around emerging sustainability challenges. Programs include the “International Degree Program in Climate Change and Sustainable Development,” the “Offshore Wind Energy Program” and the “Ph.D. Program of Green Materials and Precision Devices”. We have also established multiple interdisciplinary research centers, such as the “Global Change Research Center”, the “Center for Weather Climate and Disaster Research”, the “Research Center of Climate Change and Sustainable Development” and the “Risk Society and Policy Research Center”. These centers adopt innovative teaching methods and draw on multiple disciplines to guide students into the sustainability domain, with the aim of cultivating the kinds of talents that society needs for the future. These centers also engage in system innovation and policy research that aims to tackle the major problems faced domestically, as all countries strive to respond to the development challenges of our times.

### HIGHLIGHTS

In 2019, we held several **“Future University”** workshops, to discuss what a university will look like in the future.



More than **950** courses on sustainability.



Participated more than **200** research projects in sustainability.



NTU’s articles on SDGs that were published during 2016~2019<sup>1</sup>

	1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMER AND PRODUCTION PATTERNS	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Relevant Publication	8	87	7,572	10	22	138	709	83	48	31	209	126	340	184	156	81
FWCI <sup>2</sup>	0.86	1.96	2.08	0.9	17.22	1.81	1.36	1.4	1.1	0.81	1.85	1.8	1.6	1.04	1.41	0.84
Views Count	131	4,789	153,521	155	5,184	5,348	20,748	2,743	1,336	545	7,269	8,438	12,248	4,613	6,028	1,296
Citation Count	29	1,229	78,705	8	1,742	1,469	6,950	446	260	59	1,617	1,673	3,523	1,082	1,230	180
Percentage of Publications in Taiwan	25%	26%	22%	4%	15%	35%	15%	10%	8%	14%	16%	12%	27%	24%	29%	12%

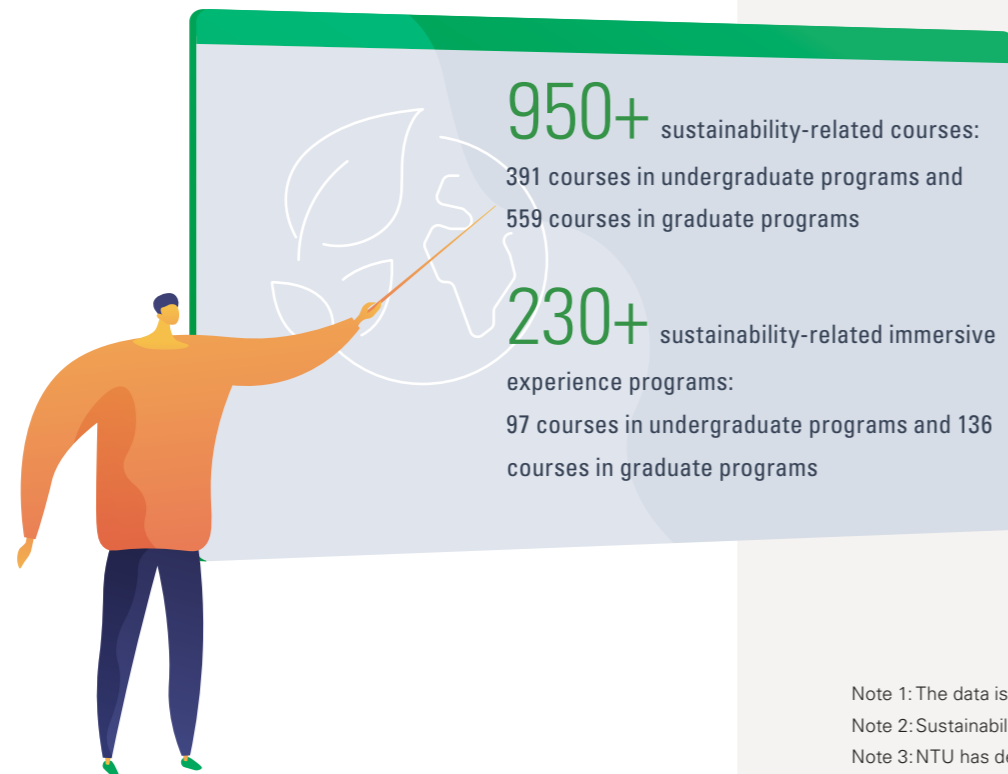
Note 1: Data retrieved from Elsevier SciVal.

Note 2: The Field-Weighted Citation Impact (FWCI) compares the actual number of citations received by a publication with the expected number of citations for a publication of the same publication year, subject area, and type. A value above 1 indicates that the citation frequency is above the global average.

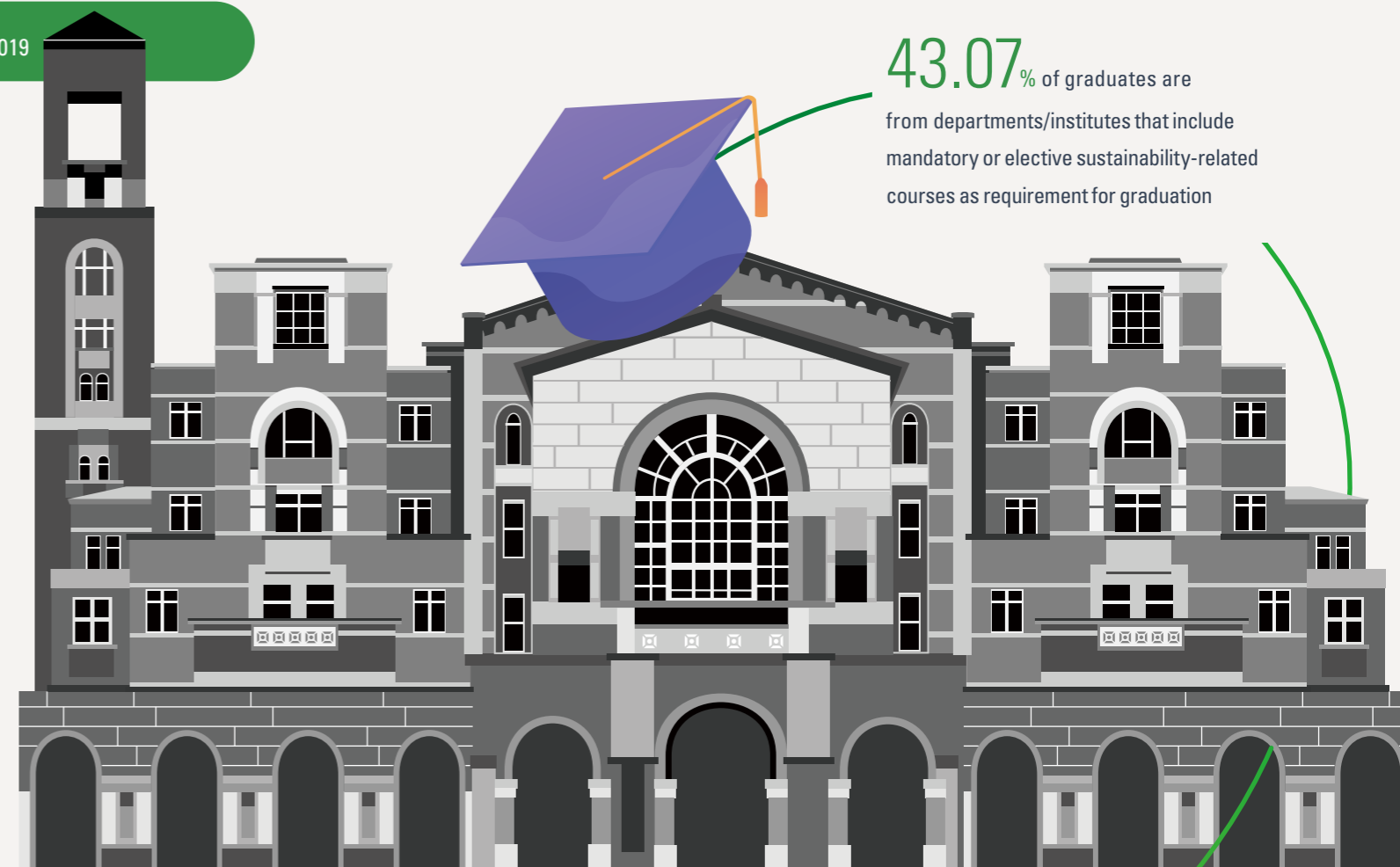
## I. Sustainability Courses

Over the years, we have made many efforts to integrate the various domains of sustainability – including climate change, renewable energy, social responsibility, human rights, and green economy – into our curriculum. Besides the respective specialties of our various departments and institutes, we bring faculty and resources from different fields and disciplines together around key social issues and pedagogical practice, in order to bridge the gap between theory and practice and establish a basis for cultivating future leaders in the field of sustainability. As an example, courses at our D-School allow students to discuss issues such as urban traffic with the guidance of academic experts, as well as mentors from the relevant government departments and the mechanical design industry. These mentors help shed light on a particular issue from their various perspectives and disciplines, and facilitate brainstorming sessions with students in view of identifying innovative solutions.

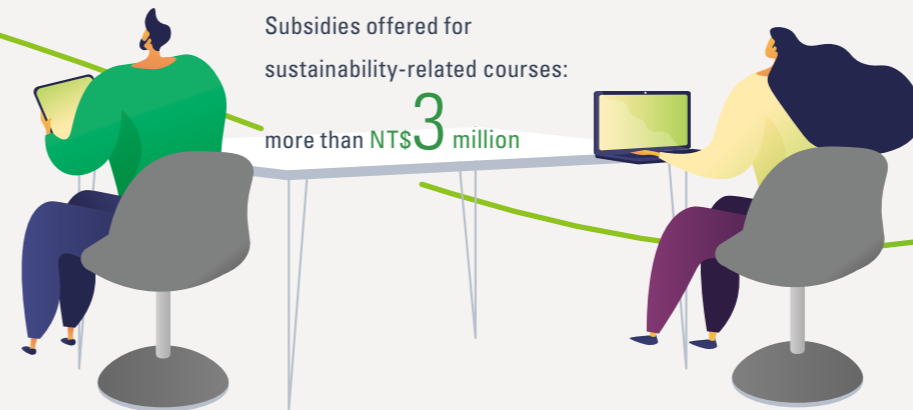
Many of our departments/institutes offer sustainability-related compulsory and elective courses. In 2019, a total of 950 sustainability-related courses were offered by 141 academic units from 11 colleges and some centers and credit programs. In 2019, a total of 3,418 students completed such courses. We will continue to offer sustainability-related courses based on different disciplines and perspectives, support relevant activities, and increase learning opportunities for students, in hopes of cultivating more leaders in this domain in the future.



Sustainability courses in 2019



**43.07%** of graduates are  
from departments/institutes that include  
mandatory or elective sustainability-related  
courses as requirement for graduation



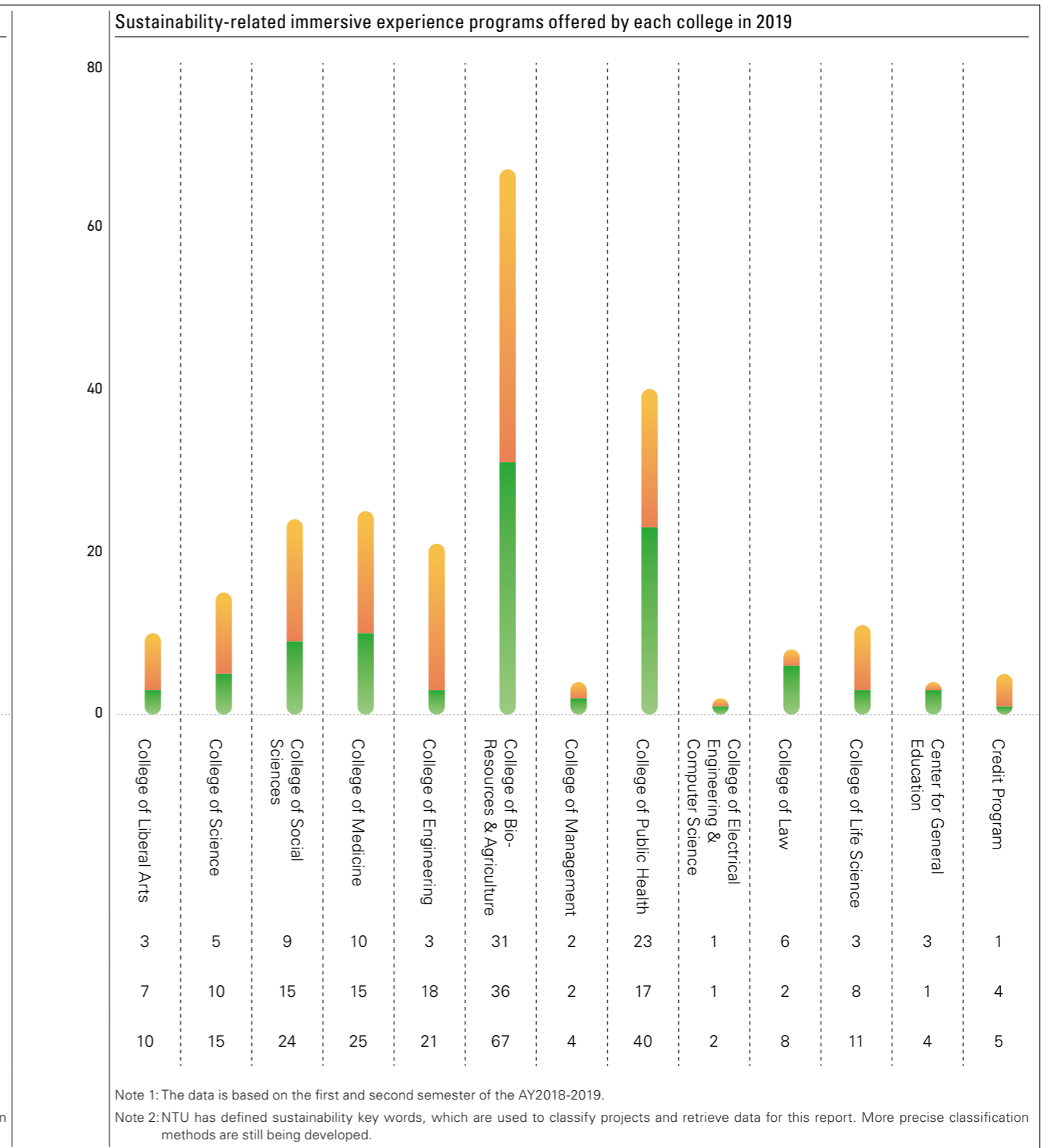
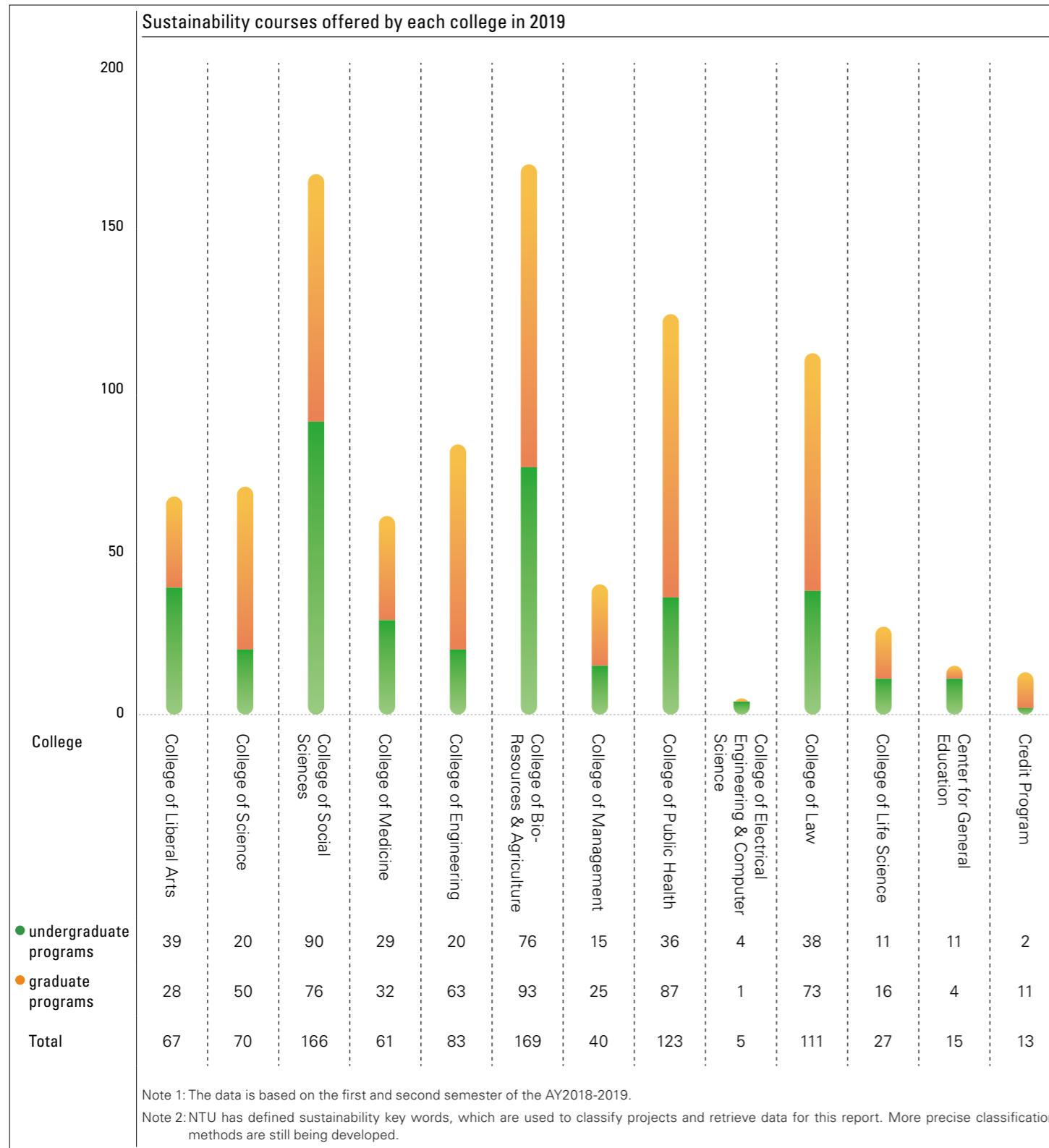
Subsidies offered for  
sustainability-related courses:  
more than NT\$ **3 million**

**55.08%**  
of teaching units offered  
sustainability-related courses

Note 1: The data is based on the first and second semester of the AY2018-2019.

Note 2: Sustainability-related immersive experience programs provide practical learning opportunities such as experiments, internships, and practice.

Note 3: NTU has defined sustainability key words, which are used to classify projects and retrieve data for this report. More precise classification methods are still being developed.



Sustainability-related research projects

200+ sustainability-related research projects

182 researchers engaged in sustainability-related research projects

1,859 open access journal papers

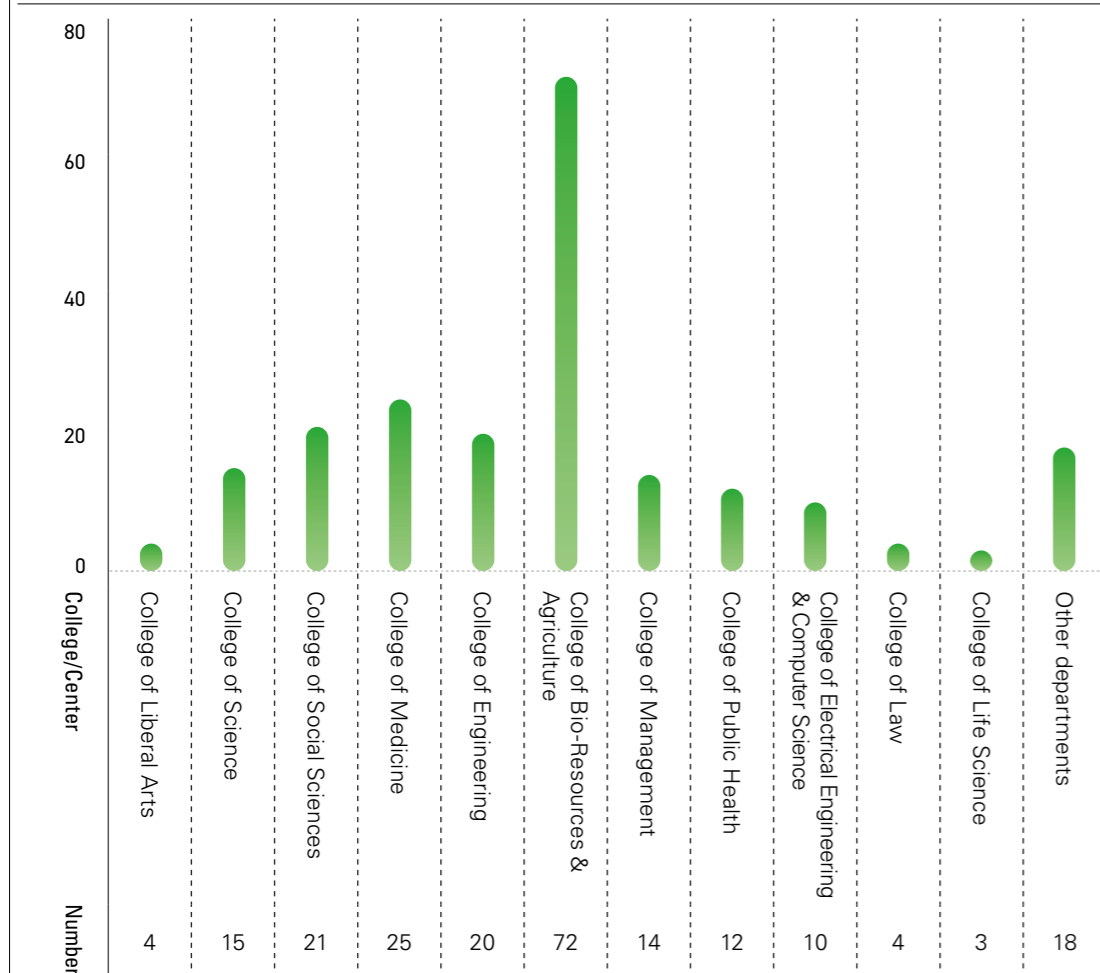
## II. Sustainability Research

At NTU, we strive to contribute to society through excellent and solid research that addresses challenges both domestically and abroad. We encourage faculty and students to conduct more international research and to assist Taiwan's diplomatic allies in resolving sustainable development issues. We also work more deeply with local communities across Taiwan, and help them address challenges related to economic and social development. Our research ranges from basic research to practical application on topics such as climate change, disaster prevention, public health, ecological conservation, social welfare, citizen participation, and equality for the underprivileged.

As a comprehensive university, we cover the largest number of subject areas among all research institutions in Taiwan. Our faculty have long worked with sustainable development issues that are crucial to the next generation, such as food safety, food and agricultural education, long-term care, smart city, sustainable environment, and energy transition. In 2019, a total of 218 sustainability-related research projects were organized by our colleges and research centers, and a total of 182 faculty members, researchers, and project-based staff participated in the projects. Our Office of Research and Development encourages faculty and students to conduct forward-looking, innovative research and to deepen the foundation of key issues. This office offers a number of individual and group project subsidies, such as the 'Subsidy Project for Doctoral Students to Conduct Research Abroad' and the 'Jade Picking Project'.

In 2019, our colleges published a total of 5,096 journal papers in journals listed in the Science Citation Index (SCI), the Social Science Citation Index (SSCI), and the Arts & Humanities Citation Index (A&HCI). To increase the accessibility of research results, we published 1,859 open access journal papers. Our College of Life Science, College of Medicine, and College of Public Health accounted for most of the open-access papers. We will continue to support the policies of our government, and utilize our research and expertise to help Taiwan navigate the challenges of sustainability.

Number of sustainability-related research projects



Note: NTU has defined sustainability key words, which are used to classify projects and retrieve data for this report. More precise classification methods are still being developed.

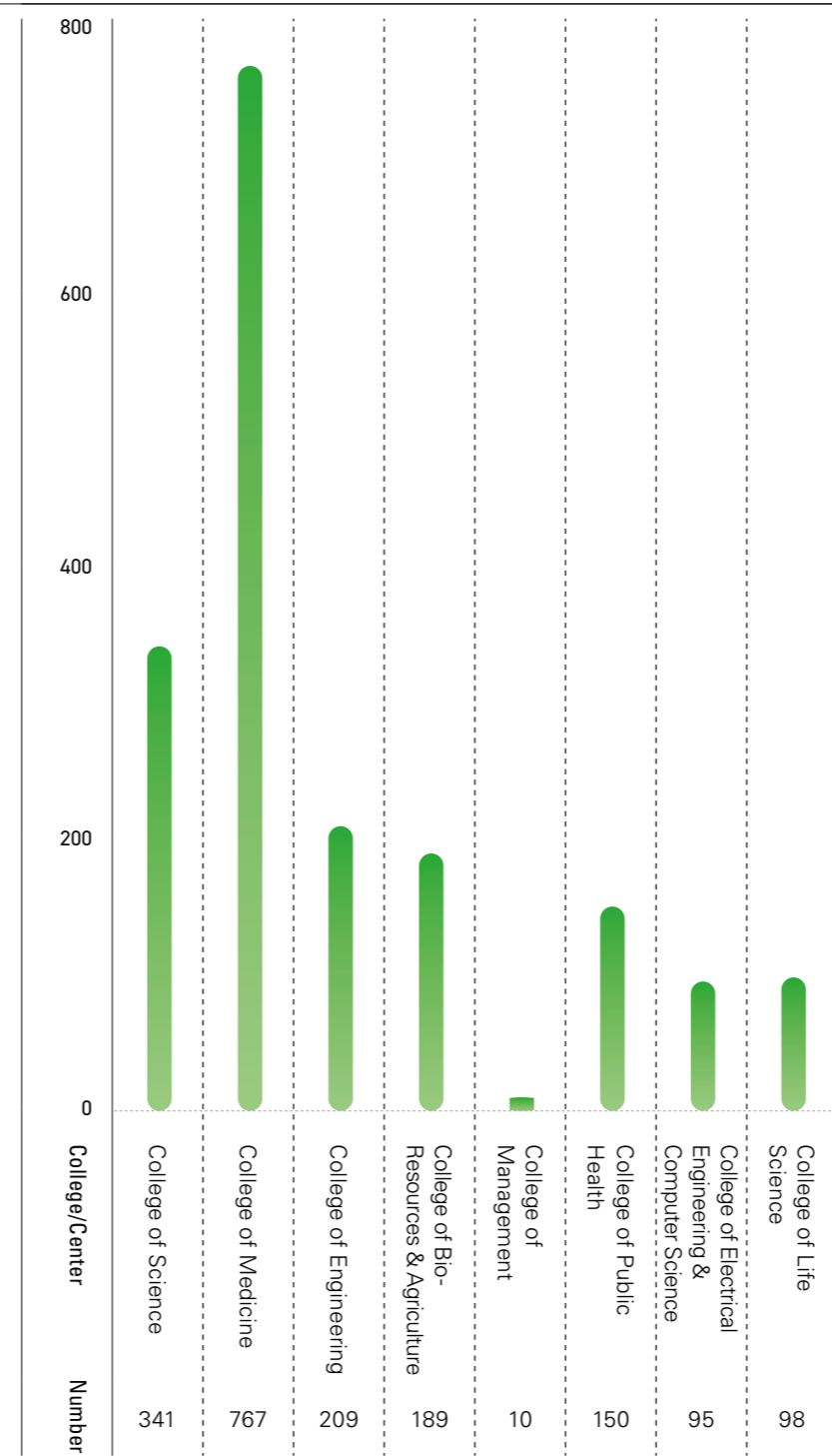
Number of journal papers published in 2019

SCI (Science citation index Expanded)	4,869
SSCI (Social science citation index)	645
A&HCI (Arts & Humanities Citation Index)	40
<b>Total</b>	<b>5,096</b>

Note 1: The number of journals published by the National Taiwan University (articles and reviews) as of December 31<sup>st</sup>, 2019, was retrieved from the Web of Science on April 9<sup>th</sup>, 2020.

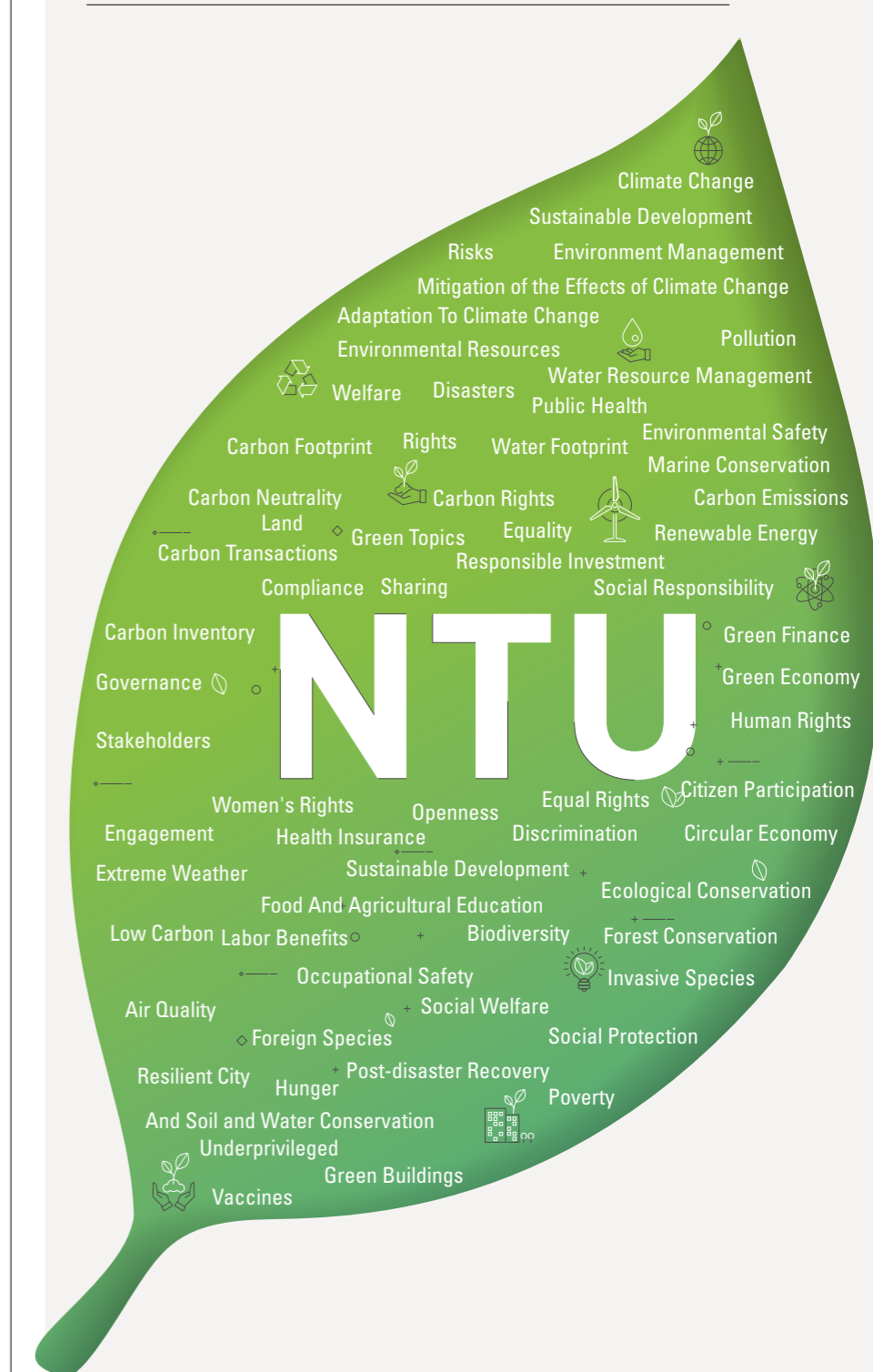
Note 2: Double counting has been eliminated resulting in a total of 5,096 journal papers published by the NTU in 2019 (i.e., journals categorized by field of research, which appear on multiple lists of SCI, SSCI, and A&HCI on the Web of Science website).

Number of open access journal papers published in 2019



Source: SCIVAL database updated on February 4<sup>th</sup>, 2020, data retrieved on February 13<sup>th</sup>, 2020.

Sustainability-related keywords used for the classification of courses and research





# 5.2

## Campus and Public Engagement

### HIGHLIGHTS

**70.13%** of new faculty completed sustainability-related courses in 2019.



NTU students organized a total of **74** volunteer projects in 2019. **2,043** students volunteered and **10,908** less-privileged people benefited from these projects.



Our School of Professional Education & Continuing Studies offered **214** courses and issued **2,260** certificates in 2019.



We have established a Center for Sustainable Development, and a full-time fundraising team to promote USR.





## I. Campus Engagement

Campus is not only a place for teaching, research, and learning, but also a place where faculty, staff, and students work, live, think, and grow. At NTU, we actively cultivate a culture of sustainability by incorporating sustainability elements into training courses for new faculty, staff, and students. Further, we support student clubs and campus activities, which aim to spread awareness of the importance of a sustainable environment and an equitable society to every part of our campus.

### (I) Nurturing sustainability talent

#### 1. NTU Orientation Camp

The Orientation Camp at our campus held yearly from August to September is composed of a variety of student-led activities aimed at welcoming and helping incoming freshmen settle into their new environment as they transition from high school to college life. Nearly 3,000 freshmen participated in the Orientation Camp for the 2019 academic year. Besides learning how to utilize the campus resources and develop the right attitude to learning, freshmen were taught about gender equality and the importance of respecting diversity.

A total of **2,750** freshmen participated in the NTU Orientation Camp in 2019, accounting for **61.21%** of all freshmen that year



#### 2019 NTU Orientation Camp and sustainability courses for freshmen



The four sustainability-related courses "Gender Friendly Campus" totaled **24** hours, accounting for **31.17%** of freshmen orientation course hours

Freshmen orientation courses totaled **77** hours

2019 faculty and staff training records



452 people  
completed sustainability-related courses<sup>3</sup>

29 were offered to  
staff members<sup>2</sup>

70.13% of new instructors  
completed sustainability-related courses<sup>1</sup>

2. Faculty and staff training and development programs

Our people are the key to ensure that the teaching and research, other campus activities and the management of the school can be carried out well. While our faculty members are responsible for teaching and research, staff members take care of administrative and general affairs. We provide a variety of training and development resources based on the different role requirements and career development needs of our employees. We also integrate sustainability concepts into these training programs, in order to help faculty and staff promote a culture of sustainability on campus when carrying out their duties.

Take the new faculty orientation workshop as an example. During this training, new faculty will learn about our governance structure and administrative guidelines, new teaching and research trends, and how to use innovative teaching platforms. They are also introduced to the nature and ecology of our forest campus. The orientation workshop is designed to familiarize new faculty with the university, help them adjust to a career in teaching and build relationships with peers, encourage them to bring sustainability concepts into the classroom and use innovative teaching methods – thus contributing to a culture that takes sustainability into account and values high-quality teaching. There are other training programs available for existent faculty on sustainability, including courses on the marine environment, low-carbon buildings, environmental education, green cities, etc., aimed at broadening and deepening the sustainability awareness among all faculty members.

Note 1: Based on data in August 2019.

Note 2: Based on the first and second semester of AY 2018-2019.

Note 3: This classification is based on the keywords for sustainability we have selected so far. We are still in the process of developing a more precise classification system.

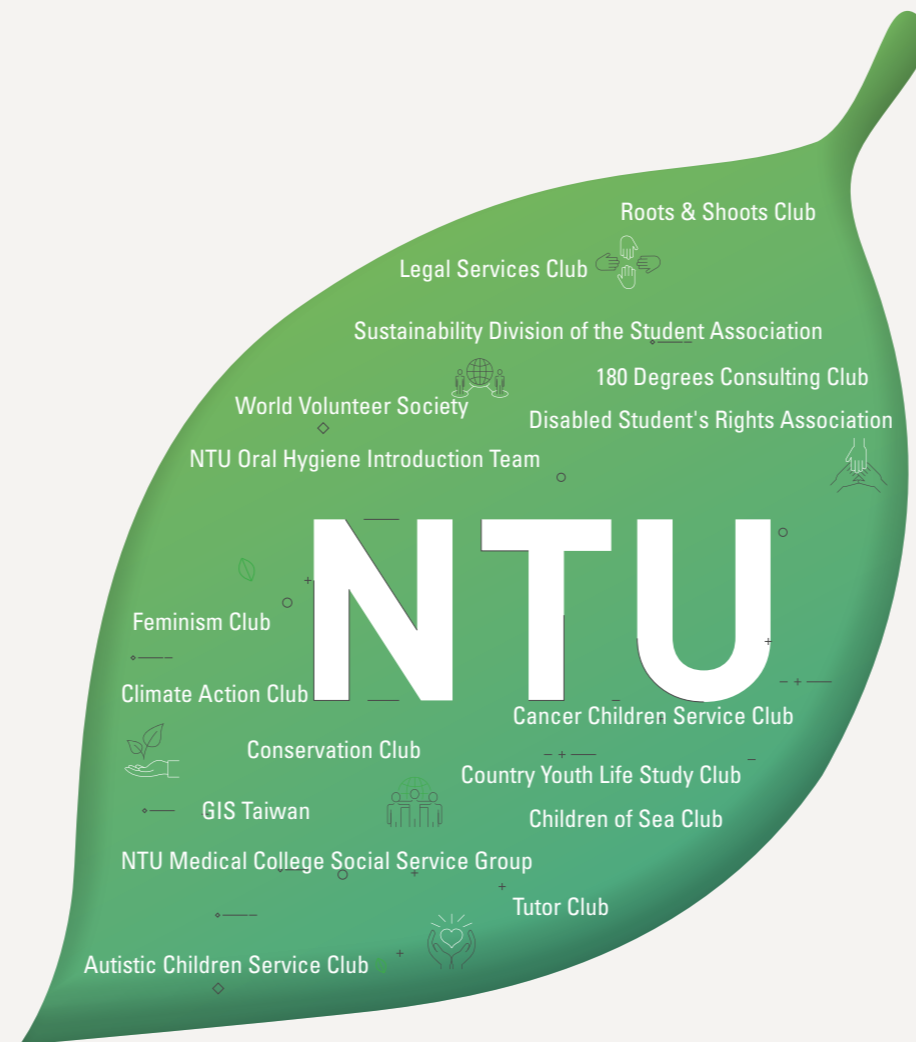
### (II) Active and innovative sustainability clubs

Every year, more than 400 student clubs are active on campus, from service-oriented clubs who volunteer in different parts of society, to vibrant fitness clubs, to arts clubs that cultivate students' mind and soul. The creativity of our students is displayed during the annual Azalea Festival and club fair. Club activities are fully organized by students, and show the ability and international vision of our students as they prepare to lead for the future. For example, the Global Initiative Symposium invites representatives from around the world to Taiwan to share their thoughts on the most salient issues for sustainable development, allowing the interactions between different cultures to spark new ideas and stimulate new thinking. More information about the student clubs can be found here: [https://osa\\_activity.ntu.edu.tw/club/index](https://osa_activity.ntu.edu.tw/club/index).



### Sustainability-related Student Clubs

There are **82** sustainability-related clubs on campus. They cover various sustainability issues such as social services, healthcare, gender, the natural environment, climate change, education, and the rights of the underprivileged.



### (III) Sustainability Activities on Campus

Campus is an important place in the daily lives of students, faculty, and staff. At NTU, we integrate environmental protection and sustainability into our energy and resource management, campus safety and planning, and procurements. In 2005, we established our Environmental Protection & Occupational Safety & Health Center. This center brings together different units of our university, in order to maintain a sustainable and safe campus. Since 2010, the center has formulated sustainability-related programs and actions, while publishing whitepapers on the sustainable campus, and monitoring progress. More details about our sustainable campus can be found at: <http://sustainability.ntu.edu.tw/>.

Moreover, administrative and teaching units often collaborate with student clubs on environmental sustainability issues, such as eco-friendly agriculture, food waste, and plastic reduction. For example, in the face of increasing food waste, in 2019 the Net Impact Club organized the 'ReFood' picnic event, in which they used leftover food. Another example is the 'Green Collar Market', organized annually by students from our College of Bio-Resources & Agriculture. This market invites the public to experience eco-friendly agricultural production and the practice of circular economy through games and DIY activities. The aim is to increase participants' awareness of the importance of environmental sustainability, as they are encouraged to think about how health and environmental protection can apply to their daily lives.



Net Impact Club ReFood Picnic



Fifth Green Collar Farmers Market organized by the Student Association of the College of Bio-Resources & Agriculture

COLUMN

The very first Life Education Center at a university in Taiwan provides faculty and students with holistic education

Life education is a core part of holistic education and lifelong learning. Nowadays, values have changed, and success in life is no longer synonymous with external success. In fact, the value of life comprises the totality of all the parts of one's life, beyond external success such as academic achievement or financial success, which was seen as the only source of success in the past. It is important to realize oneself, find the meaning of life, have a good internal balance, enjoy quality relationships with others, and develop the ability to deal with setbacks. These aspects are also critical to our ability to face life's challenges. To promote life education, NTU has established a Life Education Center, as the first university in Taiwan to do so. This center is creating positive social impacts through its research, academic programs and social services.



NTU Orientation Camp – Tonight is About Love

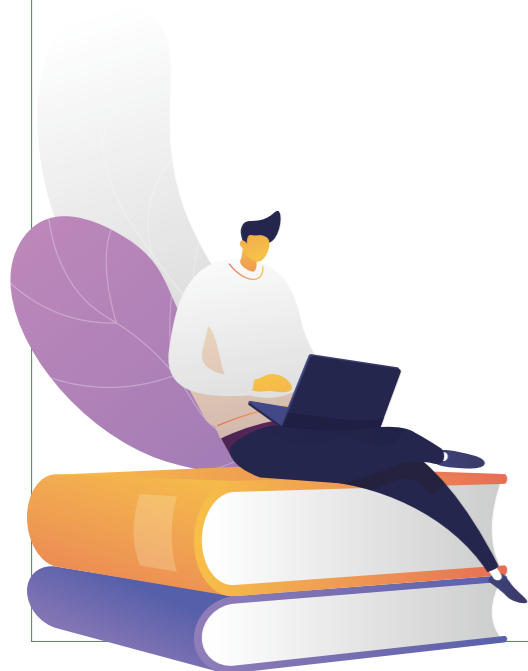
Every year around 3,000 freshmen participated in this event to talk and learn about love. In the lively teaching and learning atmosphere, freshmen learn different aspects of love!

Life Education Hall

In collaboration with general education courses, life stories and life philosophy are shared in the Life Education Hall. At least 20 events are held every year, reaching out to a total number of 15,710 students.

Advisor Spiritual Workshop

The Advisor Spiritual Workshop is organized for faculty to share their thoughts and experiences, and provide new inspiration as they continue advising students.



## II. Social Engagement

The fulfillment of USR should meet the needs for development at the global and national levels, and respond to environmental and social issues. Our faculty and students are bridging the gap between local communities and the world through student volunteer services, continuing education, and industry-government-academia collaboration. In this way, we help drive our country's sustainable development as we apply our expertise and passion for service to the societal needs that we see.

### (I) Student service-learning and rural area volunteer service

Whether through courses or extracurricular activities, our students have many opportunities to bring what they learn into society both locally and abroad. In 2019, the NTU students organized a total of 74 domestic and foreign volunteer teams, which consisted of 2,043 students, and reached about 10,908 less advantaged people in rural areas. A total of 13,371 students chose to study service learning courses as part of their curriculum, where they have concrete opportunities to help. Starting in the AY2019-2020, we will increase the subsidy for student clubs that service rural areas, and support long-term local service projects.

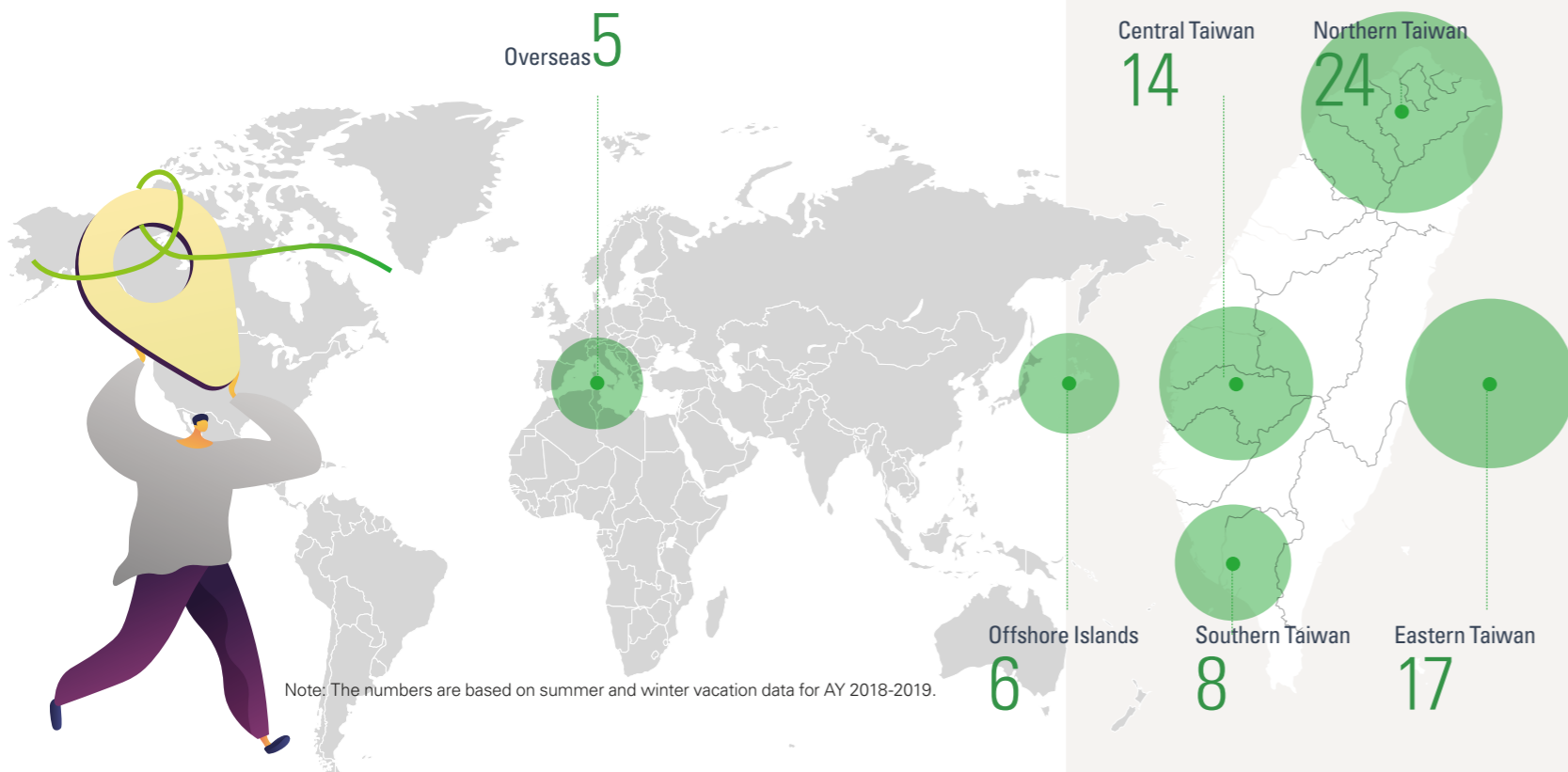


Visit by the Autistic Children Service Club

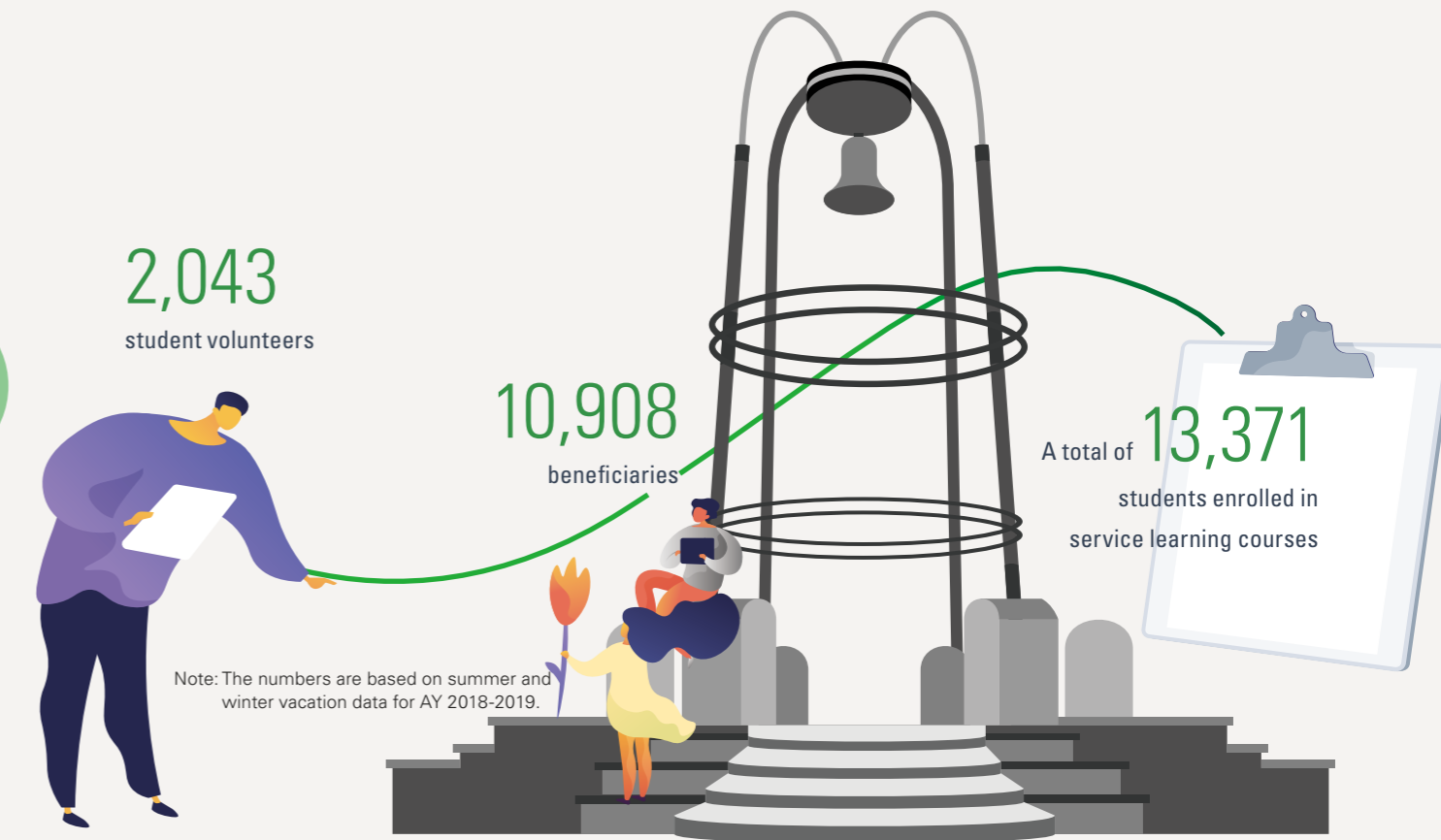


Visit by the Taoyuan Area Alumni Association & Wuling Senior High School Alumni Association

Number of student teams and distribution by region in 2019



Number of student volunteers, number of people who benefitted from their service, and number of students who enrolled in service learning courses in 2019



COLUMN

## Social Devotion Special Awards

The 'Social Devotion Special Awards' was established in order to commend students who have shown special care for society in the spirit of selflessness, and to encourage more students to contribute to society. Awardees also receive a monetary reward of NT\$100,000 (for individuals) and NT\$300,000 (for clubs/societies). Moreover, we encourage all our colleges to issue 'Altruism Awards' for students who help others, so as to further encourage students to help one another and engage in charity.

Winners of the 'Social Devotion Special Award's in 2019 include: Yang Yu-Hsiang (Department of Geography) for providing services to the underprivileged, the Social Service Division of the Student Association at the Department of Social Work, and the World Volunteer Society.

### Yang Yu-Hsiang

Yang has been volunteering in rural areas since high school. Since starting college, he has been working at the Bethesda Home for Handicapped Children, devoting his time to helping children with disabilities, who are critically ill, or who have special needs.



### The Social Service Division

This group traveled to Dongyin on the island of Matsu, an area rarely visited by other volunteer teams, to host holiday camps in local communities. They also pioneered distance tutoring services, thus showing that social work can be done in innovative ways.

### The World Volunteer Society

This club has led students out of their comfort zone to remote areas. The society has brought their warm company and spirit of service to 9 locations in Taiwan and overseas, thus bringing supplies and knowledge to other corners of the world.

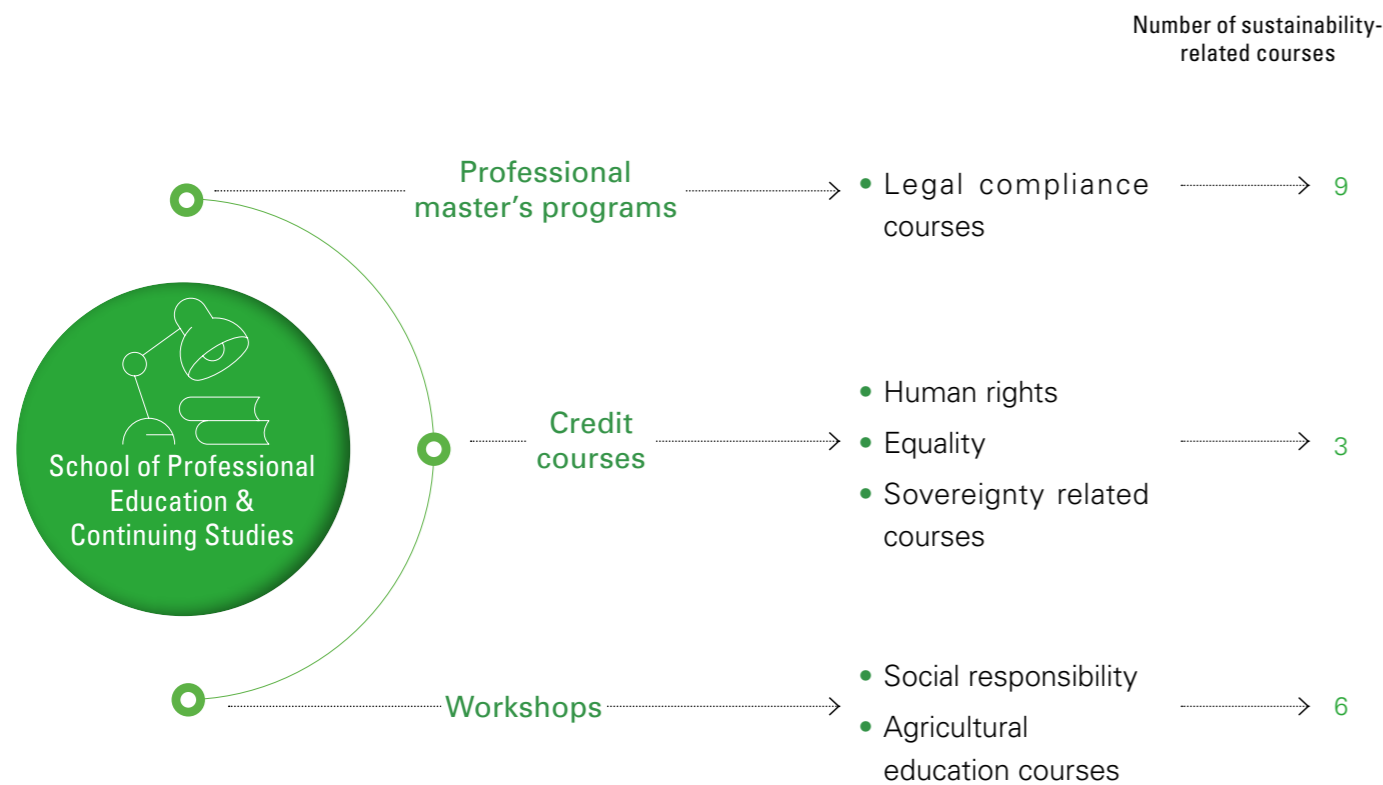


### (II) Continuing education

At NTU, we strive for educational excellence and drive innovation and growth in society. Our School of Professional Education & Continuing Studies was established as a platform for companies, government and the public to access NTU's teaching and research resources for learning. Through our programs, workshops, and company trainings, we seek to break the boundaries of age and life stage, spread knowledge more widely, and continue to exert a positive influence on society. The School of Professional Education & Continuing Studies provides credit programs, non-degree programs and master degree programs. In 2019, 214 courses were offered and 2,260 certificates<sup>1</sup> of continuing studies were issued. The courses cover business administration, law, nursing, agriculture, life, arts, and philosophy. Our School of Professional Education & Continuing Studies also promotes sustainability. In 2019, a total of 18 sustainability-related courses were offered around topics such as legal compliance, human rights, social responsibility, and agriculture. More information on continuing education can be found at: <https://www.ntuspecs.ntu.edu.tw/specs/tc/>.

Note1: The number of certificates in 2019 is calculated based on the date certificates were printed.

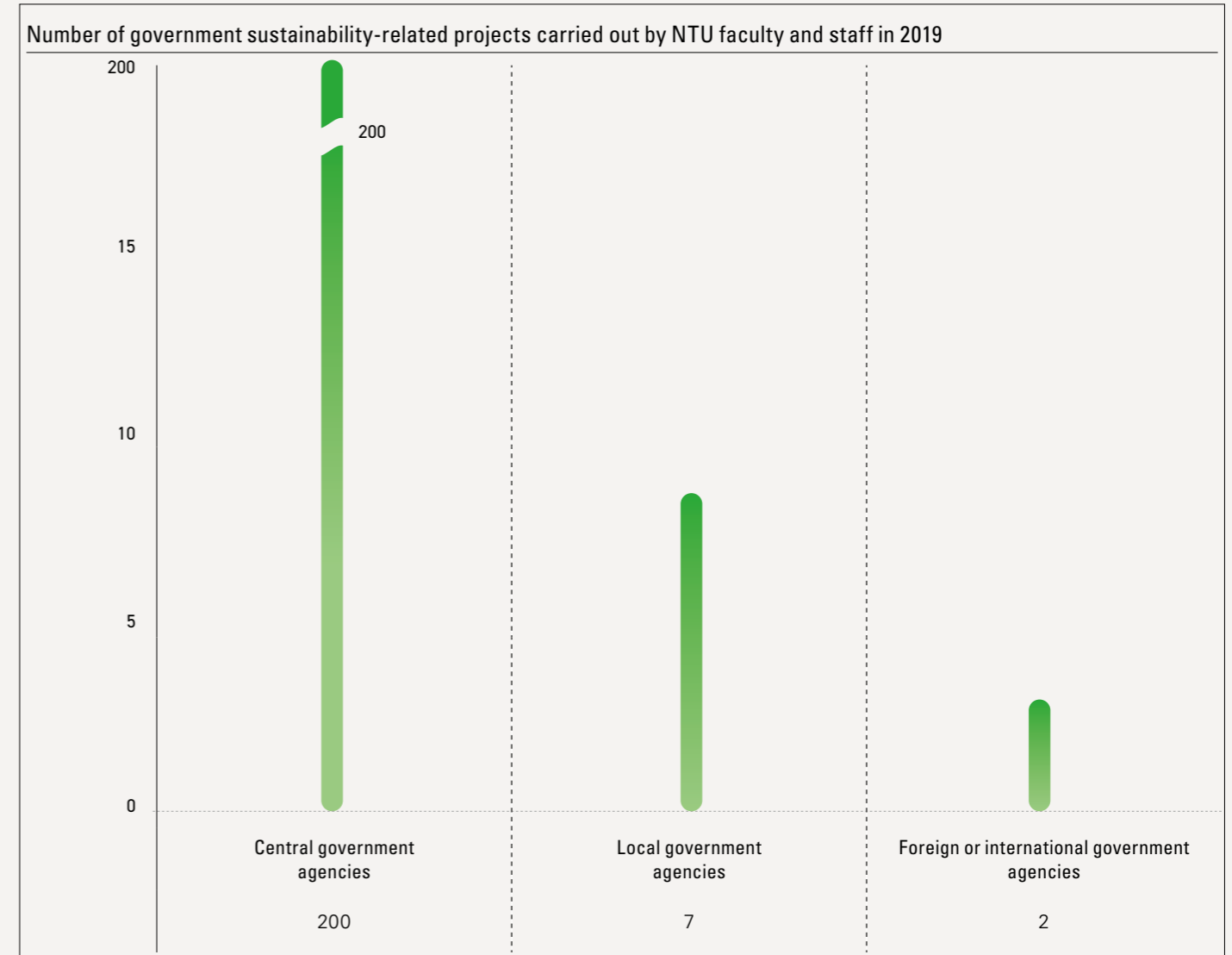
Number and examples of sustainability-related courses offered by the School of Professional Education & Continuing Studies in 2019



Note: This classification is based on the keywords for sustainability we have selected so far. We are still in the process of developing a more precise classification system.

### (III) Collaboration with governments

As a comprehensive research university with broad expertise and strong research capacity, we work with the government to formulate new policies and address societal needs through research and practical projects commissioned by the government. In 2019, we carried out 209 government sustainability-related projects. We will continue to strengthen our research infrastructure, enhance industry-academia collaboration and communication, and bring together internal and external resources as we support major government policies through our research efforts also in the future. We will also encourage our faculty to take a prominent role in helping develop adequate policies for sustainable development, by engaging in the development and application of policies promoting sustainable development in the country.



Note 1: This classification is based on the keywords for sustainability we have selected so far. We are still in the process of developing a more precise classification system.

Note 2: Please see 5.1 for sustainability-related keywords.



5.3

## Environmental Protection

Our main campus located in the center of Taipei City, and has become part of daily life for our students, faculty and staffs, as well as the general public. Bearing in mind our social responsibility to care for the environment, as well as to provide as comfortable condition as possible for learning, research and everyday life, we are driving many initiatives to improve the quality of our campus environment. Firstly, we are actively reducing our carbon emissions. Secondly, we are working with different domains including **resource management, ecological conservation, sustainable procurement, and sustainable dining**, to achieve our goal of a sustainable campus.

### HIGHLIGHTS

Waste recycled:  
Increased by **8.7%**



Renewable energy consumption:  
**86,100 kWh**



Campus green area:  
**3111.74 square meters**



Number of green buildings:  
As of 2019, there are **6** green buildings



Sustainable procurement ratio:  
Higher than the **6.6%** required by the government



Water consumption:  
Decreased by **4.9%**



Ban on disposable and melamine tableware:  
**100%**





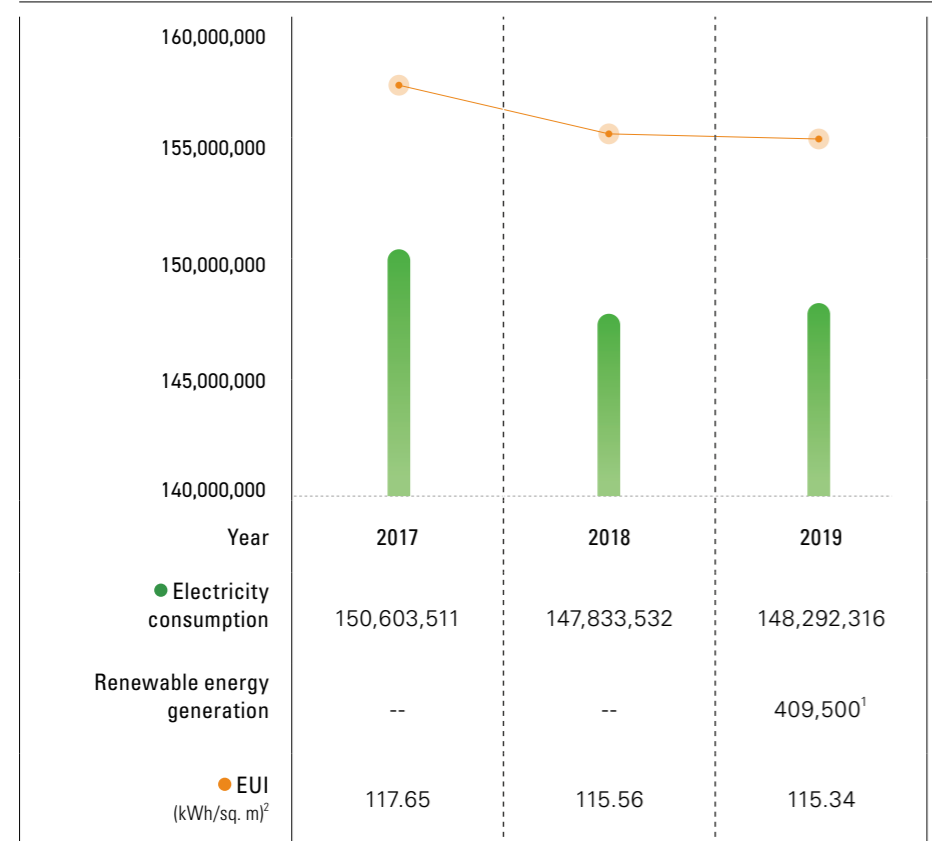
## I. Low-carbon Campus

NTU has the largest number of faculty and students in Taiwan. We also have a large number of buildings and laboratories. Maintaining a high-quality teaching and research environment requires a lot of electricity. Since the increase in greenhouse gas emissions year by year is the main cause of global climate change, we are taking our responsibility as global citizens and implementing various measures save energy and reduce GHG, as well as reduce negative impact on the environment. To this end, we have partly switched to renewable energy sources, improved the efficiency of our equipment and buildings, and integrated energy education into various disciplines, in order to encourage greener lifestyles among students and faculties. We are on a well on our way towards a low-carbon campus, as we do our part to help mitigate global warming and the ability to withstand climate change.

Our energy management system balances power supply and demand based

on space usage and environmental conditions. Energy conservation and carbon reduction measures in recent years include: replacing old air conditioners, switching to energy-efficient lighting, improving heat pump performance, monitoring the power usage of buildings on campus, adopting green building design, developing a GHG emissions inventory, and launching programs for shared mobility. In 2019, our energy consumption and GHG emissions declined significantly compared to 2017, which shows that our efforts to conserve energy and reduce carbon are effective. As of 2019, there are 6 green buildings on campus. We are actively developing the use of renewable energy. Some buildings on campus have already completed the installation of solar power, with total installed capacity reaching 395 kW. Of the total electricity generated, approximately 86,100 kWh is provided to buildings on campus (the remaining electricity is sold to Taiwan Power Company).

Electricity consumption and energy usage intensity in the last three years



GHG emissions in the last three years



Note 1: Calculated using an installed capacity of 395 kW and annual power generating efficiency of 1,050 kWh/kW.

Note 2: The floor area of buildings on campus is: 1,285,656 square meters in 2019; 1,279,312 square meters in 2018; 1,280,044 square meters in 2017.

Note 3: Scope 1 GHG emissions are direct emissions.

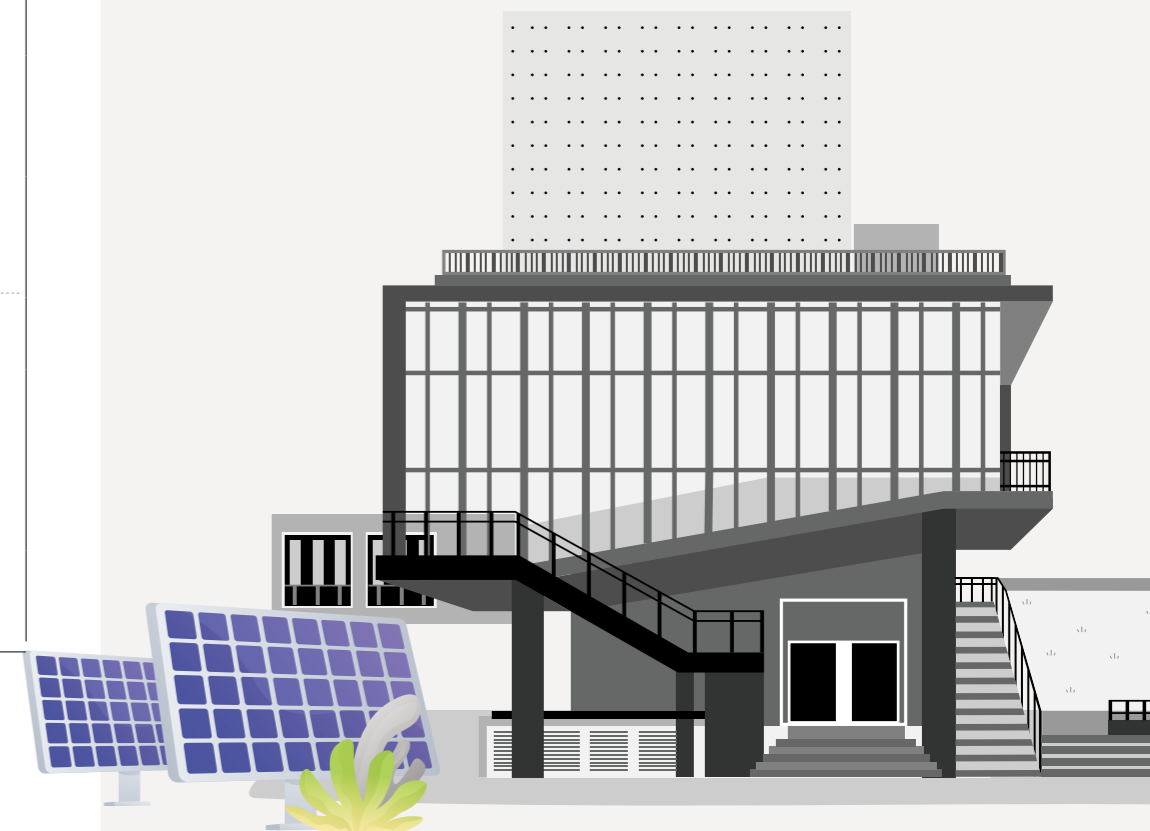
Note 4: Scope 2 GHG emissions are indirect emissions from electricity purchased and used.

Number of green buildings in the NTU in 2019<sup>1</sup>

● Main Campus ○ Yunlin Campus

<p>Phase two construction of instructional buildings</p> <p>Silver</p> <p>Year certificate was acquired 2019</p>	<p>Phase three construction of the Building for Research Excellence (Tseng Jiang Hall)</p> <p>Silver</p> <p>Year certificate was acquired 2019</p>	<p>Construction of the Biomedical Engineering Hall</p> <p>Bronze</p> <p>Year certificate was acquired 2019</p>
<p>Construction of the Faculty and Staff Dorm</p> <p>Certified</p> <p>Year certificate was acquired 2018</p>	<p>Construction of the Animal Resource Center</p> <p>Certified</p> <p>Year certificate was acquired 2017</p>	<p>Construction of the Agricultural Incubation and Promotion Center (Chuhe Building)</p> <p>Certified</p> <p>Year certificate was acquired 2019</p>

Note: The number of Green Building Label (Class Certified and above) obtained as of December 31, 2019.



Practical measures for energy conservation and carbon reduction



Replacing old air conditioners

A total of 1,006 air conditioners that were 10 years or older were replaced with more energy efficient air conditioners in 2017-2019, which is expected to reduce electricity consumption by 25%.



Switching to energy efficient lights

- Indoor lighting: A total of 3,500 T5/T8 fluorescent lights were replaced with LED lights in 2019, which is expected to reduce energy consumption by 40%.
- Fire safety lights: A total of 4,278 fire safety lights were replaced with LED lights in 2011-19, which is expected to reduce their electricity consumption by 89%.
- Outdoor lighting: All outdoor lighting on campus was replaced with LED lights in 2011. Since 2017, smart street light systems are being installed in batches, and 178 lights have been replaced so far. Smart street lights use 1/3 less electricity compared to LED lights.



Improving heat pump performance

The natural gas boiler system in the sports center has been replaced with a system of water-to-water heat pumps, hot water storage tanks, and electric boilers for backup. This has increased the energy efficiency of the showers and the swimming pool by 61.98% and 87.20% respectively.



Monitoring electricity usage

Regular meetings are held every week to review the electricity consumption of various buildings, and detect and address any abnormalities. The energy efficiency of all large air conditioning systems, such as in the Life Science Building, our Main Library, and the Second Activity Center, is monitored continuously to ensure energy efficiency.



GHG inventory

Since 2010, we conduct yearly GHG inventories. As the first national university in Taiwan we successfully completed an external verification of GHG emissions.



Installation of solar panels

In May 2019, the Department of Animal Science and Technology installed solar panels with an installed capacity of 180 kW and began generating electricity; the Graduate Institute of National Development installed solar panels with an installed capacity of 72 kW and began generating electricity in October of the same year. The four buildings of the two faculties have a total installed capacity of 252 kW. Our total installed capacity of solar panels is 395 kW.

COLUMN

Promoting sustainable transportation on campus

In order to create a low-carbon and more convenient campus transportation system, we introduced the iRent 24-hour scooter system (from Hotai Leasing Corporation) in 2014. Since 2019, we are collaborating with the Department of Transportation of the Taipei City Government on the "Taipei City Public Bicycle Rental System Operations Management – YouBike 2.0 Trial Program". This program provides rental bicycles at our main campus, the Shuiyuan campus, and the Chang Hsing dormitories. A total of 102 stations with approximately 1,800 racks have been built in the pilot area, with 500 rental bicycles available for use by students, faculty members, as well as the general public. This will help reduce the number of private bicycles strewn around campus, while increasing the convenience of green transportation.

Highlights of YouBike 2.0

YouBike 2.0 has a device powered by a solar panel that provides rental, communications, and text display functions. Rental methods include EasyCard and mobile phone QR code scan.



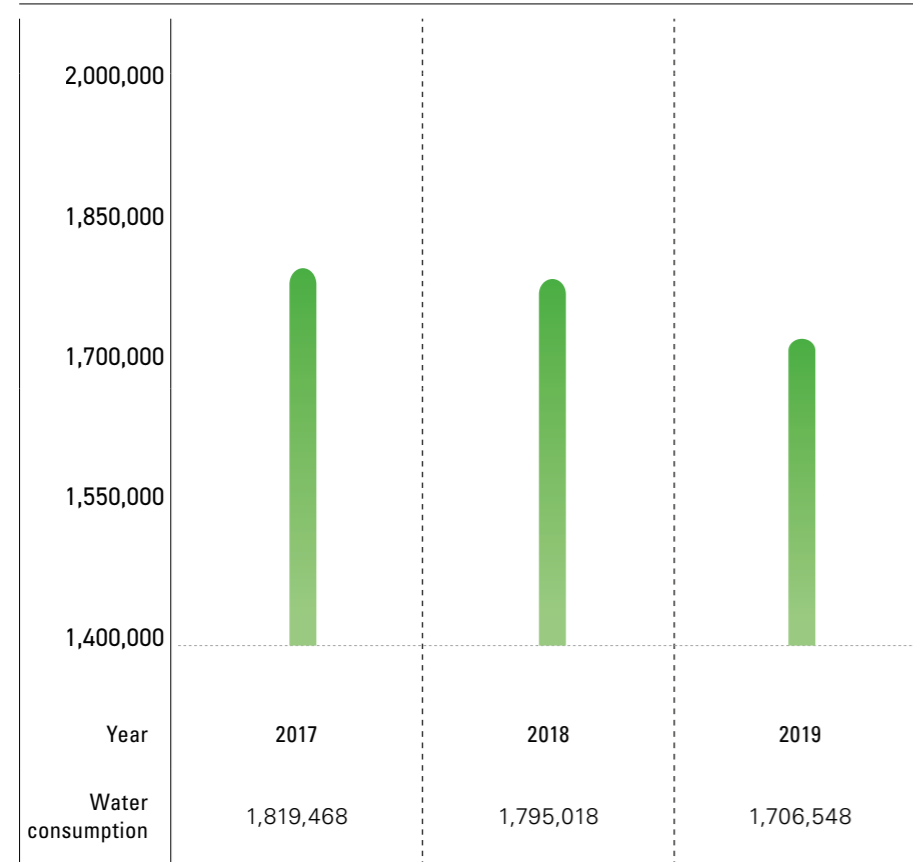
The bicycle rack is powered by a solar panel and has a nighttime warning function that makes it more eco-friendly and safe.

## II. Water Management

Our campus has over 30,000 visitors every day. Vegetation accounts for 737,646 square meters of the campus, an area equivalent to the size of 3 Daan Forest Parks. This requires a lot of water. In 2018, we started replacing the water meters in our buildings with digital meters. In 2019, we installed a digital monitoring system to strengthen the monitoring of our water consumption, and minimize water waste. This new system helped identify water leakage in the basement of the Core Subjects Classroom Building, after which the building's water consumption significantly decreased. Also, in order to reduce the consumption of tap water, we are setting up rainwater recycling facilities in our buildings or on vacant spots on campus. New constructions also include rainwater recycling systems, which collect rainwater for the irrigation systems, or channel rainwater into our largest campus pond, 'the Drunken Moon Lake'. Following these efforts to effectively monitor, conserve and recycle water resources, our water consumption decreased by 4.9% in 2019.

Water consumption in the last three years

Unit: Tons



## III. Recycling

NTU has introduced waste reduction mechanism and recycling system from years ago. Waste is separated into general waste, recyclable waste, and kitchen waste. Thanks to this waste separation policy, the amount of recycled waste increased by 8.7% in 2019 compared to the previous year. To encourage recycling, our Property Management Division set up a second-hand circulation function in the Property Management System. A total of 87 items were posted on this platform, and 9 items were sold in 2019. There were 12 disposed items being reused by the NTU units, and many others were sold at the public auction platform, such as the Shwoo platform run by the Taipei City Government (an NT\$ 506,300 gain), and 4 other public auctions (an NT\$ 3,614,700 gain). Auctions not only encourages the circulation of disposed items and extend the lifespan of objects, but also provide an alternative source of income.

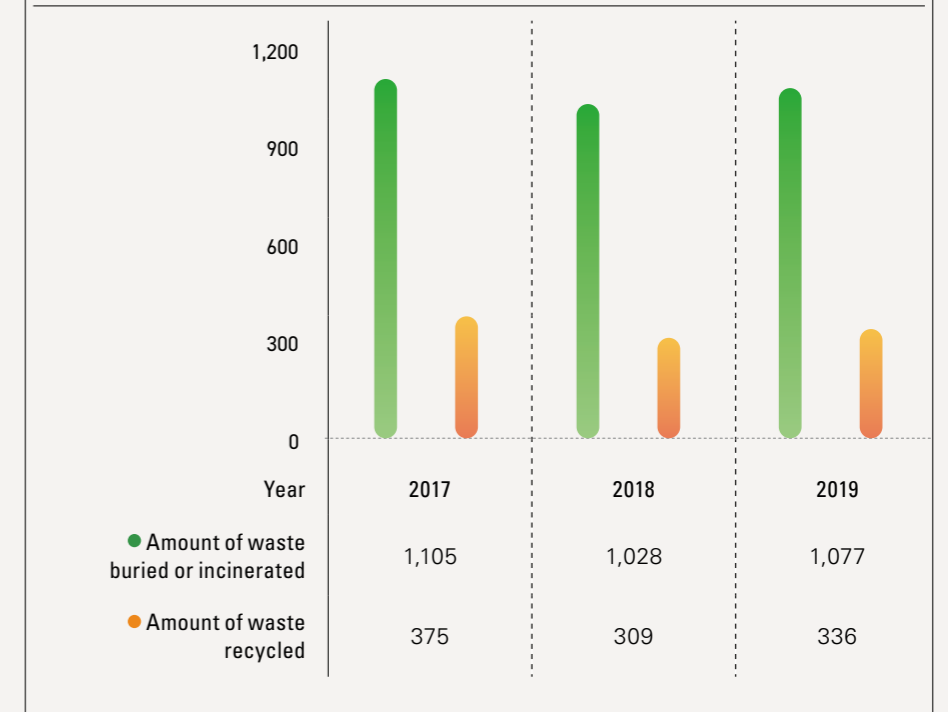
Our industrial waste is divided into six categories: radioactive waste, biomedical waste, waste liquid from laboratories, expired and other waste chemicals, containers, and consumables. The management of laboratory waste is stipulated in the 'Regulations for Storage and Disposal of Waste from Laboratories', which clearly define the classification standards and the regulations for storage and disposal. The laboratory operations management system monitors the amount of waste generated by each laboratory. Upon request, licensed waste treatment companies would be scheduled and dispose industrial waste from laboratories.

In order to reduce the amount of industrial waste, we have established a 'chemical resource sharing platform' that facilitates the storage and disposal of chemicals. We train our laboratories to manage their resources carefully – which is further encouraged by the principle that the user pays for the waste disposal.



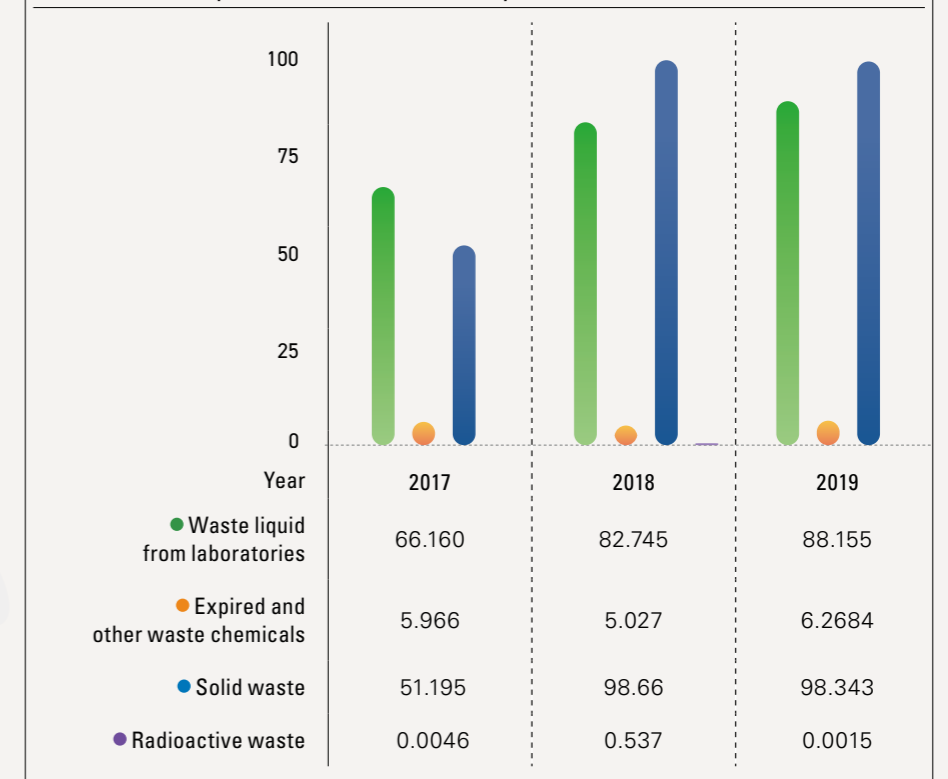
Waste produced in the last three years

Unit: Tons



Industrial waste produced in the last three years

Unit: Tons



## IV. Ecological Conservation

How to strike a good balance between the needs of human beings and the right to survival of other species is an issue that must be closely considered in the development of a sustainable campus. Our Office of General Affairs-General Services Division and the Campus Planning Office worked together with the Department of Horticulture and Landscape Architecture to conduct a thorough analysis of the current status of plants throughout the campus, and assess the requirements for plant survival and growth. They developed a management plan for enriching the number of plant species, in order to make the environment more attractive and increase biodiversity on campus. This work provides the basis for our long-term campus ecology maintenance plan.

In response to the fragmentation and isolation of green spaces as cities develop, we have adopted the concept of ecological stepping stone to design vertical greening landscape to create an ecological corridor in the city by connecting our green rooftops on campus. We now have 42 greening areas amounting to a total of 3,111 square meters, which effectively increases the natural habitat in the

surrounding environment. At this stage, the goal is to focus on maintenance and plant regeneration in these three-dimensional greening areas, in order to provide a lush green environment.

Every three years, the campus planning office conducts an ecological survey of the animals and plants on the campus. Samples are taken from 27 permanent sampling areas on the main campus, as well as the southeast zone of the main campus, the insect museum at Mt. Chanchu, and the Shuiyuan Campus. Birds, mammals, amphibians and reptiles, insects, trees, and greening are surveyed. The latest survey found that protected species such as *Xenochrophis piscator*, *Mauremys mutica*, and *Urocissa caerulea* can be found on campus. We encourage citizens to participate in these ecological surveys. GIS software is used for documentation and visualization. We also rely on various domestic and overseas resources, such as the black-crowned heron report system, the Roadkill report system, and the ebird and iNaturelist systems. Moreover, we provide training courses for volunteers, faculty members and students, so that the people on our campus may better understand our campus ecology.

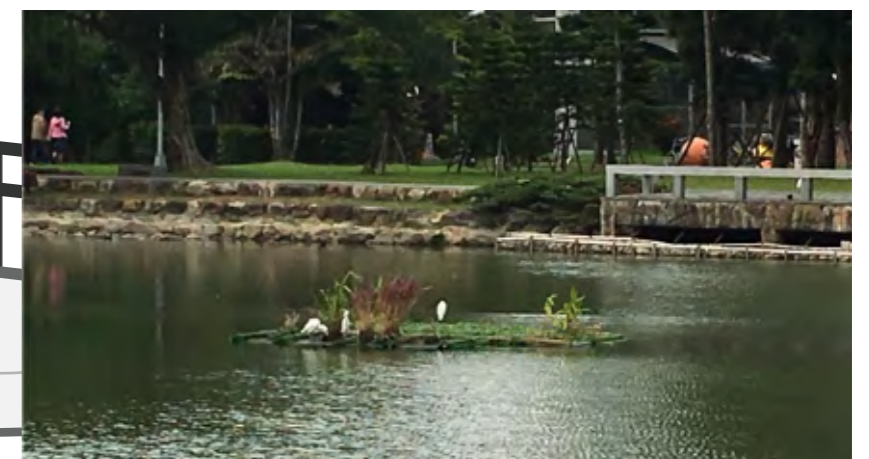


### COLUMN

#### Ecological engineering – prospering together in symbiosis

NTU uses waste wood and ties them together with environmentally friendly materials to make natural floating islands. A coconut fiber blanket is placed on the floating platform for plant roots to be attached and to retain water. This creates a natural water landscape and increases the habitat space for birds such as ducks, geese, and swans.

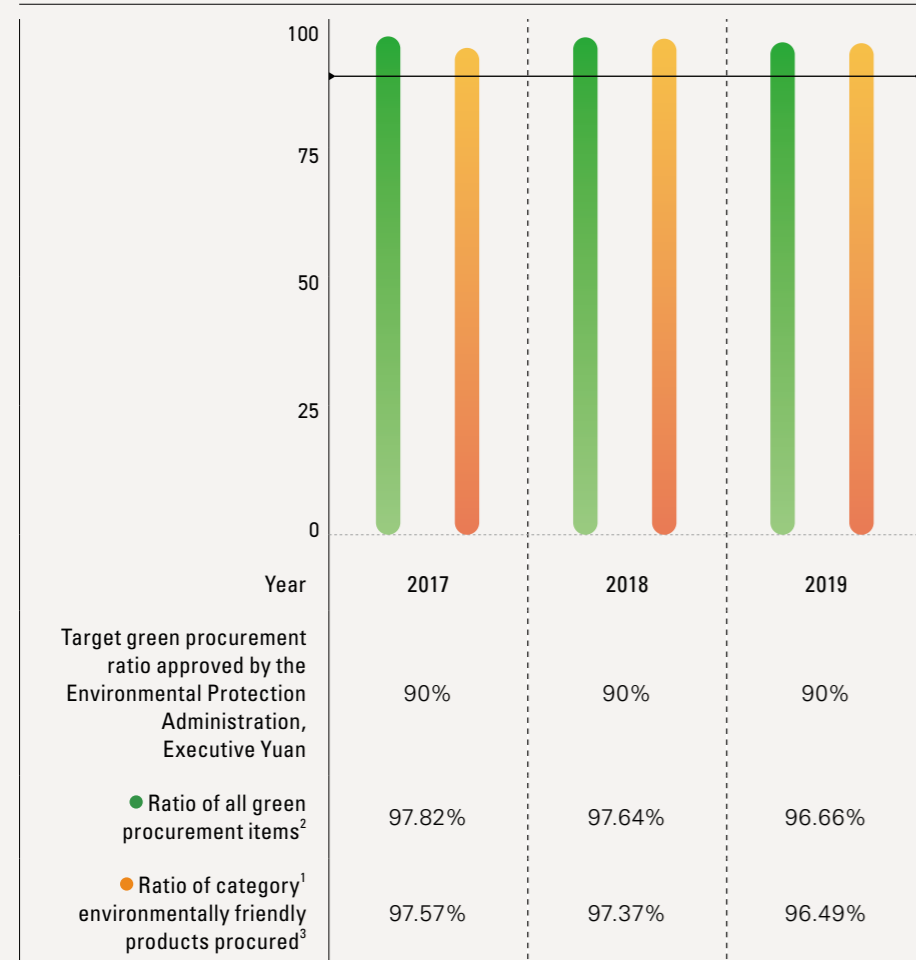
The aquatic plants planted on the artificial floating islands not only cleanse the water, but also provide a safe and concealed space for ducks, geese, swans, water birds, amphibians, and *Gallinula chloropus* on the Drunken Moon Lake, improving the overall visual effect of the landscape and maintaining the biodiversity on campus.



## V. Sustainable Procurement

As the green consumption trend intensifies around the world, we have put in place a sustainable procurement policy with related assessment guidelines in accordance with the 'Government Agency Green Procurement Plan'. We urge all units to prioritize recyclable, low pollution, and resource-efficient products, and encourage priority to eco-friendly products that have obtained the green label. The website of the Procurement Division, Office of General Affairs lists related laws and regulations and references is especially helpful for units implementing sustainable procurement. In the last three years, our sustainable procurement ratio surpassed the target ratio set by the government.

Sustainable procurement ratio<sup>1</sup>



Note 1: The statistics above cover all campuses.

Note 2: (Procurement amount of designated environmentally friendly products + Procurement amount of green products) / (Total procurement amount of designated items + Procurement amount of green products)

Note 3: Procurement amount of designated products with environmental label / Total procurement amount of designated items

## VI. Sustainable Dining

As a place where faculty, staff, and students work, learn, and live, it is important that we provide healthy and safe meals. To this end, we promote sustainable agriculture and a food culture that is both eco-friendly and educational. We cooperate with the government policies to promote food safety, reduce food waste, and use eco-friendly tableware. We established the 'NTU Dining Service Committee', which oversees the restaurants and convenience stores on campus, with the aim of securing good and safe food options for all our staff. This committee is supported by the expertise and farming resources of our College of Bioresources and Agriculture.

### Sustainable dining related activities and plans

<p>Food safety</p>	<p>MOE campus food ingredients registration platform</p>	<p>NTU complies with regulations of the MOE and provides guidance to restaurants with registering their information on the MOE campus food ingredients registration platform. This provides transparency for food on campus, establishes a food risk management mechanism, and establishes a campus food safety protection network.</p>
	<p>Periodic food inspection</p>	<p>The committee's work group conducts sample inspections of food in restaurants and convenience stores on campus each semester, and sends the samples to a certified testing institution for microbiological and chemical testing. When test results fall outside of safety standards, a second inspection will be conducted or the food is taken off the shelves. A penalty is imposed according to regulations and a time limit is prescribed for making improvements.</p>
	<p>Food service safety and sanitation on-site inspections</p>	<p>The committee's work group conducts food service safety and sanitation inspections of all restaurants and convenience stores on campus each semester, the responsible department and the operator are notified of deficiencies, and guidance is provided for making improvements. Penalties are imposed according to regulations for major violations, which are put on record.</p>
	<p>Food service safety and sanitation education and training</p>	<p>The management unit and restaurant operators are called to a meeting each semester to promote government policy and hygiene inspection related affairs, and also strengthen food safety education and training.</p>
<p>Reduction of food waste</p>	<p>Food service safety and sanitation education and training</p>	<p>Food carbon footprint reduction courses are arranged for restaurant operators, instructing them to cherish food, avoid waste, use local ingredients, and shorten the distance of delivery, jointly promoting the concept of "cherish 100% of food to achieve zero food waste."</p>
<p>Eco-friendly tableware</p>	<p>Eco-friendly tableware for freshmen</p>	<p>The Office of Student Affairs provides a set of eco-friendly tableware during the NTU Orientation Camp and registration of graduate students, encouraging them to bring their own eco-friendly tableware for energy conservation and carbon reduction.</p>
<p>Promotion of sustainable agriculture, livestock, and aquatic products</p>	<p>NTU Farm</p>	<p>NTU Farm actively assists teachers and students with teaching, internships, and trial research projects. Besides demonstrating sustainable development, NTU Farm highlights the environmental features of a farm, and provides green spaces for environmental, ecological, and agricultural education.</p>

Please visit the website below for more details

• [Campus food ingredients registration platform](#)

• [NTU Dining Service Committee](#)

• [NTU Farm](#)

### Sustainable restaurant statistics<sup>1</sup>

Year	2017	2018	2019
Total number of restaurants <sup>2</sup>	77	78	78
Number of restaurants that prohibit the use of disposable and melamine tableware and plastic straws <sup>3</sup>	77	78	78
Ratio of restaurants that prohibit the use of disposable and melamine tableware and plastic straws	100%	100%	100%
Number of vegetarian restaurants <sup>4</sup>	2	2	3

Note 1: The statistics above cover all campuses but not subsidiaries.

Note 2: Total number of restaurants and convenience stores on campus.

Note 3: The ban of disposable and melamine tableware and plastic straws took effect on July 1, 2019.

Note 4: The number of vegetarian restaurants is calculated by vendor, including: The Student Activity Center's Shixiangyuan vegetarian, Xiao Xiao Fu Food Services, and Xiaoshang.



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## Equity and Wellbeing

### HIGHLIGHTS

At NTU, we strive to create an environment and culture that is healthy, friendly, and safe, where everyone may have a fulfilling experience of work, life, and learning.

**89%** of low-income students enrolled in AY2018-2019 benefited from the NTU Care Project.



There were **339** students from underprivileged families enrolled in our undergraduate programs.



A total of **11** buildings in the school are now equipped with gender-friendly restrooms.



There were more than **60** barrier-free facilities being renovated.



Our foreign students were from **66** countries around the world.



Of the 2015 Freshman cohort, 474 out of 519 underprivileged students graduated in 2019, resulting a graduation rate of **91%**.



**85** underprivileged students were awarded 'Hope scholarships' (ranging from NTD 10,000-240,000 per person per year). These scholarships were introduced in 2019.



**304** underprivileged students received 'Hope Grants' (ranging from NTD 40,000-80,000 per person per year) in 2019.



**67** outstanding high-school students were awarded 'Fu-Bell Scholarships' (of NTD 200,000 per person per year). These scholarships were introduced in 2019.



**395** students from universities in Hong Kong were relocated to NTU due to the emergent situation in Hong Kong in 2019.

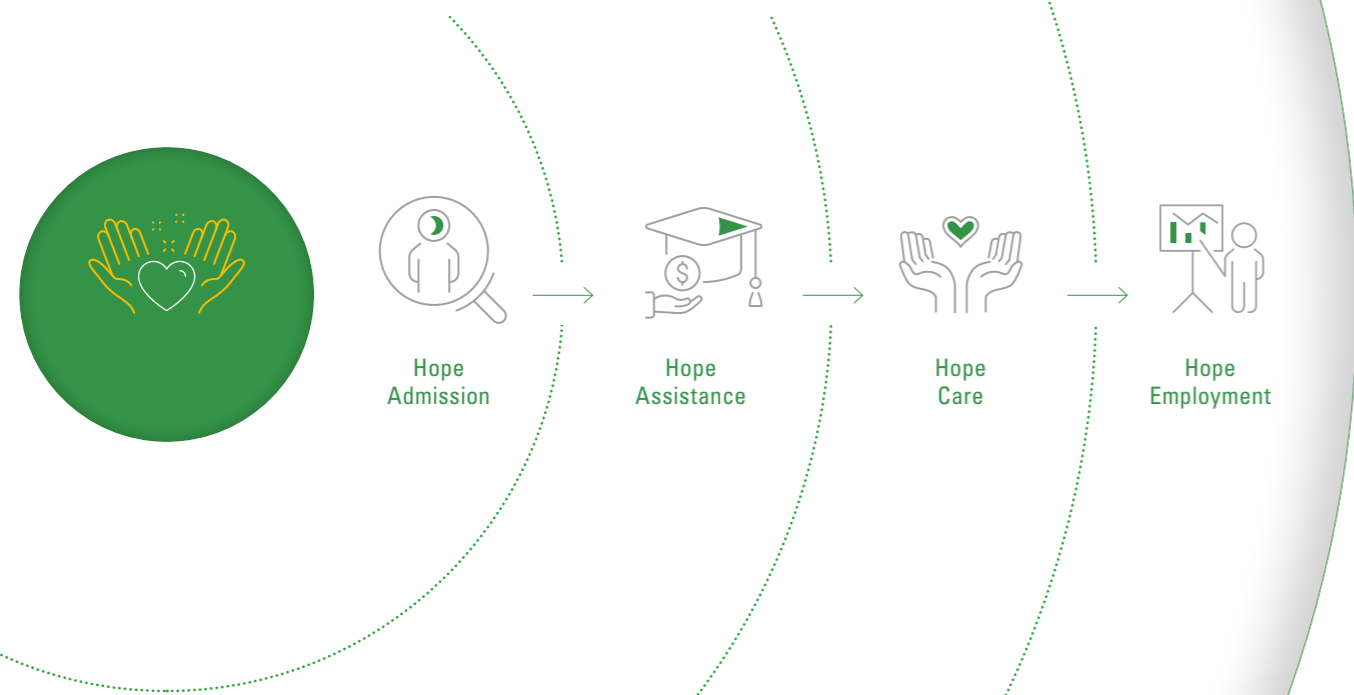


## I. A Friendly Campus that Values Diversity

### (I) Diversified recruitment, and student counselling

Higher education serves as an important catalyst for promoting social mobility and bridging the gap between rich and poor. This kind of social responsibility is important for a university such as NTU. We believe that besides academic excellence, it is important to contribute to a more equal distribution of social resources. In 2015, we launched the 'NTU Hope Program' for students from underprivileged families. As of 2019, we are gradually increasing the number of students enrolled through this program, with the goal of doubling the number of Hope students in two years and tripling the number in four years.

For students who are struggling with adversity, yet are willing to care for their fellow human beings, we offer various opportunities for financial support, counselling, and other assistance. These programs aim at easing the economic burden on students and their families, as well as take care of students' needs in their everyday lives and their studies, including helping them secure internships and facilitating integration into the job market. The Hope Program brings together the resources of our various offices, with each unit implementing contributing according to their respective missions and expertise. The program spans across four main areas, in order to make sure that students from less privileged backgrounds are well taken care of in terms of their studies, life and future: (1) Hope Admission; (2) Hope Assistance; (3) Hope Care; and (4) Hope Employment.







### COLUMN

#### The Hope Family

Every student admitted through the Hope Enrollment Project has the opportunity to participate in the 'Hope Enrollment Freshman Orientation Camp' organized by our Center for Teaching and Learning Development, Office of Academic Affairs. The camp helps freshmen familiarize themselves with the resources on campus, and offers practical living information to help them successfully adapt to college life. The 'Hope Family' is a family-like community of learning consisting of several hope students, tutors, and teaching assistants, which offers tutoring that is tailored to the students' needs, personal counselling services, and group activities. Highly interactive, it helps build connections with peers, and offers a variety of innovative learning courses. The Hope Employment Project offers students various career-related support and services. The purpose is to provide students from underprivileged families with comprehensive guidance and care, to help them improve their learning and build self-worth.



Other initiatives to promote diversity

Initiative	Beneficiary	Support offered
 Indigenous Students Resource Center	Indigenous students	The Indigenous Students Resource Center organizes freshmen orientation, ethnic education, cultural learning, international exchanges, and career planning. The center promotes the 'Higher Education Sprout Project' and offers scholarships such as the 'Indigenous Language Inheritance Scholarships for Indigenous Students' and 'Tribal Inheritance Scholarships for Indigenous Students.'
 Disability Support Services, Student Counseling Center	Students with disabilities	The center offers support and individual guidance for special education students from enrollment to graduation, in order to help students to reach their full potential and successfully complete their studies. Services include special education assessment, loan of assistive technology, special education resources, improvement of the barrier-free environment, adaptation counseling, activities for empowerment, and career counseling, etc.
 Summer College	All students	Our Center for Teaching and Learning Development offers 29 liberal education courses for college students all across Taiwan. These courses break through the regional barriers and the constraints of traditional courses, by allowing teachers and students from various backgrounds to learn together. Moreover, in order to support disadvantaged students and encourage continuous learning, our Summer College offers lower credit fees for the liberal education courses than the average credit fees of summer courses at other universities. As a further incentive, credit fees can be waived for students from low-income families who complete their courses successfully. We are continuously working with our partner schools to identify the gaps in education development, and continuing our efforts to extend the curriculum to realize liberal arts education and to contribute to local development.
 Scholarships for Undergraduate and Graduate Students	Varies based on the type of scholarship	Our Student Counseling Center of the Office of Student Affairs allocates our various scholarship resources to students in need, so that the programs may be as helpful as possible.

For more information, please visit the websites below

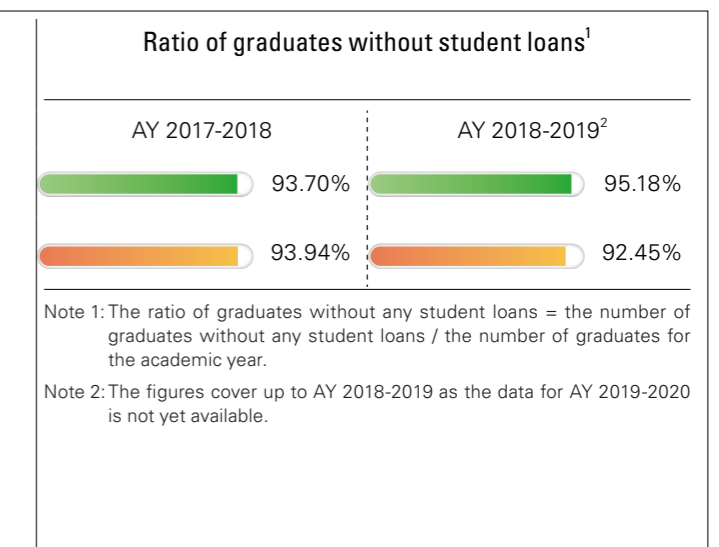
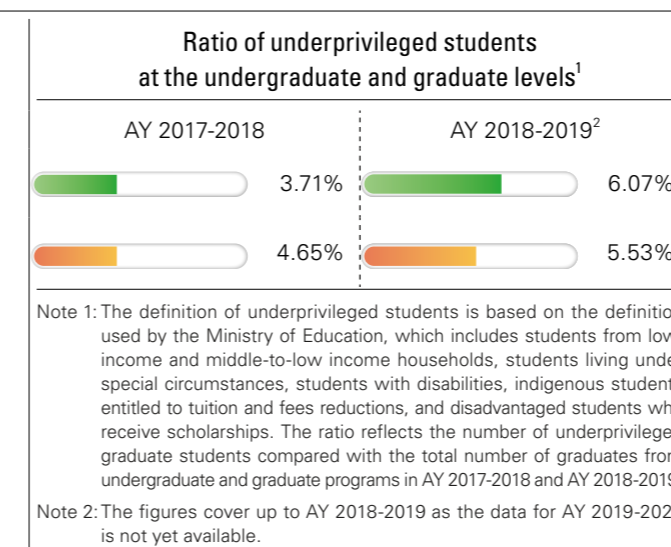
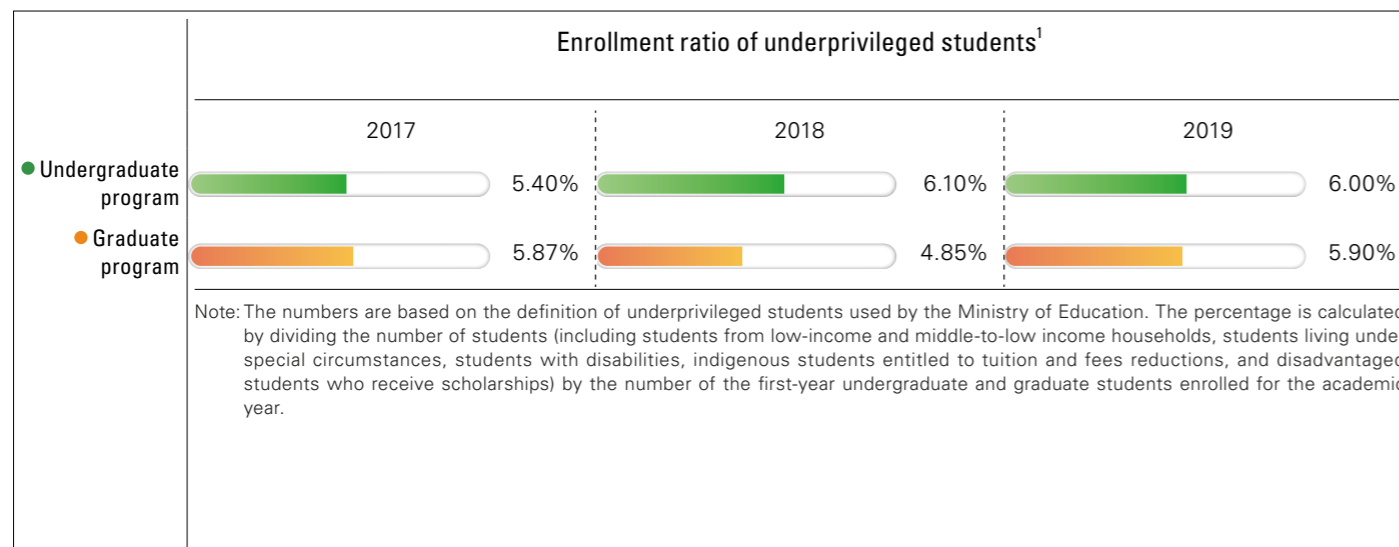
- [Facebook fan page of the NTU Indigenous Students Resource Center](#)
- [Disability Support Services, Student Counseling Center, Office of Student Affairs, NTU](#)
- [Summer College](#)
- [Student Assistance Division, Office of Student Affairs, NTU](#)

Percentage of students benefiting from loans, scholarships<sup>1</sup>, and tuition and fees reductions

	2017			2018		
	Amount applied (NTD million)	Number of recipients	Percentage <sup>2</sup>	Amount applied (NTD million)	Number of recipients	Percentage <sup>2</sup>
Tuition and fees reduction	52.02	2,706	4.29%	52.59	2,734	4.35%
Student loans	110.08	3,478	5.51%	114.01	3,419	5.44%
Scholarships and Grants <sup>1</sup>	365.66	56,312	89.27%	368.9	54,851	87.20%
Grants for underprivileged students	4.5	330 (Number of people)	1.05%	4.99	369 (Number of people)	1.17%

Note 1: Scholarships and Grants include: stipend, graduate student scholarships, government grants for descendants of military personnel, civil servants and teachers, as well as other scholarships and grants provided by NTU and the public and private sectors.

Note 2: The ratios for tuition and fees reductions, student loans, and scholarships are calculated by dividing the number of students approved for the aid by the total number of students enrolled in the first and second semester for the academic year. The ratio for grants for disadvantaged students is calculated by dividing the number of students who have received grants by the total number of students for the academic year. The total number of students enrolled is based on the number of undergraduate, master and Ph.D. students enrolled in the first and second semester in AY2017-2018 and AY2018-2019, which were 63,077 and 62,900. The total number of students for the academic year is the average number of students enrolled in the first and second semester in that academic year.





(II) Committees, campus planning, and grievance mechanism promoting campus diversity and equality

We have several committees and grievance mechanisms in place, which promote diversity and inclusiveness on campus. Each of these units has formulated and implemented various programs that support a friendly campus.

1. Diversity and equality committees

 <p>Gender Equality Education Committee</p>	<p>Promotes gender equality education on campus in hopes of creating a friendly campus environment.</p>
 <p>Special Education Implementation Committee</p>	<p>Integrates resources, plans and develops special education strategies, and improves the infrastructure and design of handicap-accessible environments in order to respond to the characteristics and needs of students with special needs and to promote special education at NTU.</p>
 <p>Campus Planning Office Committee</p>	<p>Formulates directions for friendly campus planning to promote campus diversity, anti-discrimination, and assistance for the underprivileged, including: human-oriented traffic/sidewalks/public bicycles, handicap-accessible spaces and facilities, gender-friendly spaces, the campus signpost system, and a friendly international environment.</p>

For more information, please visit the websites below:

- [National Taiwan University Gender Equality Education Committee](#)
- [Disability Support Services, Student Counseling Center, Office of Student Affairs, NTU](#)
- [NTU Campus Planning Office](#)


2. Campus plans and measures related to diversity and equality

 <p>Gender-friendly restrooms</p>	<p>NTU established the "NTU Regulations for the Establishment of Gender-Friendly Restrooms" to promote the establishment of gender-friendly restrooms on campus so that NTU teachers and students could further implement concepts of friendly campus and gender equality. The regulations stipulate that all new buildings must have gender-friendly restrooms, and existing buildings will be prioritized for restroom improvements based on their individual conditions. NTU also established the "National Taiwan University Handbook for All Gender Restroom" to promote the concept of gender-friendly restrooms and serve as a reference for the planning and designing of gender-friendly restrooms.</p> <p>As of 2019, a total of 11 buildings have been established Gender-friendly Restroom, such as Basic Medical Science Building, 1<sup>st</sup> Student Activity Center, Dept. of Sociology, Department. of Social Work, Guo Qing Women/Men Graduate 3<sup>rd</sup> Dorm, 2<sup>nd</sup> Student Activity Center, Core Subjects Classroom Building, Chee-Chun Leung Cosmology Hall, The Apex Building, Multi-Purpose Classroom Building, Tseng Jiang Hall, Precision Greenhouse.</p>
 <p>Map of handicap-accessible facilities</p>	<p>NTU has invested in more than NT\$50 million and completed improvement projects for handicap-accessible environment at over 60 locations since 2006. The Office of General Affairs compiled a map of handicap-accessible facilities on campus in December 2015. The map is accessible through computers and mobile phones and shows the information on handicap-accessible slopes and entrances, restrooms, elevators, and parking spaces for cars and scooters. The information is presented with photos and text descriptions, helping people with impaired mobility learn about the location and condition of facilities in advance.</p>
 <p>Employment Plan for People with Disabilities</p>	<p>NTU strives to protect the rights and interests of people with disabilities, take care of students or alumni with disabilities, and provide employment opportunities; therefore, NTU established the 'Employment Plan for People with Disabilities' to help the disabled to find a suitable local job. This plan is in line with the principles of equality, inclusion, and reasonable accommodation in the Convention on the Rights of Persons with Disabilities (CRPD).</p>

For more information, please visit the websites below:

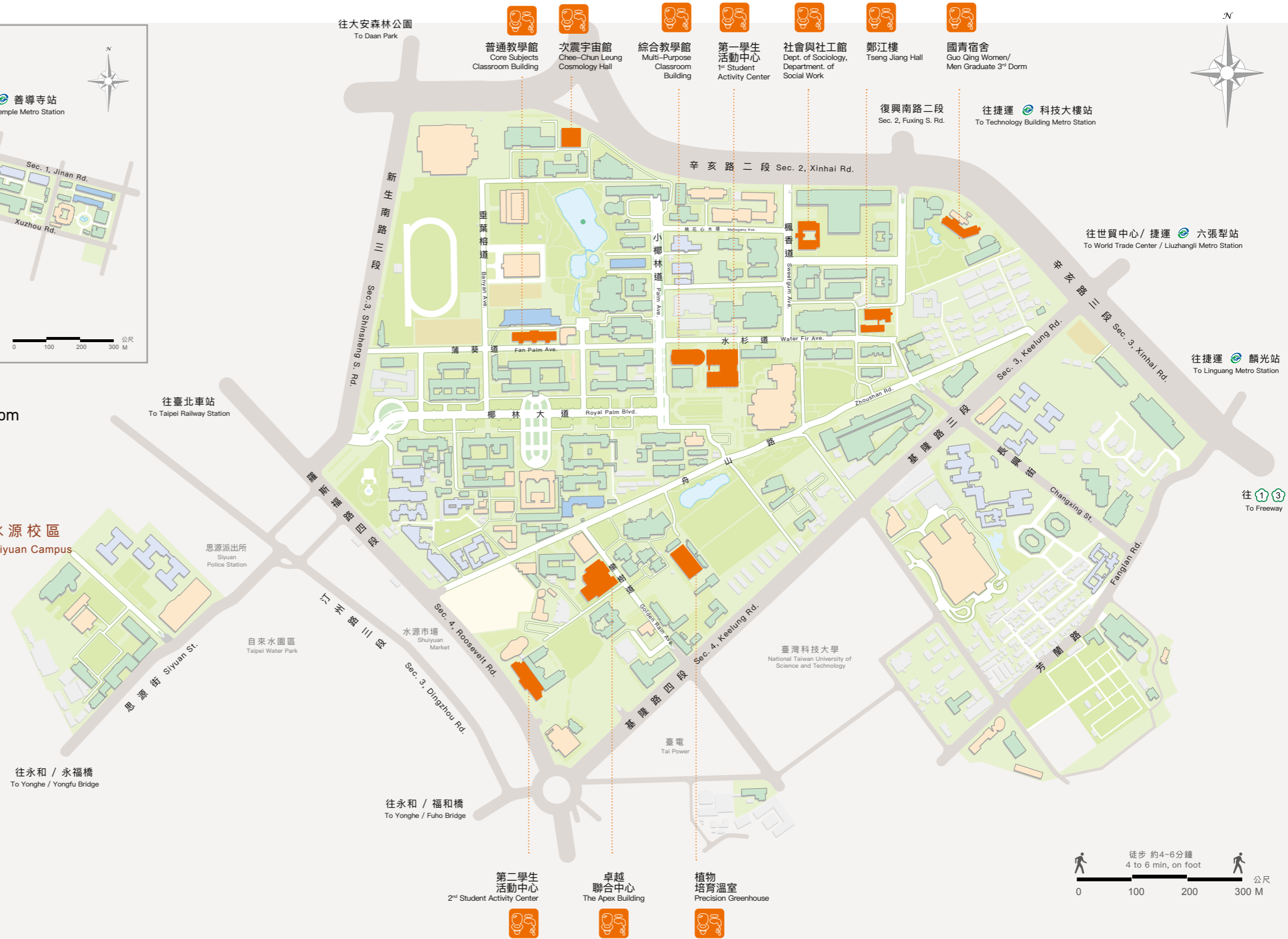
- [National Taiwan University Regulations for the Establishment of Gender-Friendly Restrooms](#)
- [National Taiwan University Guidelines and Manual for the Establishment of Gender-Friendly Restrooms](#)
- [Map of handicap-accessible facilities on campus](#)
- [Employment Plan for People with Disabilities](#)



 Building with Gender-friendly Restroom

水源校區  
Shuiyuan Campus

校總區  
Taipei Main Campus



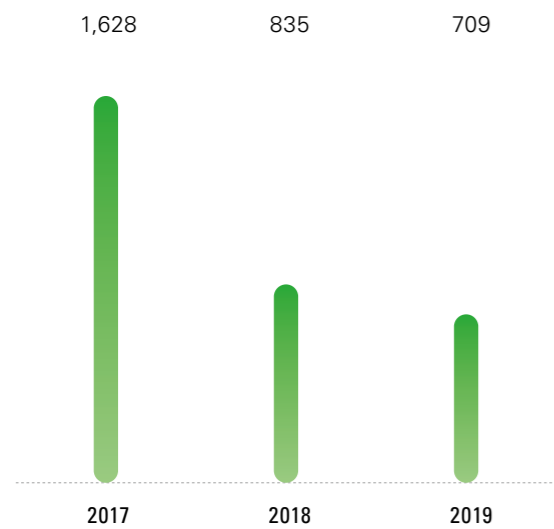
3. Grievance mechanism related to diversity and equality



NTU Suggestion System

This two-way communication platform invites teachers, students, and alumni to provide constructive suggestions for institutional development and administrative operations, and facilitates systematic cooperation among departments and units to create an excellent, friendly learning environment at NTU.

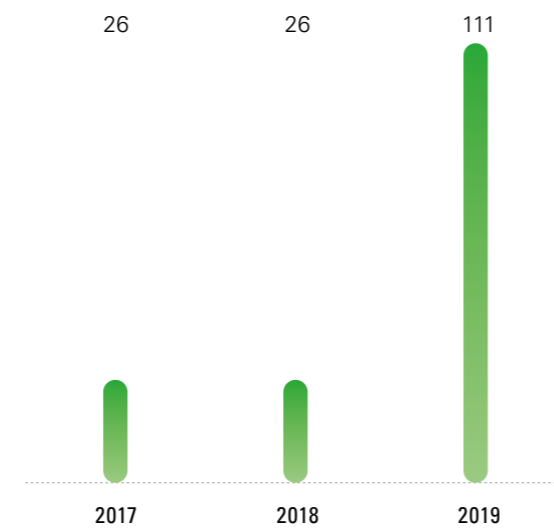
Number of Suggestions



NTU Workplace Sex Discrimination Grievance and Appeal Committee and NTU Sexual Harassment Prevention and Resolution Committee

These committees aim to protect the work rights of faculty and staff, provide a work environment free of gender discrimination, prevent sexual harassment, and protect the rights of victims.

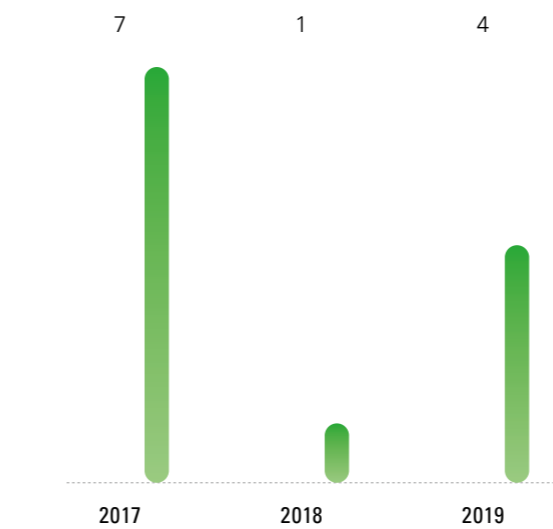
Number of Reported Cases



Faculty Appeal Committee

This mechanism allows faculty members to file their grievances. Pursuant to Article 7 of the 'NTU Organizational and Review Directions for the Faculty Appeal Committee', full-time NTU faculty members may file an appeal with this committee if they believe that measures conducted by NTU are illegal or inappropriate and further damage their rights and interests.

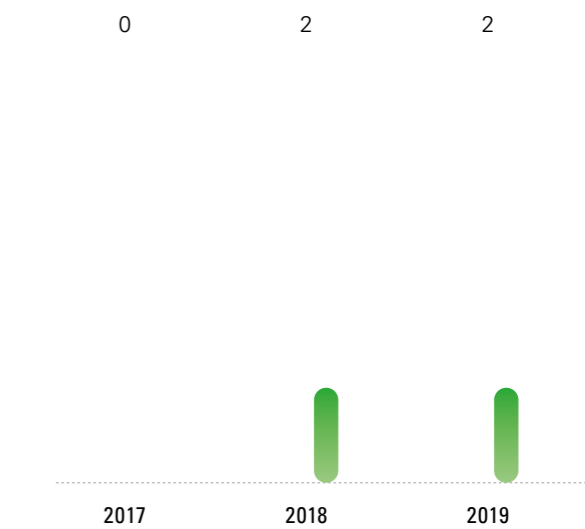
Faculty Appeal Committee



Staff Member Grievance Committee

This mechanism allows staff members to file their grievances. Pursuant to Article 2 of the 'NTU Regulations for Staff Member Grievances', NTU staff members may file an appeal to NTU if they believe that management measures or the handling of work conditions conducted by NTU are inappropriate and damages his/her rights and interests.

Number of Complaints



For more information, please visit the websites below:

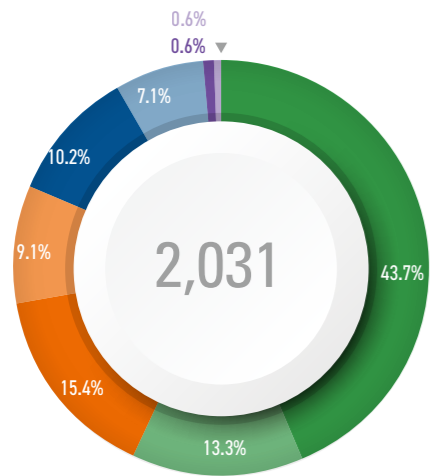
• [NTU Suggestion System](#)

• [National Taiwan University Gender Equality Education Committee](#)

• [Organizational and Review Directions for the Faculty Appeal Committee](#)

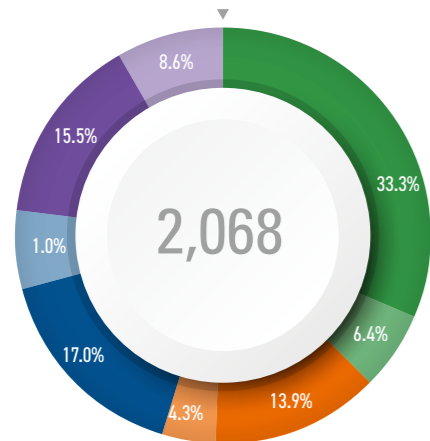
• [Regulations for Staff Member Grievances](#)

(III) Faculty and student composition



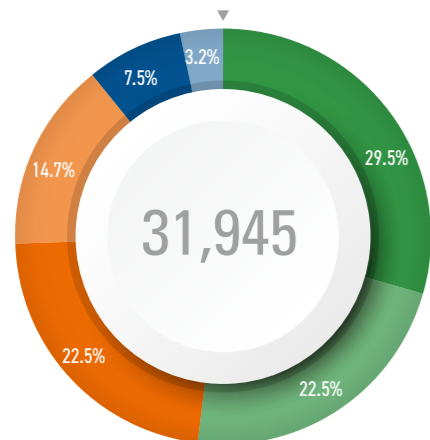
Number of full-time teachers in 2019

Position	Male	Female	Total
Professors	887	271	1,158
Associate Professors	313	184	497
Assistant Professors	208	145	353
Lecturers	13	10	23
<b>Total</b>	<b>1,421</b>	<b>610</b>	<b>2,031</b>



Number of part-time teachers in 2019

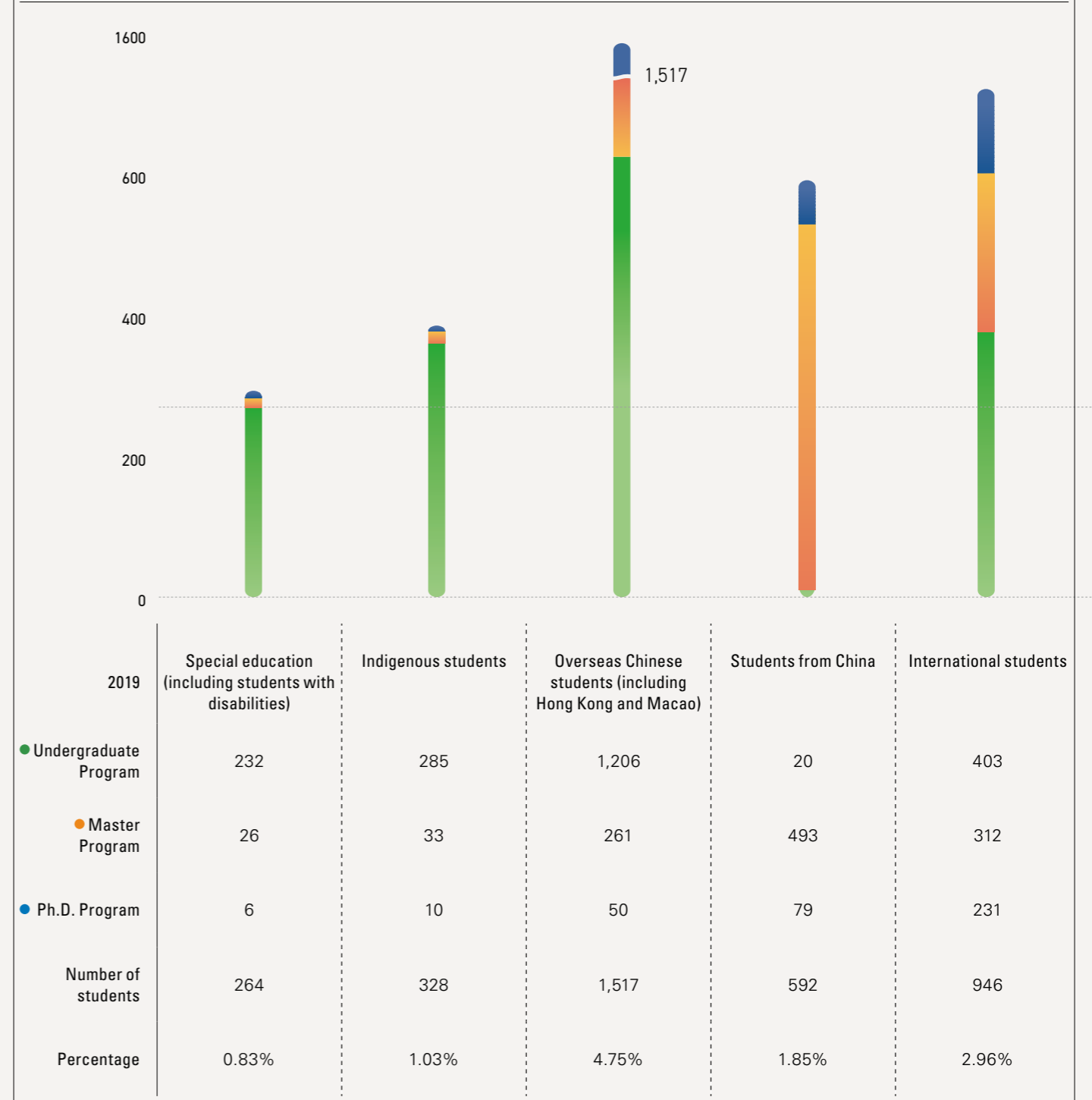
Position	Male	Female	Total
Part-time Professors	652	125	777
Part-time Associate Professors	273	85	358
Part-time Assistant Professors	332	129	461
Part-time Lecturers	303	169	472
<b>Total</b>	<b>1,560</b>	<b>508</b>	<b>2,068</b>



2019

	Male	Female	Total
Undergraduate Program	9,432	7,183	16,615
Master Program	7,190	4,707	11,897
Ph.D. Program	2,405	1,028	3,433
<b>Total</b>	<b>19,027</b>	<b>12,918</b>	<b>31,945</b>

Student diversity



## II. A Campus that is Happy and Safe

### (I) Remuneration and benefits for faculty and staff

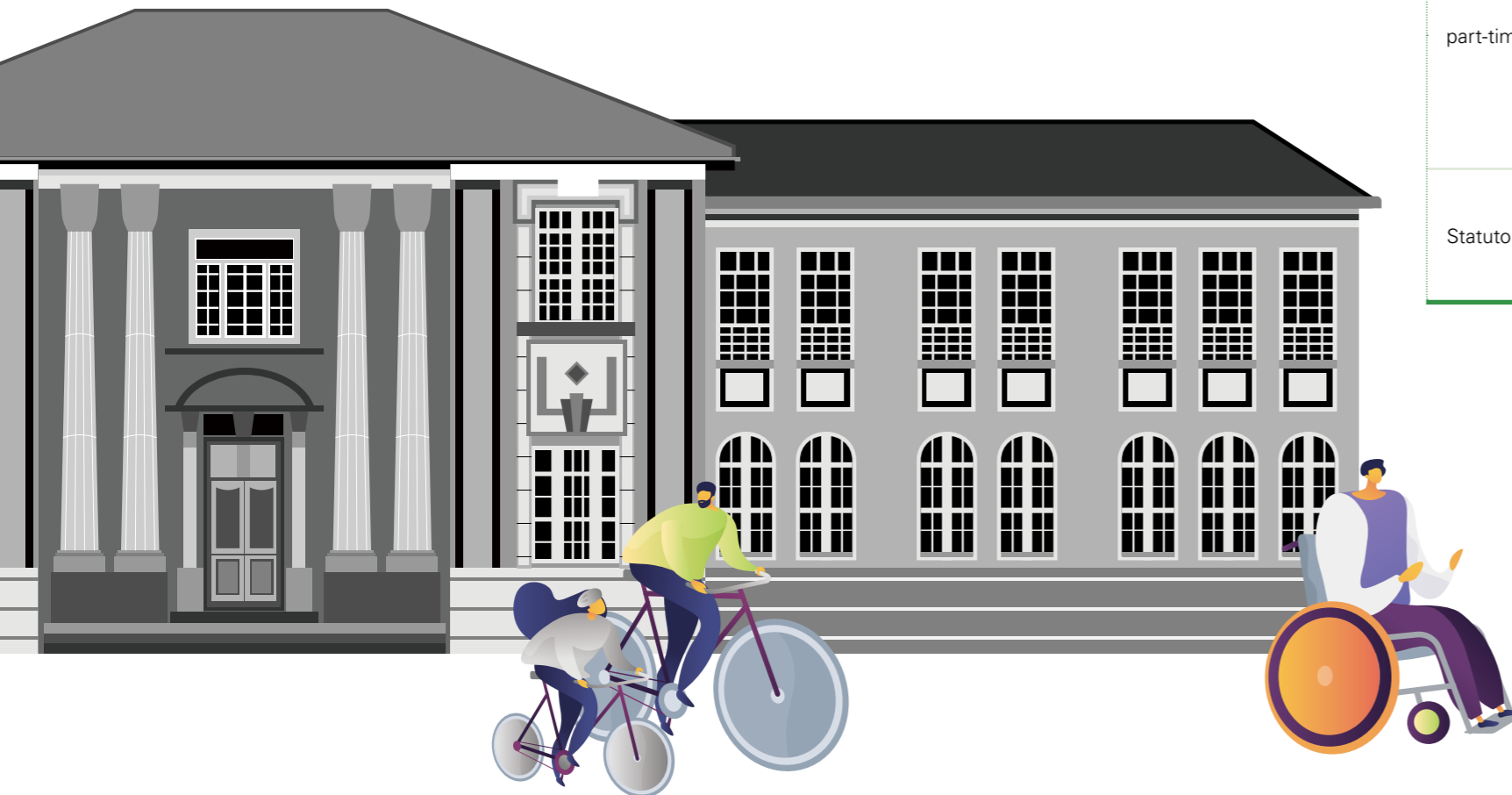
The remuneration of our faculty and teachers is governed by the 'Teacher Remuneration Act', 'Civil Service Pay Act', and 'Regulations Governing the Payment of Remuneration to Military, Public and Teaching Personnel'. Remuneration of contract staff is governed by the 'Contract Staff Management Guidelines and the Remuneration Criteria for Contract Staff'. The current salary standard for full-time and part-time faculty and staff members is highly competitive compared to the minimum wage. We continuously adjust salary levels with in line with the revisions of the Ministry of Labor, in order to ensure the rights and interests of all of our employees.

In order to recruit and retain excellent professors, we provided better accommodation by expanding our faculty dormitories and established awards including the NTU Preeminence Chair Professorship and the Distinguished Professorship of Practical Contribution. In addition, NTU provided extra bonus for 100 faculties and subsidized innovation projects for new faculties. To accelerate our competitiveness in academic research, we gave bonus for more than 40% of faculties. And to encourage administrative units to generate income for the university, we paid additional compensation to around 50% of staff members.

For more details on the remuneration and benefits for faculty and staff, please visit the [NTU Personnel Department](#).

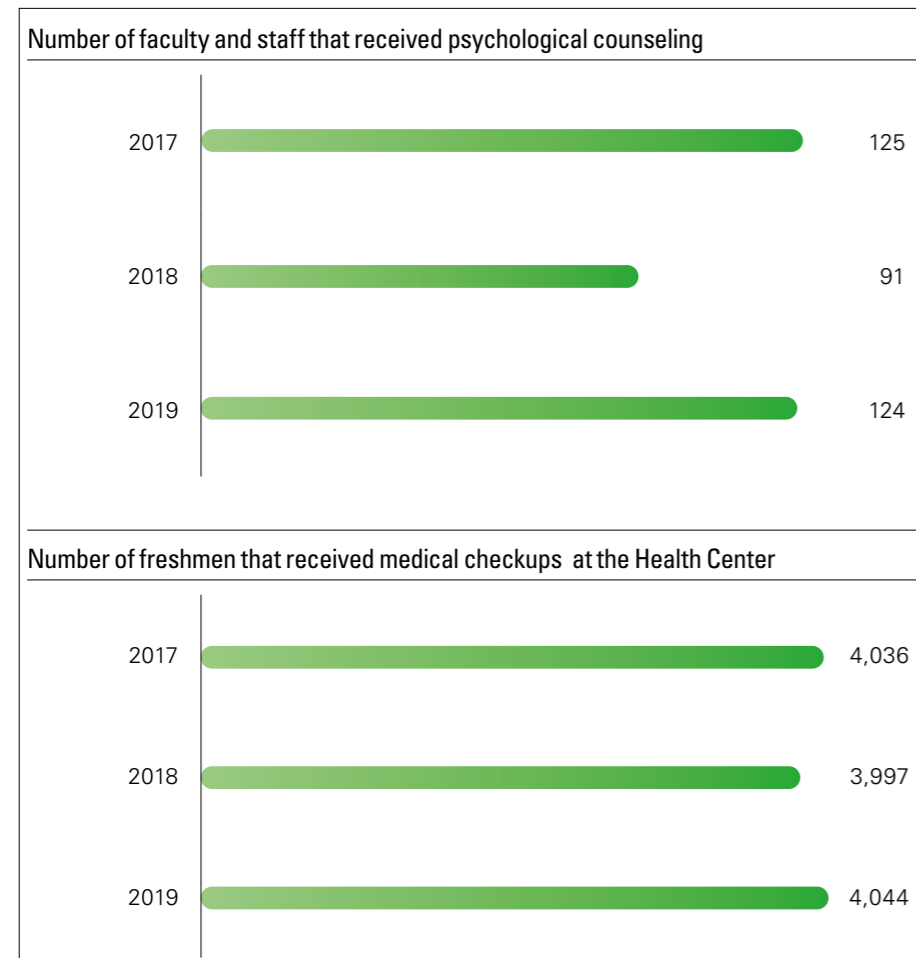
The Ratio of Lowest Salary of Full-time and Part-time Personnel to the Minimum Wage

Item		2017	2018	2019
Types of employees		Lowest salary of various staff: Minimum wage		
Full-time staff	General full-time staff	1.00	1.00	1.00
	Full-time project research assistants	1.05	1.03	1.00
	Post-doctoral fellows	2.70	2.65	2.53
part-time staff	General part-time staff	1.00	1.00	1.00
	Project-based part-time assistant	1.00	1.00	1.00
Statutory minimum wage (NT\$)		\$21,009	\$22,000	\$23,100

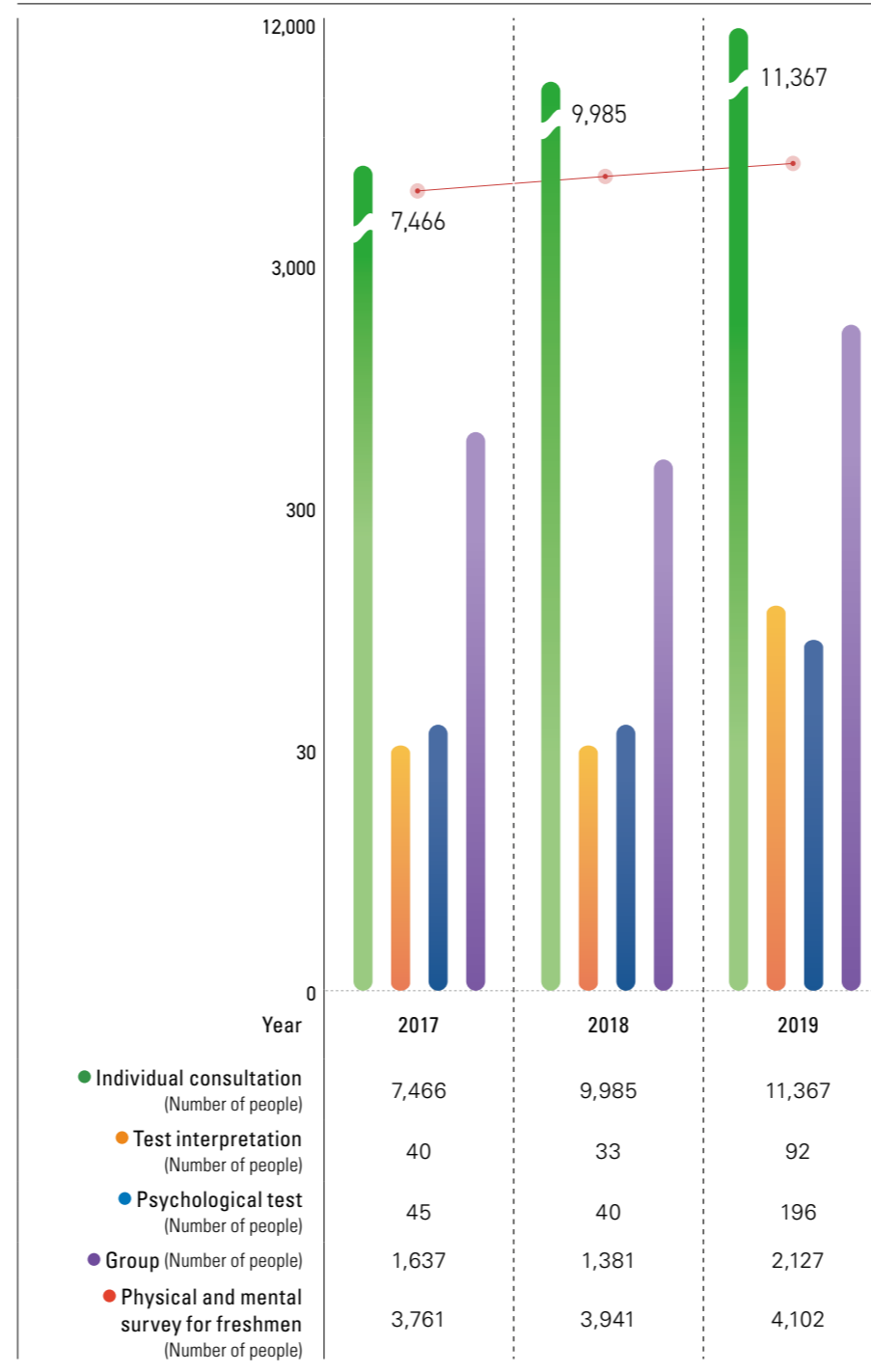


### (II) Physical and mental health services for faculty, staff, and students

At NTU, we have our own Health Center and a Student Counseling Center, in order to promote health and provide healthcare services to students, faculty, and staff. The physical and psychological wellbeing of our students and staff is also cared for by each department, who help with various resources such as insurance, health examinations, and psychological counseling, in view of promoting habits in study, work and life that will ensure good health. At NTU, we are a non-smoking campus, with a few smoking areas in especially designated outdoor spaces. For more details on services, please visit the [Personnel Department for specific services](#), the [Student Counseling Center](#), and the [Health Center](#).



Number of consultations by the Student Counseling Center



### (III) Workplace health and safety

Our Environmental Protection & Occupational Safety & Health Center is in charge of the campus environment safety and health work. The center complies with EHS-related laws and regulations and provides EHS education and training, in hopes of protecting the environment and ensuring the health and safety of personnel. We also have a Campus Security and a Student Safety Center to strengthen campus security. The center handles student accidents, promotes safety education, and conducts various counseling and preventive work. For more details on services, please visit the [NTU Campus Security](#), and the [NTU EHS Center](#) and the [Student Safety Center](#).

#### Work-related injuries and ill health among faculty and staff

Year	2017	2018	2019
Number of recordable incidents of work-related injury or ill health			1
Full-time Equivalent (FTE) faculty and staff			12,007
Number of recordable incidents of work-related injury or ill health per FTE employee			0.008%
Number of recordable incidents of work-related injury or ill health per 100 FTE employees			0.8%

Note 1: The scope of statistics covers faculty and staff.

Note 2: Employees can claim compensation for occupational injuries. To do so, the employee must submit supporting evidence including a diagnosis issued by a medical institution, and fill out the 'NTU's Application Form for Labor Insurance Occupational Injury Healthcare and Benefits'. The unit that the employee belongs to will verify the claim and approve the application. The application form is then submitted to our Personnel Department for official approval, before being sent to the Bureau of Labor Insurance for review. The final decision is made by the Bureau of Labor Insurance.

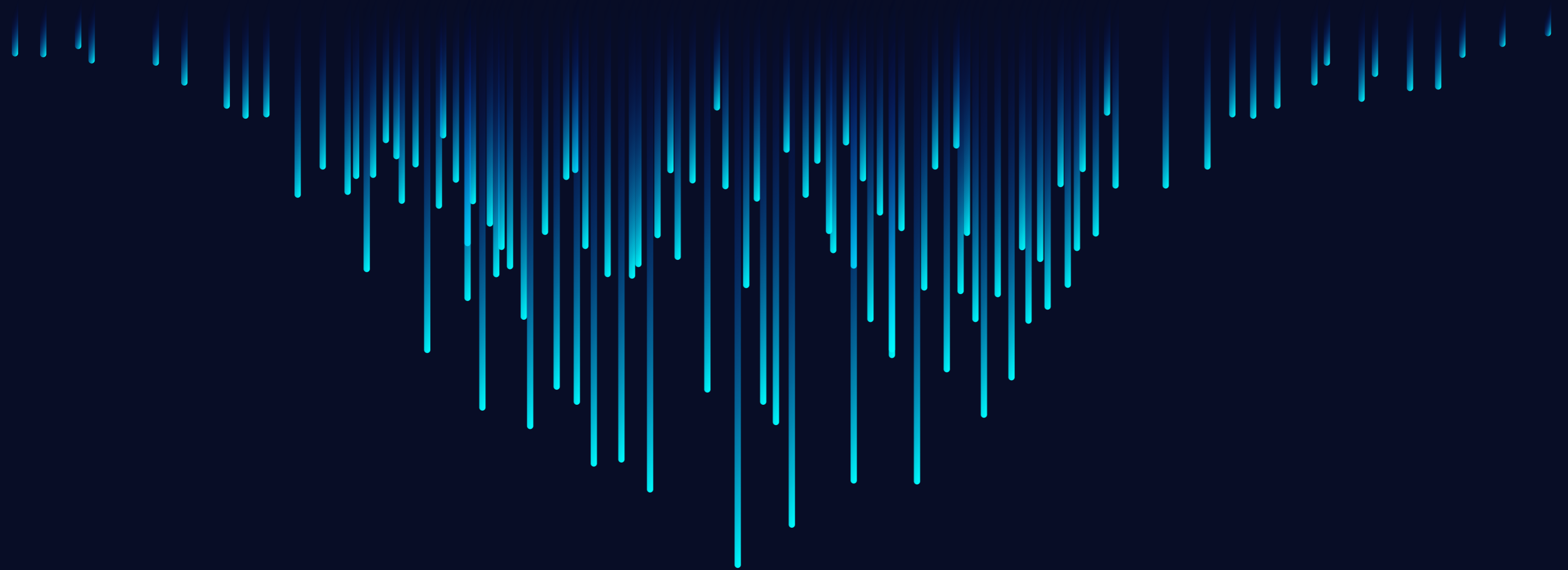
#### Occupational injuries in laboratories

Year	2017	2018	2019
Number of accidental occupational injuries	12	15	26

Note 1: The data includes faculty, staff, and students.

Note 2: This data increases 2017-2019. However, most incidents were false alarms caused by improper handling. No severe injuries were reported.

# APPENDIX



## Summary of Subject Matters Assured

No.	Subject Matters Assured	Reporting Criteria	Page																								
1	<p><b>Number of journal papers published in 2019</b></p> <table border="1"> <thead> <tr> <th>Total number of journal papers</th> <th>Category</th> <th>Number of journal papers</th> </tr> </thead> <tbody> <tr> <td rowspan="3">5,096</td> <td>SCI (Science Citation Index Expanded)</td> <td>4,869</td> </tr> <tr> <td>SSCI (Social Science Citation Index)</td> <td>645</td> </tr> <tr> <td>A&amp;HCI (Arts &amp; Humanities Citation Index)</td> <td>40</td> </tr> </tbody> </table> <p>Note 1: The number of journals published by the National Taiwan University (articles and reviews) as of December 31<sup>st</sup>, 2019, was retrieved from the Web of Science on April 9<sup>th</sup>, 2020.</p> <p>Note 2: Double counting has been eliminated resulting in a total of 5,096 journal papers published by the NTU in 2019 (i.e., journals categorized by field of research, which appear on multiple lists of SCI, SSCI, and A&amp;HCI on the Web of Science website).</p>	Total number of journal papers	Category	Number of journal papers	5,096	SCI (Science Citation Index Expanded)	4,869	SSCI (Social Science Citation Index)	645	A&HCI (Arts & Humanities Citation Index)	40	<p>As of April 9, 2020, the total number of SCI, SSCI and A &amp; HCI journal papers (articles and reviews) published by the National Taiwan University in 2019 based on the search results on the Web of Science website.</p> <p>Note: Web of Science may modify the database and search algorithms at different point in time, resulting in different search results.</p>	38														
Total number of journal papers	Category	Number of journal papers																									
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	SSCI (Social Science Citation Index)	645																									
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2	<p><b>Number of green buildings in the NTU in 2019<sup>1</sup></b></p> <table border="1"> <thead> <tr> <th>Campus</th> <th>Building name</th> <th>Certificate classification</th> <th>Year certificate acquired</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Main Campus</td> <td>Phase two construction of instructional buildings</td> <td>Silver</td> <td>2019</td> </tr> <tr> <td>Phase three construction of the Building for Research Excellence (Tseng Jiang Hall)</td> <td>Silver</td> <td>2019</td> </tr> <tr> <td>Construction of the Biomedical Engineering Hall</td> <td>Bronze</td> <td>2019</td> </tr> <tr> <td>Construction of the Faculty and Staff Dorm</td> <td>Certified</td> <td>2018</td> </tr> <tr> <td>Construction of the Animal Resource Center</td> <td>Certified</td> <td>2017</td> </tr> <tr> <td>Yunlin Campus</td> <td>Construction of the Agricultural Incubation and Promotion Center (Chuhe Building)</td> <td>Certified</td> <td>2019</td> </tr> </tbody> </table> <p>Note: The number of Green Building Label (Class Certified and above) obtained as of December 31, 2019.</p>	Campus	Building name	Certificate classification	Year certificate acquired	Main Campus	Phase two construction of instructional buildings	Silver	2019	Phase three construction of the Building for Research Excellence (Tseng Jiang Hall)	Silver	2019	Construction of the Biomedical Engineering Hall	Bronze	2019	Construction of the Faculty and Staff Dorm	Certified	2018	Construction of the Animal Resource Center	Certified	2017	Yunlin Campus	Construction of the Agricultural Incubation and Promotion Center (Chuhe Building)	Certified	2019	<p>The number of Green Building Label (issued by the Ministry of the Interior and Class Certified and above) obtained as of December 31, 2019.</p>	48
Campus	Building name	Certificate classification	Year certificate acquired																								
Main Campus	Phase two construction of instructional buildings	Silver	2019																								
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No.	Subject Matters Assured	Reporting Criteria	Page																													
3	<p>The School of Professional Education &amp; Continuing Studies provides credit programs, non-degree programs and master degree programs. In 2019, 214 courses were offered and 2,260 certificates<sup>1</sup> of continuing studies were issued.</p> <p>Note: The number of certificates in 2019 is calculated based on the date certificates were printed.</p>	<p>According to the statistic on the NTU School of Professional Education and Continuing Studies website, the number of courses provided<sup>1</sup> and the number of certificates issued<sup>2</sup> from the NTU School of Professional Education and Continuing Studies.</p> <p>Credit programs and non-degree programs are identified by the combination of four data points: the semester, the class number, the course title, and the course sequence. The combination of the four data points forms the unique identification code in the database. Master degree programs are identified by the curriculum number which is the unique identification code in the database. The unique identification code is the calculation unit of the number of courses offered.</p> <p>Note 1: Course commencement date. Note 2: Certificate printed date.</p>	46																													
4	<p><b>Endowment Investment Targets<sup>1</sup></b> <span style="float: right;">Unit: NT\$1,000</span></p> <table border="1"> <thead> <tr> <th rowspan="2">Investment Targets</th> <th colspan="2">2019</th> </tr> <tr> <th>Amount</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Electronics</td> <td>575,644</td> <td>30.8%</td> </tr> <tr> <td>Telecommunications</td> <td>440,258</td> <td>23.6%</td> </tr> <tr> <td>Food Distribution</td> <td>147,920</td> <td>7.9%</td> </tr> <tr> <td>Raw Material Manufacturing<sup>1</sup></td> <td>228,914</td> <td>12.2%</td> </tr> <tr> <td>Financial</td> <td>430,484</td> <td>23.0%</td> </tr> <tr> <td>Automobile Manufacturing</td> <td>17,353</td> <td>0.9%</td> </tr> <tr> <td>Fund</td> <td>28,420</td> <td>1.5%</td> </tr> <tr> <td><b>Total<sup>2</sup></b></td> <td><b>1,868,993</b></td> <td><b>100.0%</b></td> </tr> </tbody> </table> <p>Note 1: Raw material manufacturing includes manufacture of rubber products, cement and basic iron and steel. Note 2: This amount only includes investments in equities and funds.</p>	Investment Targets	2019		Amount	Percentage	Electronics	575,644	30.8%	Telecommunications	440,258	23.6%	Food Distribution	147,920	7.9%	Raw Material Manufacturing <sup>1</sup>	228,914	12.2%	Financial	430,484	23.0%	Automobile Manufacturing	17,353	0.9%	Fund	28,420	1.5%	<b>Total<sup>2</sup></b>	<b>1,868,993</b>	<b>100.0%</b>	<p>As of December 31, 2019, the National Taiwan University invested in Taiwan equities, China equities and funds. The value of Taiwan equities is calculated by multiplying the number of equity shares shown on the Taiwan Depository and Clearing Corporation's passbooks by the Taiwan Stock Exchange's declared closing prices on December 31, 2019 for the respective equities. The value of China equities is based on the value shown on the brokers' statements (RMB is converted to NTD based on the Bank of Taiwan's declared Spot Rate on December 31, 2019). The value of funds are based on the statements from the fund company. The percentage of endowment investment in various industries is calculated based on aforementioned values.</p>	8
Investment Targets	2019																															
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<b>Total<sup>2</sup></b>	<b>1,868,993</b>	<b>100.0%</b>																														
5	<p>Number of university-level collaboration agreements<sup>1</sup>: 717</p> <p>Note: University-level collaboration agreements are written agreements that the NTU has signed with overseas educational research institutions. The number includes all written academic cooperation agreements which remain effective in 2019.</p>	<p>The number of university-level written agreements which remain effective in 2019, calculated based on the statistics from the International Activities Management System.</p> <p>Note: For those agreements with extension, modification and addendum, if the current agreement does not mention the abolishment of the previous one, then both agreements are viewed as effective during the valid period. The calculation is then based on the number of signed agreements.</p>	4																													

## Independent Limited Assurance Report

### Independent Limited Assurance Report

#### To National Taiwan University

We have been engaged by National Taiwan University (“NTU”) to perform assurance procedures on the sustainability performance information identified by the NTU and reported in the 2019 University Sustainability Report (hereinafter referred to as the “USR Report”), and have issued a limited assurance report based on the result of our work performed.

#### Subject Matter Information and Applicable Criteria

The sustainability performance information identified by the NTU (hereinafter referred to as the “Subject Matter Information”) and the respective applicable criteria are stated in the “Summary of Subject Matter Assured” on page 63 of the USR Report. The scope of the aforementioned Subject Matter Information is set out in the “About the USR Report” on page 2 of the USR Report.

#### Management’s Responsibilities

The Management of the NTU is responsible for the preparation of the sustainability performance information disclosed in the USR Report in accordance with the respective applicable criteria, and for such internal control as management determines is necessary to enable the preparation of the sustainability performance information that is free from material misstatement, whether due to fraud or error.

#### Our Responsibilities

We conducted our assurance work on the Subject Matter Information disclosed in the USR Report in accordance with the International Standard on Assurance Engagements 3000, issued by the International Auditing and Assurance Standards Board, to identify whether any amendment is required of the Subject Matter Information to be prepared, in all material aspects, in accordance with the respective applicable criteria, and issue a limited assurance report.

We conducted our assurance work in accordance with the aforementioned standards including identifying the areas where there may be risks of material misstatement of the Subject Matter Information, and designing and performing procedures to address the identified areas. The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the assurance that would have been obtained had we performed a reasonable assurance engagement.

The extent of the assurance work we performed were based on the identified risk areas and determined materiality, and given the circumstances of the engagement, we designed and performed the following procedures:

- Made inquiries of the persons responsible for the Subject Matter Information to understand the processes, information systems (if any), and the relevant internal controls relating to the preparation of the aforementioned information, to identify the areas where there may be risks of material misstatement; and
- Based on the above understanding and the areas identified, performed selective testing including

inquiry, observation, inspection, and reperformance to obtain evidence for limited assurance.

We do not provide any assurance on the USR Report as a whole or on the design or operating effectiveness of the relevant internal controls. Our assurance does not extend to information in respect of earlier periods or to any other information disclosed in the USR Report for 2018.

#### Compliance of Independence and Quality Control Requirement

We have complied with the independence and other ethical requirements of the Code of Ethics for Professional Accountants, which is founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behavior.

Our firm applies Statement of Auditing Standard No. 46, “Quality Control for Public Accounting Firms” in the Republic of China and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

#### Inherent Limitations

Certain Subject Matter Information involves non-financial data which is subject to more inherent limitations than financial data. Qualitative interpretations of the relevance, materiality and the accuracy of data are subject to individual assumptions and judgments.

#### Limited Assurance Conclusion

Based on the procedures we have performed and evidence we have obtained, we are not aware of any amendments that is required for the preparation of Subject Matter Information, in all material aspects, to be in accordance with respective applicable criteria.

#### Other Matter

The Management of the NTU is responsible for maintaining the NTU’s website. If the Subject Matter Information or related applicable criteria are modified after this limited assurance report is issued, we are not obliged to re-perform the assurance work.

PricewaterhouseCoopers, Taiwan

Chang, Jui-Ting

Partner

June 1<sup>st</sup>, 2020

For the convenience of readers and for information purpose only, this document has been translated into English from the original Chinese version. In the event of any discrepancy between the English version and the original Chinese version or any differences in the interpretation of the two versions, the Chinese-language version shall prevail.

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