

August 31, 2022

Designated National University Initiatives of Nagoya University



Nagoya University

Part One: To become a World-Class Research University

1. Introduction

Based on its Academic Charter enacted in 2000, Nagoya University, as a Designated National University, has set the basic goal of “becoming a world-class research university,” and, taking a global perspective, aims to be a world-class research university that educates and trains graduates who can become next generation leaders. Through cutting-edge research, we aim to innovate and pursue greater knowledge and understanding. We also want to contribute to peace between nations and promote sustainable development in both Japan and the rest of the world.

Higher education in Japan is at a turning point with significant challenges to overcome. Japan’s universities must somehow preserve standards for high-quality research and teaching in the face of decreasing university-age citizens. At the same time, they must address less financial support from the Central Government which must direct funds towards an aging population. At the same time, Japanese universities must compete globally for talent. In the following pages, we outline our plan for the fourth interim target period and beyond with particular emphasis on the following three points. i) Unique research achievements of Nagoya University faculty. ii) The vision and goals that will lead us to become a world-class university. iii) The strategies and measures that will help us achieve our full potential. Nagoya University will be better positioned to achieve its ambitious goals should it join the new elite group of Designated National Universities. We invite you to examine what follows and to consider the reasons that make Nagoya University a strong candidate for this status.

2. Producing world-class research in an ethos of free and open-minded learning: development, current state, characteristics, challenges

Nagoya University is the youngest of Japan's former imperial universities.

Although its origins date back to 1871 when the Prefectural Government founded a Temporary Medical School and Public Hospital, it was only in 1939 the national government chose it as an Imperial University. Then, only two schools (or faculties) existed—the School of Science and Engineering and the School of Medicine. But in 1955, Nagoya University took an important step in becoming a comprehensive university by setting up eight new schools including Literature, Education, Law, Economics, Science, Medicine, Engineering, and Agriculture. Of the seven former Imperial Universities, Nagoya University teaches the fewest students (16,000) and employs the smallest number of faculty members (approximately 1,700). Our key features are as follows:

(1) A Free and Open-Minded Culture of Study In the post-war period, Nagoya University developed a campus culture that encouraged creativity and freedom of thought. It attracted young students and faculty from around the country, many of whom became leaders in Japanese industry. The six Nagoya University-affiliated Nobel laureates since the turn of the 21 century are another testimony to the excellence of the academic culture at Nagoya University.¹⁾

(2) Research Achievements of our Faculty Among the seven former Imperial Universities, Nagoya University receives the fewest subsidies for basic administrative costs. It also has the lowest prescribed quotas of full-time students and faculty. Despite these disadvantages, the individual performance of our faculty rank first in *kakenhi* (Grants-in-Aid for Scientific Research) awarded by the Japan Society for the Promotion of Science (JSPS); second in other external grants; second in contracted research funding; third in joint research funding; and second in the ratio of female researchers awarded new *kakenhi* grants. Regarding mentorship of Ph.D. students, Nagoya University ranks third in the number of winners of the Ikushi Award²⁾. These show our university’s achievements.

According to the Nature Index (2016), Nagoya University ranks 72nd in the world in research on Chemistry, Physics, and the Life Sciences. One of our flagship research hubs is the Institute of Transformative Bio-Molecules (ITbM)³⁾. It was selected by the Ministry of Education, Culture, Sports, Science, and Technology as one of only nine institutions throughout Japan to be a World Premier International Research Center (WPI)⁴⁾. Researchers at ITbM are pioneering a new research field by integrating research in chemistry and biology.

¹⁾ Nobel Prize winners: Ryoji Noyori (Chemistry, 2001), Toshihide Maskawa and Makoto Kobayashi (Physics, 2008), Osamu Shimomura (Chemistry, 2008), Isamu Akasaki and Hiroshi Amano (Physics, 2014).

²⁾ JSPS Ikushi Prize: Founded by the Japan Society for the Promotion of Science with the aim of building the capacity of young researchers by recognizing outstanding doctoral students who are expected to contribute to the development of scholastic research in Japan.

³⁾ WPI: World Premier International Research Center Initiative.

⁴⁾ ITbM: (Institute of Transformative Biomolecules) aims to develop “transformative life-giving molecules” that are key in addressing critical issues at the border between chemistry and biology.

(3) Regional Advantage As a core university located in one of the world's most important manufacturing hubs, Nagoya University strongly promotes industry-academia partnerships.

Measures for promoting industry-university partnerships: We have set up the Office for the Promotion of Academic Research and Industry-Academia-Government Partnerships, systematized URAs, and established the Industry-Academia Collaborative Chair. We have also set in place cross-institutional appointments; earmarked collaborative research; full-time employment of Ph.D. students; and support for entrepreneurial education and business start-ups.

(4) Support for Asian Development In contrast to Japan's greying workforce and declining birthrate, the populations and economies of other Asian nations continue to grow. For over two decades, Nagoya University has supported many countries in the region. It has been most active in the following four areas: i) Legal and judicial systems (CALE⁵: Center for Asian Legal Exchange); ii) Healthcare Administration (YLP⁶: Young Leaders Program in Healthcare Administration at the Graduate School of Medicine); iii) Agricultural Science (Graduate School of Agriculture); and iv) Political, economic and educational development (Graduate School of International Development). Outside Japan, one hundred and sixty government officials working in the Asian region graduated from Nagoya University. One notable example is the current Minister of Justice of Vietnam. He graduated with a doctorate from our Graduate School of Law. Based on this track record, the university will expand its network to Asia Pacific, Europe, and North America, and strengthen its role as a hub university in Asia.

(5) Women's Empowerment Nagoya University sets minimum quotas for women researchers in our Young Leaders Cultivation (YLC) program⁷. We also have made it a priority to hire more women scientists (Nagoya University Women PI⁸ Scientists). To support faculty and staff with families, Nagoya University offers a daycare center and provides after-school care. The United Nations Entity for Gender Equality and the Empowerment of Women (UN Women) recognized these efforts by selecting Nagoya University in 2015 as one of only ten universities in the world, and the only one in Japan, for the HeForShe⁹ campaign.

(6) Innovative Initiatives Since the 1990s, Nagoya University has introduced many innovative initiatives.

Examples include:

- i) Building advanced research hubs: In the tradition of former Nobel Prize winners, ITbM, KMI, and CIRFE are pushing forward the frontiers of advanced studies.
- ii) Support for young post-doctoral researchers: Introducing the YLC.
- iii) Doctoral education reforms: Implementation of six government funded Leading Graduate School Programs—only one university in Japan has a greater number of selected programs. -
- iv) Internationalization of the campus and international networks: An introduction of English-Taught programs through the Global 30 (G30) and others, an increase of international students and faculty members, and active involvement in international networks (AC21, RENKEI, MIRAI, UBIAS).
- v) Large-scale industry-university collaborative research under one roof: COI, NCC, etc.
- vi) Organizational reform: In response to the changing needs of the times, Nagoya University established Graduate Schools of Environmental Studies and International Development. Both incorporate expertise in humanities, social sciences, applied sciences and natural sciences. We have also recently reorganized the Schools of Informatics, Humanities, Engineering, and some of our research centers.
- vii) Institutional management: Building robust campus management with the aim of supporting advanced research.
- viii) Establishment of the Tokai National Higher Education and Research System: Establishment of a new multi-campus system of several universities one corporation.

Since its revival during the postwar period, Nagoya University has prided itself on fostering an ethos of free and open-minded study. This is an important cultural legacy. Other hallmarks of our institution have been its leveraging of regional advantages, its systematic and strategic plan of development for the future, and contributions to bettering society. As we pass these values on to the next generation, they will form the wellspring of Nagoya University's competitive spirit.

(7) Challenges for Nagoya University to raise its appeal and rank among the world's leading research institutions For us to achieve our goals, we must overcome the following problems:

i) University Rankings: In 2021, the Times Higher Education (THE) ranked Nagoya University between 351st and 400th (sixth in Japan). Meanwhile, QS World University Rankings placed it 118th (sixth in Japan). Though higher,

⁵ CALE: The Center for Asian Legal Exchange conducts research on law in Asia and works with partners in the region to improve their legal and judicial systems.

⁶ YLP: Graduate schools in the medical field have been engaged in the Young Leaders Program (YLP) courses for the last ten years at graduate schools in developing countries and fostered a number of healthcare administrators.

⁷ YLC: A program designed to foster young doctoral students. Independent researchers from higher research institutions are called for publicly. There are quotas for inside and outside Nagoya University and eight students are selected every year. They are expected to engage in research and spend at least a year abroad over the five-year term.

⁸ PI: Principal Investigator

⁹ HeForShe: A solidarity movement hosted by the United Nations Entity for Gender Equality and the Empowerment of Women (UN Women). Its aim is to encourage men and boys to participate as allies and agents of change for gender equality and women's rights.

the ARWU World University Rankings still ranked us only 84th (third in Japan). We recognize that these are not the rankings of a university that has reached the upper echelon of the world's leading research institutions.

- ii) Revenue: Industry-university partnerships will be a pillar of Japan's future growth. Understanding this, we have made several reforms over the last few years. To date, we have increase collaborative research twofold; increased contracted research to 1.5 times its previous level; and over the past four years brought in 100 million yen in patent revenue. That said, their impact on Japanese society remains limited.
- iii) Human Resources: Employing the best people is critical to becoming a world-class research university. We must do more to encourage excellent students and researchers from Japan and abroad to study and work with us. While these issues may be difficult to resolve overnight, it is important for the Ministry of Education, Culture, Sports, Science and Technology to recognize us as a Designated National University so that we can transcend conventional thinking and pursue bold and long-term reforms.

3. Vision for Fourth Medium-term Goal Period and Beyond

Where does Nagoya University want to achieve through the fourth medium-term and where does it want to be at the end of it? In the following, we outline our vision for the fourth medium-term goal period and beyond.

(1) Becoming a Research University that produces influential world-class research Nagoya University has identified areas of basic research that people can use to tackle humanity's most fundamental challenges. We are bolstering our Ph.D. Programs, supporting young researchers, and setting up advanced research hubs. Based on analysis done by the IR Office, we will strategically support the publication of papers by selecting supported journals, etc., so that, members of our faculty will increase the number of research papers counted in the top 1–10 percent of their fields. We aim to soon join the ranks of the top 50 universities in the world in at least five research areas. This should launch Nagoya University into the ranks of the top 50 universities in the world and top 10 in Asia. Such success should attract more top global universities to partner with us.

(2) Produce outstanding Ph.D. students to lead a knowledge-based society Nagoya University's primary educational reforms revolve around improving the training of Ph.D. students. By equipping them with the right intellectual tools, our graduates will contribute to a diverse range of fields and become leaders in knowledge-based societies. The Doctoral Education Consortium established in 2018 is part of this effort. Taking advantage of our research strengths, we will continue to expand our networks linking universities by creating new joint degree programs (JDPs)¹⁰ Eventually, we hope to set up about twenty units. In addition to providing graduate students the chance to do their research in a new environment, these programs encourage faculty members in different institutions to collaborate. Increased institutional contacts will also help us learn best-practices for future educational reforms. Of course, given the overall size of Nagoya University, the number of students entering JDPs is small. Still, we believe that we can leverage spill-over effects from these programs to both improve education and stimulate innovation. By developing educational content, providing economic assistance, and guiding students towards a successful career, we aim to increase the number of Ph.D. Graduates by at least 10% compared to the fiscal year of 2020 during the fourth medium-term goal period.

(3) Promote campus diversity—internationalization and gender equality Nagoya University will promote current programs to enroll more international students and hire more researchers from abroad. We aim to increase international students to 20 percent of the total student population (about 3,200). Also, we want 70 percent of all Nagoya University students to experience study or training abroad. By attracting outstanding students from abroad and within Japan, we can guarantee campus diversity and internationalization. We also value gender equality and, therefore, aim to have 30 percent female faculty within ten years. To achieve this, we are providing an on-campus work environment that is more welcoming, and appealing, to women. In 2017, Nagoya University established the new Applied Social System Institute of Asia (ASIA). Focusing on practical problems, it will promote collaborative research in the social sciences and humanities. Participating researchers will concentrate on three areas - “institutions,” “human resources” and “the environment”. Through Nagoya University's network of regional government contacts, ASIA will suggest policy recommendations for improving society in these countries.

(4) Refocus on industry-academia partnerships with the potential to increase both the quantity and quality of spin-off companies The City of Nagoya is located in one of the world's most important manufacturing hubs. Nagoya University, therefore, proposes to take advantage of this location to build a new style of industry-academia partnership: collaboration that leads to innovation based on first, knowledge capital; second, people; and third, funding. In addition to that, we aim to significantly strengthen the research management function by assigning University Research Administrator¹¹. By 2020 we aim for such connections to triple. Nagoya University will promote them through our Sharing Education Initiative: entrepreneur education, startup company support, and

¹⁰) Joint Degree Programs (JDPs): The Programs consist of joint curricula developed between Nagoya University and a partner university. Student spend between 6 months and 1 year at the partner institute. Evaluation is required by the Ministry of Education, Culture, Sports, Science and Technology.

¹¹) University Research Administrator (URA): Personnel who engages research support activities and research & development management. They plan and manage research activities and promoting research achievements to be applied and practical in society.

support for listing new companies on the stock exchange.

(5) Leadership and consensus by shared governance for flexible decision making as a research university, Nagoya University believes in a model of leadership based on shared governance. We will improve sharing of information, goals, and strategies among executives on the governing board along with senior management of graduate schools and individual faculty members. This type of governance should attract outstanding educators, researchers, and managers from inside and outside Japan. Together with Gifu University, we established the Tokai National Higher Education and Research System (THERS), which actualizes one corporation including several universities. The THERS Chancellor is responsible for the management of the system and the University President, the Provost, is responsible for research and education, thus separating management and academia. We have established a new governance system with the following features: i) Matters are deliberated and decided on at the Board of Directors for System management, and at the management meeting for the management of each university; ii) For the management council, we have devised a form of management that will lead to frank and substantial exchange of opinions, especially with non-university committee members; iii) Thorough dialogue is held among executives and between executives and each department to formulate and share the basic policies and measures of THERS and the medium- to long-term vision of the departments. Going forward, we will continue to achieve our mission by making quick decisions and achieving an organizational culture based on frank dialogue. In addition, we will further promote the recruitment of outstanding teachers and the securing of management personnel, and strengthen our research capabilities and management base to ensure that they are at the appropriate level for one of the world's leading research universities.

(6) A sustainable financial model Nagoya University will increase the budget of the university to 1.4 times its current level (an increase of 40 billion yen). We will diversify sources of external funding and use current funds more efficiently. We imagine a virtuous cycle that encourages investment in education and research leading to more external funding.

(7) Creating a multi-campus system through full-scale national university partnerships in the Tokai Region Tokai National Higher Education and Research System was created in April 2020. The Tokai Region is a sub-region of central Japan that includes Aichi, Gifu, and Mie Prefectures. Participating universities are benefiting from improved economies of scale. We are sharing resources to improve cost effectiveness and productivity. This is attracting more government and industry funding. Member universities are also benefiting from greater size and, thus, international visibility. The system is also creating greater awareness of the Tokai region in Japan and abroad.

Part Two: Strategies and Plans for Achieving the Vision

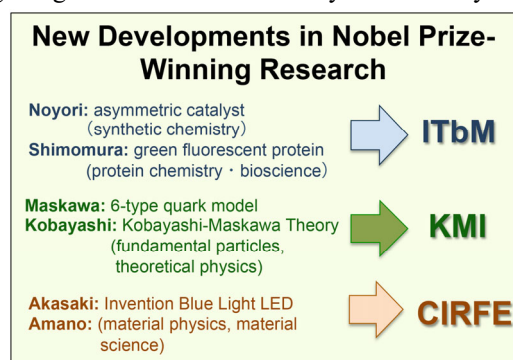
- Nagoya University's own distinctive initiatives -

To reach the seven goals in Nagoya University's plan, we will take the following measures.

1. Producing World-Class Research and Partnering with Top Universities

(1) Build advanced research hubs in the tradition of our Nobel Prize winners

Six researchers affiliated with Nagoya University have won Nobel Prizes since the turn of the 21st century. The research legacy of these Nobel laureates lives on in three advanced research hubs. Scientists at the Institute for Transformative Biomolecules (ITbM) are advancing and integrating research on chemical synthesis. They are following the footsteps of Nagoya University Nobel Laureates Ryoji Noyori, a chemist, and Osamu Shimomura, an organic chemist and marine biologist. Founded in 2012, ITbM is a World Premier International Research Center (WPI). Its research has already earned it a strong international reputation. In 2016, it received a WPI interim evaluation of "S," the highest grade, and in its latest evaluation in 2021, it reached the WPI standard ("World Premier" status). Named in honor of physicists Makoto Kobayashi and Toshihide Maskawa, the second hub is the Kobayashi-Maskawa Institute for the Origin of Particles and the Universe (KMI). Here, our faculty are researching particle physics and astrophysics. The third hub is the established Center for Integrative Research of Future Electronics (CIRFE)¹²⁾. Using gallium nitride (GaN) crystals developed by physicists Isamu Akasaki and Hiroshi Amano, researchers here are developing energy-efficient power devices¹³⁾. In addition to aiming at industrialization, as the next step, this hub is promoting the building of networks as much as possible as a co-creation base for research including next-generation and subsequent-generation semiconductors¹⁴⁾. The National Institute of Science and Technology Policy's Science Map 2012¹⁵⁾ shows important academic papers from Nagoya



¹²⁾ CIRFE: Center for Integrative Research of Future Electronics

¹³⁾ Power devices: Semiconductor devices used for power conversion including inverters and converters. Higher voltage devices with smaller power loss during power conversion are higher quality. Higher voltage devices with smaller power loss during power conversion are higher quality.

¹⁴⁾ Next-generation and subsequent-generation semiconductors: New materials that have a larger band gap than silicon, such as silicon carbide, aluminum nitride, gallium oxide, and diamond, and that show potential as semiconductor devices.

¹⁵⁾ Science Map 2012: Prepared by the National Institute of Science & Technology Policy

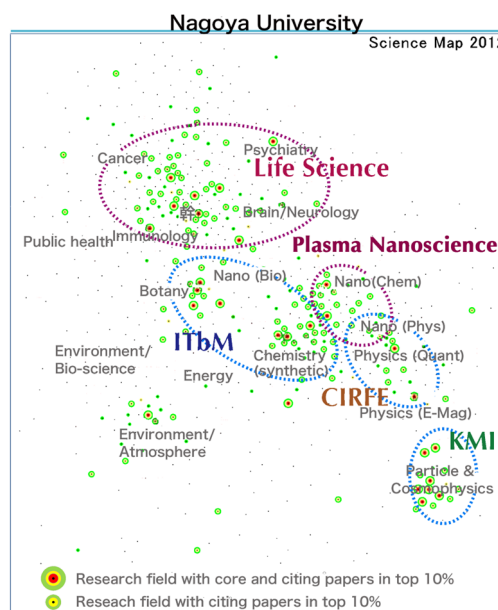
University grouped by topic. We can identify research “hot spots” by looking at those areas with rounded clusters of highly cited papers (represented by green and red dots). The KMI corresponds to the peaks in particle physics and cosmology (bottom right-hand corner), and the CIRFE correspond to the peak in solid-state physics (middle right). ITbM bridges the peaks shown for plant and chemical synthesis. Building on these past successes, Nagoya University plans to increase such research hubs.

If we compare Nagoya University to other former Japanese Imperial Universities, it ranks 1st in the number of academic papers per faculty member and 2nd in the ratio of the top 1 percent of highly cited academic papers. Despite this, we lag behind our planned benchmark, the University of Edinburgh. It was ranked 19th in the 2016 QS World University Rankings and 41st in the Academic Ranking of World Universities (ARWU). Though we are ranked lower overall, we are optimistic because both ITbM and KMI surpass the University of Edinburgh in quality and quantity of scientific journal articles. We are hopeful that doubling the number of similar advanced research hubs will enhance

Nagoya University’s research output and help close the gap with our colleagues in Edinburgh.

	上海	QS	教員数	論文数	教員当論文数	1%論文	国際共著率
東京大学	20	34	4859	8102	1.67	1.59	36.7
京都大学	32	37	3961	5857	1.48	1.49	33.4
名古屋大学	72	115	1716	3354	1.95	1.49	31.5
大阪大学	96	63	3465	4668	1.35	1.18	30.6
東北大学	101-150	75	3033	4371	1.44	0.80	34.7
北海道大学	151-200	130	2114	3141	1.49	0.76	30.3
九州大学	201-300	135	2089	3393	1.62	1.36	32.3
エディンバラ大学	41	19	2022	4658	2.30	3.48	60.8
ITbM			39	92	2.36	4.35	33.7
KMI			34	188	5.53	10.11	84.0

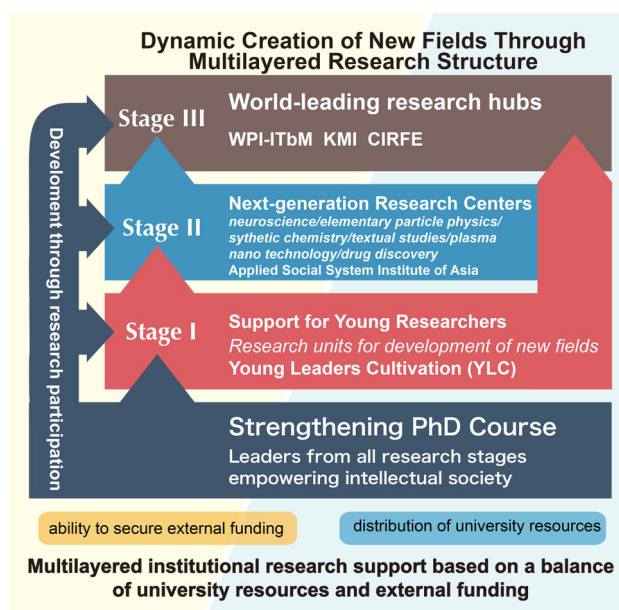
Note: This table shows the ARWU and QS World University Rankings for 2016. The data concerning published papers is from Web of Science 2015.



(2) Attract and train young researchers in the spirit of free and open-minded learning - create academic fields for the future

When nearly everyone else had abandoned their efforts, Nagoya University continued to support experimentation with crystallizing GaN. This contributed to Professors Akasaki and Amano’s Nobel Prize winning research on Blue LEDs. Nagoya University received significant revenue for their discovery because of intellectual property rights. This one example speaks to the merits of starting small, with basic research, then producing a positive cycle of human, financial and information resources. In the same way, Nagoya University plans to increase research output by building on three distinct stages of research development (Figure 2). As we move forward, Nagoya University will strengthen this multi-stage support to ensure that we meet our research goals. But at the same time, we must also balance how we allocate university resources and the revenue from external and competitive funding.

Stage I: Fostering young researchers: Nagoya University provides extensive support for bold and innovative basic research by young investigators (aged 25–35). We want to guide top researchers onto a career path while encouraging them to continue their work as part of a team. Nagoya University, therefore, helps these young researchers with startup costs; a suitable research environment; mentors; support for getting research funds; and training on how to become a principal investigator (PI). Nagoya University has shown its support for the next generation of researchers in our Young Leaders Cultivation (YLC) program. Internal funds support eight outstanding young researchers each year for a five-year term of employment. The young researchers on the program often gain tenure positions early after hiring, and we currently support 29 researchers at any one time. Currently, thirty researchers are taking part in this program, many of whom Nagoya University will hire in tenured positions. By directing external funds to the YLC program, we plan to expand participants to fifty. Recognizing the importance of diversity for innovation, Nagoya University will also create positions specifically for women and



international faculty. Moreover, we currently support seven “cross-disciplinary research units” (comprised of three young researchers below the age of forty working in different fields) for three-year periods. With an infusion of external funding, we also plan to expand the number of these units.

Stage II: Developing research hubs for the next generation: To ensure the next-generation of scholarship, Nagoya University selects research groups in different fields with the potential to develop into research hubs equivalent to ITbM. The current research groups include the following areas for developing new research hubs include neuroscience, particle physics, synthetic chemistry, and textual studies¹⁶⁾. To improve collaboration, we have already earmarked funding for employing researchers from abroad. The next candidates for research hub status should include the study of Asia in the humanities and social sciences, plasma nanotechnology, data science, pharmaceutical sciences, and space science.

Stage III: Forming advanced research hubs: The purpose of building research hubs, such as ITbM, the KMI, or the CIRFE, is to pursue the most advanced studies in the world. At the same time, we want to contribute to developing society by innovating and creating new academic fields. Nagoya University also seeks to heighten its international profile and attract the best people.

(3) Social Science and Humanities Research that will shape the future

In April 2017, Nagoya University merged the Graduate School of Letters with the Graduate School of Languages and Cultures to form a Graduate School of Humanities¹⁷⁾. We have also established a new platform for collaborative research in the Social Sciences and Humanities (SSH). It is called the Applied Social System Institute of Asia (ASIA). Next, we plan to strengthen our partnerships with research institutions at home and abroad (in Asia, Europe, and the Americas) while advancing cross-disciplinary research. Development in this area is best exemplified by our newly formed Research Center for Cultural Heritage and Texts (CHT), a research hub that was selected as a Global COE Program by the JSPS and awarded a Kakenhi “S” Grant.

2. Offer a World Class Standard of Education that Attracts Graduate and Undergraduate Students from All Over the World

(1) Prepare doctoral students to lead a knowledge-based society

Nagoya University’s central educational mission is to produce outstanding doctoral researchers who can become leaders in shaping society both at home and abroad. Improving our Ph.D. programs is important if we are to join the ranks of the world’s elite research institutions.

The best example of this is Hiroshi Amano. He was still a graduate student in the Akasaki Lab at Nagoya University when he produced the research that ultimately led to the development of Blue LEDs. More recently, 18 of the 211 recipients of the Japan Society for the Promotion of Science (JSPS) Ikushi Prizes awarded to outstanding Ph.D. students came from Nagoya University. This places us third among all Japanese universities. Nagoya University is also forging ahead in education by expanding the doctoral curriculum with the Leading Graduate School Programs. We designed these six programs to foster excellent students who are creative, internationally-minded, and expected to play leading roles in academia, industry, and government. Three specific skills were especially important: i) Research skills to

tackle new problems, ii) International communication skills, and iii) Ability to use research skills to benefit society. To better train Ph.D. students in these skills, we have partnered with private companies and universities abroad through the Leading Graduate School Programs and established the Doctoral Education Consortium in fiscal year



¹⁶⁾ Textual Studies: A path-breaking research methodology that integrates analysis of textual structure and function while bringing together scholars working in different fields on texts recognized for their important cultural heritage. Selected for JSPS International Joint Research Program Grant and Grants-in-Aid for Scientific Research S.

¹⁷⁾ Merged the first major of the Graduate School of Letters with the Graduate School of Languages and Cultures and the Graduate School of International Development

2018. This is revolutionizing our graduate level education.

At the moment, Nagoya University's Ph.D. programs are only at 70 percent capacity. One reason is the limited career paths in Japan for most graduates. Until now, the purpose of such programs has been to train future academics. To change this, we will focus on the Doctoral Education Consortium and advance the following three initiatives. Though the WISE Program, which we have 4 programs and the number of programs is the largest in Japan, we want to prepare Ph.D. candidates for work not only in academia but also in industry and international organizations. We hope to increase the rate of Ph.D. Graduates by at least 10% compared to 2020 during the fourth medium-term goal period.

- i) It is important for a research university to develop a positive cycle of integrated training and research. First, our faculty should produce outstanding research that attracts excellent students. Next, after studying at Nagoya University, these students can then go on to produce research of even greater impact. We aim to further link education with advanced research by offering Ph.D. programs in partnership with the advanced research hubs described in Stages II and III. We also encourage graduate students to contribute to advanced research at ITbM, KMI, and CIRFE. By doing so, we can train a new generation of researchers in the future's most important fields.
- ii) Joint Degree Programs (JDPs): Connected to an International Research Network International collaborative research raises the standards of partner institutions and helps train Ph.D. students who will go on to play important roles internationally. Nagoya University has promoted internationalization of our graduate schools through the JSPS Core-to-Core Program, the Japanese-German Graduate Externship, the Campus Asia Program, and international research networks built by our faculty members. Through this experience, we introduced seven Joint Degree Programs (JDPs) in close partnership with leading universities overseas. Establishing a JDP is complicated because the Ministry of Education, Sports, Science and Technology must authorize it. Since only twenty-seven such programs exist in Japan, this suggests that Nagoya University is a leader in this area. Both universities evaluate JDP dissertations so the quality of the degree can be guaranteed. Students learn about the world through this program but so do universities. They can introduce best practices from other education systems and further promote joint research. Nagoya University aims to establish more than 20 units during the fourth interim target period. This will enable us to integrate the next generation of researchers into international networks. The Tokai National Higher Education and Research System was central to the start of operations of the Inter-university JDP Council of Japan in 2022, and Nagoya University plays a leading role as vice president. Through this council, we will expand the establishment of JDPs in universities across Japan, not just Nagoya University, and expand the functions of existing JDPs.
- iii) Cultivation of transferable skills: So graduates can contribute to society, they must become competent in areas outside of their expertise. Nagoya University helps to instill such "transferable skills." In our Leading Graduate School Programs, we cultivate competencies that will enable our students to become responsible leaders. Rapidly changing societies need people attuned to current conditions, individuals who possess communication skills for expressing and defending their views in English, and people who can solve complex problems. These demands transcend nationality and areas of expertise. One example of how we have responded is by developing a new curriculum and partnering with North Carolina State University through the Technology Partnership of Nagoya University, Inc. (also known as "NU Tech"). This includes coursework in American social and environmental studies; teamwork; independent overseas study; leadership; mentorship; and entrepreneurship. This vision of a holistic education guides our efforts at further enriching the curriculum. In April 2017, for example, we established a new Graduate School of Informatics. It will offer programs training students in mathematics and data science that should lead to discovery and innovation in data analysis. In order to cultivate transferable skills, we have also taught the course "Professional Literacy" as a common graduate school subject since 2019.

(2) Sharing Education between industry and academia: A New Initiative in Graduate Education

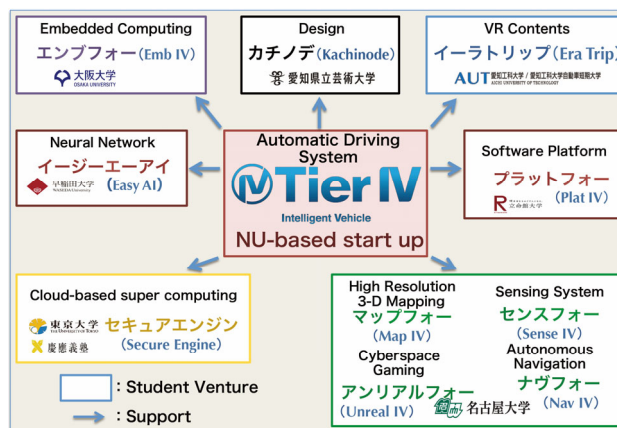
As exemplified by our Nobel laureates, the mission of Nagoya University is to connect advanced knowledge with society. Industry is changing, so it is important to form new partnerships with universities and private companies. It is also essential to train skilled workers. We believe that Sharing Education is critical for new industry-academia partnerships and so we want to promote the following:

- Course Sharing: We plan to develop a university-wide system of education through our Leading Programs.

It will work together with industry and open to manufacturing. This should better position us to partner with industry for developing human resources.

- Laboratory Sharing: So that findings can be disseminated to society more quickly, we will support as part of an entrepreneurial education student start-up companies (micro ventures) in small laboratories.
- Effort Sharing: We will recommend young, designated faculty for dual appointments in academia and industry. This should enable us to unify education and research through shared appointment of rising stars in research.

In February 2017, in the CIRFE in the field of power devices, a shared education program with a business consortium was launched. In another example, in the field of mobility, eight universities have participated in ten micro ventures centered around a Nagoya-based company specializing in autonomous vehicle technology called Tier IV. It was built jointly by Nagoya University and the National Institute of Advanced Industrial Science and Technology and involves over twenty Ph.D. students and researchers. Nagoya University will promote sharing education and make it part of the curriculum in new multidisciplinary fields.



(3) Financial and career support for Ph.D. candidates

To attract outstanding students to our doctoral programs, we must raise funding for graduate students to international standards. Nagoya University is taking the following measures:

- Support students with scholarships funded both by individual donations and through an endowment specifically dedicated to helping doctoral students.
- Complement direct Grants-in-Aid for Scientific Research (kakenhi) with money raised from individual companies and business consortiums affiliated with advanced research hubs in Stage III research.
- In addition to the teaching assistant (TA) program, we created a system that hires students with specialized skills at higher QTA/GSI salaries¹⁸⁾.
- Financial support from the national government for the “Creation of university fellowships for scientific and technological innovation” and the “Support for Pioneering Research Initiated by the Next Generation”.
- In addition to the national measures, we have added Nagoya University’s own support, and have expanded tuition exemption for master’s and doctoral program students.

A major obstacle preventing the growth of students enrolled in doctoral programs is employment opportunities for people with graduate degrees. By promoting graduate school education along the lines described above, we hope to expand chances for “doctoral students to learn from society and society to learn from doctoral students”. Nagoya University is already working to develop career alternatives for graduates by making them more attractive to employers. We intend to take advantage of our position in the Tokai Region to secure career tracks for graduates and postdoctoral researchers in private companies. This will be through a partnership with our Business Capacity Development Center and Doctoral Education Consortium.

3. An International Campus with People from All Over the World

(1) Development of international education programs: Admitting 3,200 international students

Internationalization has always been an important goal for Nagoya University. Today, 2,400 international students from more than 90 countries study on our campus. This already represents 15 percent of the entire student body,

Some schools, such as Nanyang Technological University (Singapore) and Pohang University of Science and Technology (South Korea), rose in international rankings because they now offer graduate classes in English. In 2016, faculty taught 12 percent of our 4,539 undergraduate classes in English and 19 percent of 6,445 graduate-level classes.

¹⁸⁾ QTA (Qualified Teaching Assistant)/GSI (Graduate Student Instructor): A system that employs particularly talented graduate students who have learned expertise and instructional methods. QTAs perform more advanced class support tasks than the TAs as one of the education providers, and GSIs are responsible for the majority of classes as persons with discretion and responsibility close to that of faculty members.

but by 2020 we plan to expand this by enrolling 3,200 international students. Though we must do more, our 546 English-taught classes for undergraduates and 3,463 for graduate students suggests progress. In particular, under the Global 30 Program (hereinafter referred to as the “G30 Program”) ¹⁹⁾, we have established a group of international courses that allow students to graduate only in English ²⁰⁾ for a wide range of undergraduate and graduate fields. To understand its role and position in Asia, Nagoya University has benchmarked itself against several renowned centers of learning in Asia. Moving forward, we plan to offer more than half of graduate classes in Economics, Science, and Technology in English.

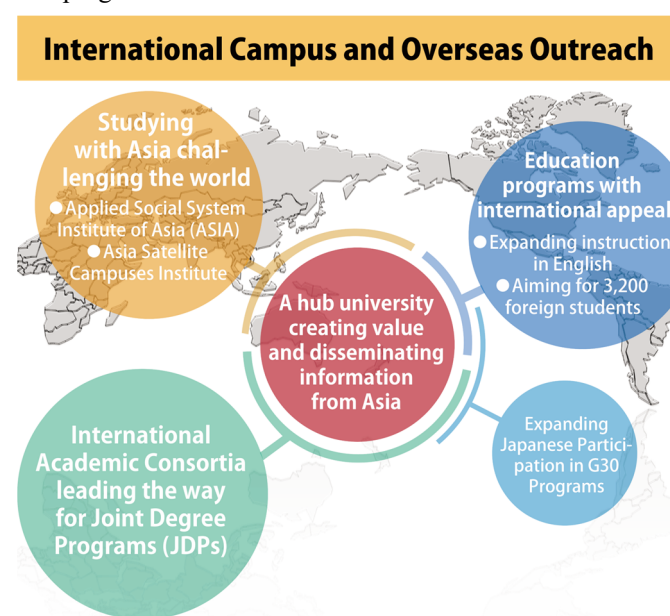
Since the G30 undergraduate program started, 41 former students are now pursuing their graduate studies in the world's best-known universities. While some G30 graduates have continued at Nagoya University, others are enrolled at Oxford University, Imperial College London, and the Swiss Federal Institute of Technology. This shows that in terms of educational level, the G30 Program at Nagoya University is one of the top programs in the world. In just the eleven years between 2010 and 2021, the number of annual applicants to the undergraduate programs more than doubled from 157 to 734. It more than quadrupled for graduate programs from 49 to 273. We can now admit more exchange students from our partner universities for one or two semesters in the Nagoya University Program for Academic Exchange (NUPACE). Most come from universities in North America, Europe, and Australia. Between 20 percent and 50 percent come from institutions ranked in the top 100 or top 200 in the world. In this way, the program has allowed us to attract a diverse group of highly-skilled students.

In 2019, we built a new dormitory, and going forward, we will promote educational and research exchanges with key universities, including strategic partner universities. In the future, Nagoya University plans to admit more students to the G30 Program. Also, each graduate school plans to offer more English-Taught classes and improve their environment so after ten years international students should make up roughly 20 percent of the student body (3,200). In addition, we will strengthen support for overseas students in their studies and lives.

Comparison of international student acceptance performance in top non-English-speaking universities: Seoul National University: 8.1%, Peking University: 16.3%, Tsinghua University: 11.1%, Nanyang Technological University 3.8%

(2) Expansion of the G30 program to all students

The internationalization of Nagoya University must benefit as many people as possible. One such benefit of the G30 program is that it offers domestic students the chance to improve their foreign language skills. As suggested



by the admission requirement of at least an 80 on TOEFL, or 6.5 on IELTS, all G30 students can read and write in English before enrolling. Perhaps not surprisingly, their language ability is higher than most Nagoya University Japanese students. To communicate with the growing number of non-Japanese faculty and students, however, many native students are improving their foreign language ability. In the future, we plan to expand the G30 program availability by allowing Japanese students to register a part of the G30 program as EMI courses, and to recognize the credits as graduation requirements for undergraduates.. Japanese students seeking entry into graduate schools overseas can use the G30 program to improve not only their academic knowledge and skills but also their spoken and written English. We hope that before graduating, about 70 percent of our students²¹⁾ will have some

¹⁹⁾ Global 30 Program (G30 Program): English-Taught full degree undergraduate and graduate programs. The undergraduate programs are in automotive engineering, biological sciences, chemistry, fundamental and applied physics, law, economics, and Japan-in-Asia cultural studies. The graduate programs are in automotive engineering, civil and environmental engineering, physics and mathematics, chemistry, biology and bio agricultural sciences, medical science, economics and business administration, linguistics and cultural studies, and Japan-in-Asia cultural studies. Support from the government ended at the end of fiscal year 2013, but the university has continued the Global 30 initiative as the university's own.

²⁰⁾ Established fields: medicine, mathematics, physics, biology, chemistry, automotive engineering, civil engineering, economics, law, literature, linguistics and environmental studies.

²¹⁾ 70 percent is equivalent to 1,540 students.

overseas experience.

(3) Leading Academic Consortia of World Universities and Promoting Joint Degree Programs

Nagoya University has long functioned as the headquarters of a network of 18 partner schools that host inter-university conferences for both students and researchers called *Academic Consortium 21 (AC21)*. In addition, we have worked as the co-chair of a group of colleges in Japan and Sweden called MIRAI. Through these initiatives, we have promoted discussion among presidents and vice-presidents responsible for international activities and played a major role in building trust between partner universities. In addition, by participating in the activities of the Association of Pacific Rim Universities (APRU) and the Japanese-UK inter-university consortium, RENKEI, we are working to strengthen organized academic exchanges and international recognition.

Results have flowed from Nagoya University's participation in these international consortia, especially with partners in AC21. Nagoya University and the University of Adelaide started the first JDP program in Japan. Five new JDP programs soon followed with Lund University, the University of Edinburgh, the University of Freiburg, the University of Western Australia, and Chulalongkorn University. Also, AC21 will continue to promote improving its international reputation, student exchange, collaborative research between universities, improving current JDP programs, and training staff.

Academic Consortium 21 (AC21): In 2002, Nagoya University took the lead in cooperating with overseas partner universities to establish AC 21. There are 14 members from 10 countries: the University of Adelaide (Australia), University of Freiburg (Germany), University of Strasbourg (France), North Carolina State University (U.S.), Shanghai Jiao Tong University and Tongji University (China), Chulalongkorn University (Thailand) and University of Stellenbosch (South Africa), etc.

RENKEI: RENKEI is a dynamic partnership between the UK and Japan in industry and higher education. RENKEI promotes the development of innovative solutions to the challenges facing knowledge-based economies by bringing together talented individuals from the respective nations and diverse backgrounds. Members include Durham University, the University of Newcastle, The University of Edinburgh, University of Liverpool, University of Southampton, University of Leeds, Tohoku University, Nagoya University, Kyoto University, Osaka University, Kyushu University and Ritsumeikan University.

MIRAI: MIRAI aims to: i) strengthen collaboration between Swedish and Japanese universities through activities in research, education and innovation, ii) enhance researchers at an early stage of their career and iii) connect, meet, learn, share research work, publish and interact with society. This will contribute to long-term collaborations and research excellence between Sweden and Japan. Members include Lund University, Umea University, the University of Gothenburg, Uppsala University, Linkoping University, Linnaeus University, Karlstad University, Orebro University, Jonkoping University, Lulea University of Technology, Stockholm School of Economic, Hokkaido University, The University of Tokyo, Tohoku University, Nagoya University, Hiroshima University, Kyushu University, Waseda University Sophia University and OIST.

(4) Researching with Asia, Challenging the World: Applied Social System Institute of Asia (ASIA)

Building on past success educating people in Asia, in 2014 Nagoya University opened the Asian Satellite Campuses Institute (ASCI). This allows government officials in participating countries to enroll in a Nagoya University doctoral degree program. It builds on our existing network with regional universities to develop an Asian research and education hub with Nagoya University at the center. There are fifteen ASCI programs in six nations ²²⁾. Moving forward, Nagoya University will contribute to building human resources in these countries. Also, we aim to be a hub university that uses our networks to strengthen cooperation with other top universities in the region and disseminate knowledge from Asia to the world. We can deepen connections with European and American universities by collaborating on research in Asia.

In 2017, Nagoya University will open the Applied Social System Institute of Asia (ASIA). It will promote interdisciplinary collaborative research on problems affecting the region and the world by scholars in the humanities and social sciences. It will also provide a platform for joint research on individual subjects with researchers in science and engineering. Taking advantage of Nagoya University's strengths, ASIA will concentrate on three fields of "institutions," "human resources," and "the environment." As information and communication technology (ICT) change societies, ASIA will research topics such as improving education in developing countries; developing human resources for industry; creating a low-carbon society; and sustainable development. ASIA will bring international acclaim to us through exchanges between leading researchers and research institutions in various countries. In addition, using the network of government officials in the region we have cultivated, we aim for concrete policy proposals and social implementation.

4. Nagoya University Advancing Together with Society (Collaboration between Industry-Academia-Government)

For Nagoya University, collaborating with industry and wider society is increasingly important for innovation,

²²⁾ Asian Satellite Campuses Institute: Established as a core component of Nagoya University's international outreach initiatives, satellite campuses were established in Cambodia, Vietnam, Mongolia, Uzbekistan, Laos and the Philippines. ASCI coordinates the delivery of the Transnational Doctoral Programs for Leading Professionals in Asian Countries.

developing human resources, and strengthening finances. As described in our strategies below, we aim for a policy of industry-academia collaboration.

(1) Streamlining infrastructure to support flow of basic research to industrial application

In 2014 Nagoya University merged several separate offices responsible for research management into a single Office of Academic Research and Industry-Academia-Government Collaboration. It is led by specialized University Research Administrators (URA). This restructuring was to foster the development and management of large interdisciplinary research projects that link the humanities and the sciences. We can now provide more unified and streamlined support for linking the results of fundamental research to both industry-academia-government collaboration and the establishment of university spin-off companies. Also,

this new management structure highlights the need in the university and wider society to establish an ‘innovation ecosystem’ to bring together multiple organizations and human resources. In 2016, we, therefore, created URA as a new profession in the university with a separate career path. There are now fifty URAs. The innovations reflect the impact of increasing collaborative and contracted research projects. Between 2014 and 2016, collaborative projects increased by 2 times and contracted research by 1.5 times.

Universities in Japan play a major role in innovation and solving problems faced by society. The following, therefore, need to be strengthened: i) Promoting university-proposed large-scale collaborative research projects between industry and academia; ii) Building a university-led ecosystem for innovation; and iii) Founding spin-off companies that can apply research results to benefit society. We will first increase the number of URAs in charge of innovation management and research promotion. The expanded office will improve proposals for collaborative research with industry and create links between industry, academia and government. In addition, a URA supervisory organization and university-wide Technical Center to provide technical support will be operated in an integrated manner, and a management system will be established that comprehensively manages academic research, industry-academia-government collaboration, and creation of spin-off companies. Nagoya University designed the layered research structure as a dynamic system that we hope will produce new fields of research. To promote these activities, we will develop support systems for each layer.

(2) Founding of research centers fostering industry-academia-government collaborative creation

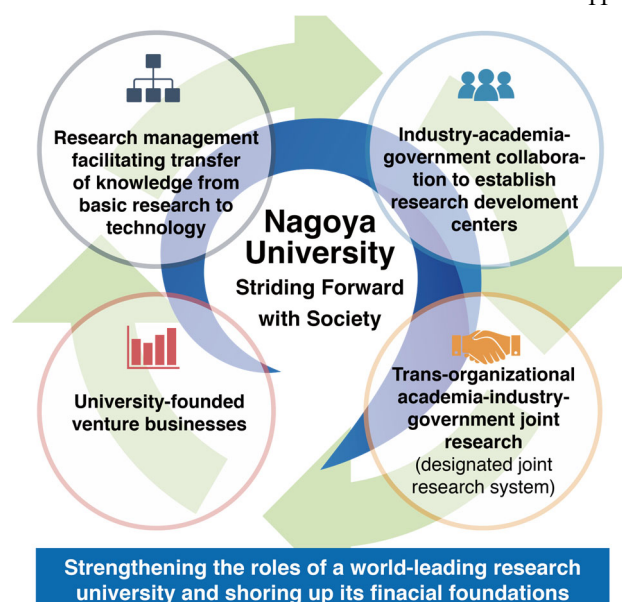
Universities must innovate in ways that encourage cooperation between industry, academia, and government. When collaborating with different companies, we are sensitive to the need to differentiate “competitive fields” from “collaborative fields.” Fortunately, Nagoya University can count many successes.

<p>Founded in 2012, the National Composites Center Japan developed the molding processing technique for carbon fiber reinforcement composite material. It also conducted research and development on its application to cars and aircraft.</p> <p>Begun in 2013, the Center of Innovation (COI) Program laid the groundwork underpinning a program of front-line research and development investigating next-generation mobility. This is an excellent example of success in working together called the Under-One-Roof Collaboration.</p> <p>Set up in 2015, the GaN Research Consortium created an open innovation hub to conduct research and development on next-generation GaN semiconductors. These have the potential to realizing an energy-efficient society.</p>
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Rather than having individual researchers or schools as leaders, Nagoya University’s collaborative programs are organized and led at the institutional level. This positions us to build an active center to nurture open innovation. We intend to establish global open innovation hubs for research and development in more than ten fields. These will focus on collaboration between industry, academia, and government. These hubs will incorporate the skills of both academia and industry in establishing a shared educational program that emphasizes practical skills.

(3) Large-scale inter-institutional industry-academia collaborative research

In 2016, as a result of examining best practices in the United States, especially the Facilities and Administration Classification, Nagoya University introduced the Designated Collaborative Research System. This novel system provides the basis to calculate indirect costs of industry-academia collaborative research projects. It leads the way



for other national universities in Japan. We also introduced a new research assistant employment system for graduate school students involved in industry and university collaborative research projects (industry-academia collaboration RA). In 2016, the central government published Guideline for Enhancing Industry-Academia-Government Collaboration Activities. To comply with this, Nagoya University has introduced risk management for handling confidential information about advanced technology. These changes were highlighted in the government guideline as an example of good practice. In 2014, we introduced industry-academia joint research course•section designed to incorporate finance, personnel and research themes provided by companies into the university. To date, we have applied this to 37 laboratories and research groups involved in collaborative research between industry and the university.

It is a priority for Nagoya University to continue inter-institutional large-scale industry-academia collaboration. In particular, we have shown the effectiveness of the Under-One-Roof style of cooperation for laboratories and research groups. We hope to expand these examples to incorporate whole research centers. But while companies are enthusiastic, securing research space for collaborative projects remains an issue. We will, therefore, make use of university-wide facility management to ensure the space required for industry-academia collaboration. We hope to set up fifty laboratories and research groups and a limited number of larger research centers. Our goal is to increase external funding from such collaboration by more than three times.

(4) University spin-off companies contributing to industry

The Tokai Region around Nagoya is a manufacturing center of global importance. But there are very few university spin-off companies when compared with the Kanto region around Tokyo and the Kansai region around Osaka. Recognizing the need for change, in 2016, we established the Nagoya University & Tokai District University Wide Area Venture Fund. This privately managed venture capital fund is targeted at university spin-off companies. We also secured a separate fund of 100 million yen to support those wanting to set up a company and to provide entrepreneurship training called the Tongali Project. This is a new approach for investing in start-up companies established by both Nagoya University and four other universities in the Tokai region - Nagoya Institute of Technology, Gifu University, Mie University and Toyohashi University of Technology²³⁾.

As we move forward to the next stage, we plan to use the funds to support Ph.D. education. We wish to emulate the good practice shown in two programs established at University of Waterloo in Canada. The Co-op program²⁴⁾ consists of a six-month lecture course followed by six months of corporate research while the Velocity Program²⁵⁾ provides places for research, accommodation, start-up expenses and mentorship by professors. We will also support start-up companies established by universities. We can simplify requests to companies for financial backing through instruments such as stock acquisition rights. Our goal is to improve revenue by increasing the number of start-up companies to 80, twice the current number, and with research donations of 1 billion yen.

5. Governance to Sustain Flexible Reform Fit for a Global Elite Research University

(1) “Separation of management and academia” and a flexible system for proposing, debating, and enacting policies through advanced shared governance

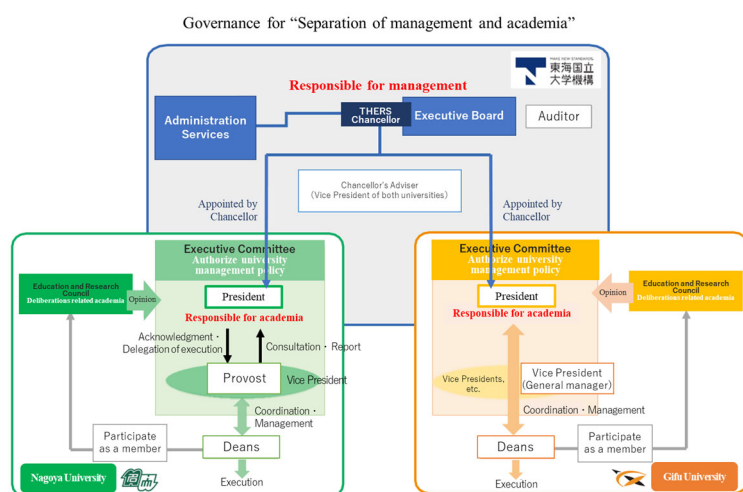
Since education and research encompass a broad range of different fields, many aspects of Nagoya University’s organization are delegated to the level of individual schools. To manage the university from a more unified perspective that includes the views of all schools, we have introduced governance that clearly demarcates roles for proposing, debating, and enacting policies. We recognize that autonomy and support by talented faculty members are essential components to the smooth running of individual schools. However, we must balance this with consideration for university-wide goals. There should be a strategic division of responsibilities bolstered by close links between top management and individual faculty. This includes appointing a Provost responsible for overall management of both research and education.

In the Education and Research Council, the members are the University Trustees (riji), Deans (kenkyukacho), and those who are chosen from the university faculty at large in order to deliberate from a university-wide perspective. In addition to that, places have been newly reviewed from the perspective of diversity so that at least 20% of the councilors are female. A sub-committee was established under the Education and Research Council to deliberate from an expert standpoint, and operational innovations were made so that the Education and Research Council focuses on substantive deliberations on important matters related to university academic activities. The

²³⁾ Partnership between five universities Nagoya University, Nagoya Institute of Technology, Gifu University, Mie University, Toyohashi University of Technology

²⁴⁾ Co-op Program: An educational program comprising 6 months desk learning and 6 months work in a company.

²⁵⁾ Velocity Program: A program for providing research space, living accommodation, start up funds, and mentorship by faculty.



Implementation Committee, which consists of executives including the Vice Presidents and the Deans, is presided over by a Provost, and a system is in place to prepare and implement specific implementation methods and plans in accordance with the policies decided at the Executive Committee after consultation by the Education and Research Council. In sum, the Executive Committee is responsible for deciding goals and strategies, while the Executive Committee and Deans jointly share the responsibility of carrying them out. Terms of office for Deans and other

administrators, therefore, must be revised to be in line with the time required to achieve strategic goals. The increased responsibility of the Deans and Directors envisaged in our system of shared governance means the selection procedure for these key posts must also be revised to reflect the unified perspective of all schools in the university. When selecting the Deans, in addition to confirming the selection policy in advance at the Executive Committee, the universities will decide after confirming the credentials of the candidates selected by the departments and other matters. In addition, the universities shall conduct thorough dialogue within the Executive Board members of THERS and between the universities' Executive Committee members and each department. They shall then utilize this dialogue to formulate the basic policies and measures of THERS and the medium- and long-term vision of the departments. The universities shall share a clear vision while operating THERS and departments, and this shall form the basis for achieving advanced shared governance.

In the Tokai National Higher Education and Research System, the Chancellor is responsible for the management of the THERS. The University President and the Provost are responsible for research and education, thus separating management and academia. Based on this structure, the Chancellor focuses on building a strong financial base and raising awareness for the THERS as a whole, while the Provost creates a vision for the future of the universities and strengthens their research and education capabilities. Under the leadership of the THERS Chancellor and the Presidents, the management of THERS shall be handled by the Executive Board, and the management of each university shall be deliberated and decided at the Executive Committee. In addition, in order to incorporate expertise from industry, local governments, and the community at large, non-university committee members make up more than half of the members of the THERS Administrative council. We conduct prior lectures before the council so that they can deeply understand THERS, and secure time for deliberation on important matters and exchange of frank opinions on the day of the meeting to ensure that meetings are substantive. We are increasing the number of Administrative Council meetings held and are seeking to ensure it is an active body by conducting activities such as site visits.

With regard to the administrative structure that supports THERS, we centralized the administrative and management bureau that were established at THERS, Gifu University, and Nagoya University, and integrated it into the chain of command with the THERS Executive Director of Administration at the top.

Going forward, we will continue to achieve our mission by making quick decisions and achieving an organizational culture based on frank dialogue. In addition, we will further promote the recruitment of outstanding teachers and the securing of management personnel, and strengthen our research capabilities and management base to ensure that they are at the appropriate level for one of the world's leading research universities.

(2) Educational and management effectiveness guided by institutional research and incorporation of opinions from society at large

Nagoya University established the Office of Institutional Research (IR)²⁶⁾ (IR Office established in April 2020) to facilitate process management of planning, decision-making, and initiatives. The IR office helps ensure institutional transparency and information sharing to sustain shared governance. Further, it also acts as a site for compiling information about the opinions and requests of students and their guardians, academic societies, industry, and governmental organizations—all of which can then be used to understand the needs of society better. Through the involvement of faculty, the office also assists in faculty and staff development.

(3) Strategically-guided faculty selection, participation of women faculty, training of faculty, introduction of highly skilled professionals

Faculty members are responsible for improving the quality of university education and research and for developing new academic fields. Employing suitable people, therefore, is essential. Nagoya University must hire

²⁶⁾ IR: Institutional Research. The IR office gathers information useful for effective management of the university. For instance, concerning papers published as a result of research including the number of times they are referenced; the amount and number of competitive grants obtained; university rankings; gathering and analyzing data useful to help improve the level of education in the university; and proposing policies for improvement and verifying their effectiveness.

new faculty in a transparent manner, open to the public and with due consideration of prospects and importance of the field. Assessment post-hire will be conducted based on basic guidelines determined by the Education Research Council. Greater emphasis on strategically-guided faculty selection and performance evaluation will ensure that Nagoya University can attract talented personnel who will drive our mission as a research university.

It is essential to promote gender equality and hiring of women. Specifically, we plan to diversify the career paths open to women faculty and PI researchers, expand welfare support and services, and create an environment that is more conducive to women's needs. Through these measures, we will aim to increase the ratio of female faculty by 6 percent or more from the start during the fourth interim target period, and 30 percent during the fifth interim target period. To improve the versatility of our administrative staff, we plan to offer training commensurate with position and rank. We plan for half of our administrative workforce to be proficient in English (scoring 600 or higher on the TOEIC). We also want to expand opportunities for them to work at other institutions, including those abroad. We will facilitate collaboration and exchanges between clerical, technical, URA, and other professions to develop excellent university management staff and establish career paths. In addition, from 2022, we will strengthen the administrative structure by newly establishing an annual salary system for administrative staff and hiring, as distinct from those employees who were initially employed under the old system, job-specific staff who are responsible for specialist jobs among the existing jobs.

(4) Training future university managers through University Design Workshops

It has become increasingly important for university managers to respond to changes in politics, economy, and society. Therefore, an approach that focuses only on local or single-issue measures is not enough to solve issues on university-wide problems of education and research, employment and personnel training, and financial affairs. Leading universities such as the University of California, San Diego (UCSD), have designed their vision of what a university should be and have developed systematic governance to realize the vision. Nagoya University will follow this lead and, based on the vision laid out in this document, analyze our current university management. We want future leaders among faculty and administrative staff to learn best practices in research, education, internationalization, industry-academia cooperation, financial affairs and governance. The forum for this learning will be the proposed university design workshop. Based on models used by the University of Edinburgh and UCSD, we will introduce to Japan a new model of academic management and personnel training. We hope this will allow us to make a better selection of future Deans of School and University Directors. We want to promote it in cooperation with organizations such as the Japan Association of National Universities.

6. Shoring up our Financial Foundation Through Positive Cycles of Management Resources

Nagoya University continues to improve management of its finances. When we became an independent administrative corporation in 2004, we brought in revenue of 73.9 billion yen. By 2015, this has increased to 106 billion yen. This rise came from increased competitive funding and more income from Nagoya University Hospital. While this is a start, if we are to advance research, education, internationalization, and social cooperation, we will need other sources of revenue. Responding to society's need for knowledge creation and personnel training, we will seek out new sources of income. In turn, revenue from these sources will enable more knowledge creation and better personnel training, thus creating a positive cycle for more income. We aim to expand our budget 1.4 times (or an additional 40 billion yen) from its current levels. On the other hand, since we also have accountability to society for the use of management resources, Nagoya University will use management resources appropriately and effectively, and strengthen the financial base by creating a virtuous circle of management resources. It is important to manage our finances so Nagoya University can be on a stable financial footing.

(1) Positive cycle of funds in industry-university cooperation

Nagoya University is improving its financial standing and strengthening partnerships with industry by earmarking "expenses for strategic collaboration between industry and academia." This is "designated collaborative research." We were the first in Japan to introduce this concept and to develop a means to calculate indirect expenses using an "hourly rate system."²⁷⁾ Following our example, more and more universities have introduced hourly rates for the use of research facilities and expertise. Going forward, we plan to promote designated collaborative research and increase revenue from indirect costs by six times.

Working with industry forms a link not only with research but also student collaborations with business and employment prospects. Promoting cooperation with industry helps especially to prevent mismatches in student job searches. With deregulation and support of companies, we can provide a matching service to aid our students. We plan to establish a framework for university-led start-ups in which Nagoya University receives stock acquisition rights in exchange for licensing fees and facilities costs. We will also partner with industry to provide them with viable exit strategies (such as stock listings, mergers, and acquisitions). Through cross-appointments, we aim to place skilled personnel, such as shared researchers, when they are needed by start-up businesses. This will create

²⁷⁾Hour rate system: The cost associated with carrying out collaborative research is calculated for the whole university. This cost is then divided by the total time required. An appropriate cost per unit time for one member of faculty is then multiplied by the amount of time used for the research and the total cost estimated by multiplying by the number of staff involved in the study.

positive cycles of revenue and human resources. To do this, however, there needs to be more deregulation so that we are not required to sell off stock acquisition rights as soon as stocks go public.

(2) Expanding the Nagoya University Foundation

Leading research universities in the United States have large-scale endowments²⁸⁾. To strengthen our finances, we intend to increase the size of the Nagoya University Foundation. Although there are many differences between Japan and other countries in terms of philanthropic culture and tax law, we still want to learn best practices for fundraising. Taking the Chicago Campaign: Inquiry and Impact as a model for seeking donations from alumni, we expanded our fundraising and achieved our goal of 20 billion yen cumulative donations in 2021. The Nagoya University Foundation has received donations based on stocks of listed companies, and this has been the focus of recent attention as an original approach to increasing donations. In addition, we plan to launch a new endowment campaign and have the President of the Tokai National Higher Education and Research System get involved in sales personally.

(3) Strengthening our financial foundation by diversifying financial resources

Nagoya University must diversify its sources of revenue. Today, income comes mainly from student tuition, the Nagoya University Hospital and collaborative research with industry. Also, we aim to put ourselves on a firmer financial footing through for-profit ventures that make use of real estate assets as well as better managing surplus funds. Although some people may see these as risky, greater deregulation can let us use financial instruments that offer higher return such as stock portfolios.

Nagoya University wants to commercialize some of our research and educational achievements as an additional source of revenue. Our faculty members can use their knowledge to develop new for-profit ventures. This might include continuing education programs, such as executive courses delivered by prominent alumni or consulting services by current faculty. To begin these activities, of course, we must establish a new special section. With sufficient deregulation, we would ideally create a new corporate organization called Nagoya University Research and Innovation (NURI). This would allow us to incorporate the know-how of the private sector into our activities.

(4) Allocation of management resources

Nagoya University must boost revenue to ensure resources are allocated efficiently. Combining administrative accounting with advice from the Institutional Research (IR) team, Nagoya University aims to introduce the "visualization" of education and research expenses. This allows us to analyze cost-effectiveness and, therefore, to more efficiently reduce costs. With the consent of the university community, the central administration can then allocate resources to priority areas and prevent unnecessary duplication of items and activities. At the same time, we will use incentives to support efforts by individual graduate schools to increase their revenue from external funding. One example would be to assign all the income from indirect costs after a graduate school has reached its target income for the fiscal year.

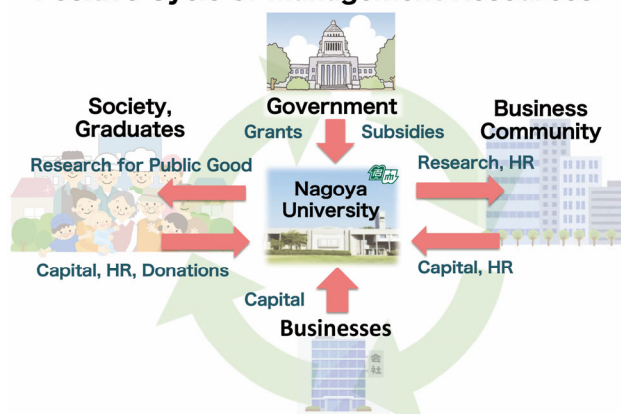
(5) Appropriate and effective use of management resources

Under shared governance, each school takes responsibility for its budget for education, research, and social cooperation. Principal investigators and project managers set goals but their university holds them accountable for their results and the financial viability of what they do. We intend to manage our finances in a way similar to the University of Illinois at Chicago's Responsibility Center Management (RCM).

Faculty members are the university's most valuable resource. To help them reach their potential, we plan to introduce evaluations that will visualize a person's effort in education, research, social cooperation, and administration. Furthermore, we plan to defray some of the costs of faculty salaries using external funding and cross appointments. We also will introduce a point system for strengthening our budget flexibility, including non-personnel costs. We can then redirect resources to the hiring of new researchers and to achieve a more flexible and effective management.

Nagoya University also seeks to reduce the workload of our administrative staff through cost reduction and productivity enhancement; improving the services of our Technical Center, which manages all technical staff on campus; and encouraging sharing of devices used for analysis and other equipment.

Positive Cycle of Management Resources



²⁸⁾For example, the University of Chicago has an endowment close to 900 billion yen and North Carolina State University has 100 billion yen.

7. Creation of a Positive Cycle for Sustainable University Development based on a New Multi-campus System: the Tokai National Higher Education and Research System (THERS) Promoting Quantitative and Qualitative Development

If we are to compete on a global scale, research universities must reach a minimum size. At the moment, size limits what Nagoya University can do. This is a problem also faced by other national universities in the Tokai region (this includes Aichi and the neighboring prefectures of Mie and Gifu). We therefore set up the Tokai National Higher Education and Research System (THERS) in April 2020, and this system is now opening up new directions for the development of national universities. Its purpose is to promote quantitative and qualitative development in each institution and, thereby, contribute to regional economic growth. At the time of the launch, our benchmark was the multi-campus University of California system. At present, we are discussing with potential member universities ways to maintain autonomy while also managing a linked network organized as a single unit. The new network should raise both the quantity and quality of activities for participating universities while at the same time allowing each member to accomplish its mission and develop further. Such a system would aim to contribute not only to the region but the wider world as well. THERS will become a core hub for regional innovation in the Tokai region, and we will continue to work on the expansion of THERS in terms of its membership and scope of undertaking, while working together with various Tokai-based local sectors.