Tohoku University’s Plan for “Universities for International Research Excellence”

The Tradition of “Research First”, “Open Doors” and “Practice Orientation”

1907: Foundation of Tohoku University as third national university

Synergy of Research and Education

Research First

Education

Research

Co-creation with Society

Creating Social Value

Diversity

Japan’s first female university students, 1913 (110 years ago)

Open to diverse backgrounds

Tohoku University was founded with considerable donations from third parties

“Sendai is a city most suited for research”
- A. Einstein, 1922

“Industry is Academia's Dojo”
(Kotaro Honda, 6th President)

Major contributions by members to disaster recovery after the 2011 Great East Japan Earthquake

Antenna
Laser Diodes
Spectrometry
Recording Tech.
Flash Memory
Compactin

Chika Kuroda
Ume Tange
Raku Makita
Seiji Kaya
Shigeyoshi Matsumae
Lu Xun
Tohoku University is committed to creating social value through world-class research achievements and taking proactive measures for social innovation based on our experience in contributing to the recovery from the 2011 Great East Japan Earthquake.

**Research Excellence**
Scientific output, Top 10% publication output & percentile, Top 10% publication output & percentile by early career researchers

**Impactful Research & Innovation**
Funds from private companies, number of industry co-creation centers, university start-ups, IP revenue, joint publications with industry partners

**Campus for Aspiring Minds**
Ratio of foreign researchers and female researchers, number of PI research units, ratio of PI and staff members, ratio of staff with international expertise

**Gateway to New Ventures**
Ratio of international students, international experience of Ph.D. students, financial support for Ph.D. students, number of Ph.D. students, number of Ph.Ds.

**Global Readiness**
Ratio of foreign researchers, staff with international expertise, international students, international experience of Ph.D. students, international executives

**Responsive and Responsible Governance**
Ratio of independent funding, business scale, own funds, corporate strategic financing, international executives

**Commitment for Impact**
Tohoku University is committed to creating social value through world-class research achievements and taking proactive measures for social innovation based on our experience in contributing to the recovery from the 2011 Great East Japan Earthquake.

**Commitment for Talent**
Tohoku University is committed to working with international communities to nurture and educate the next generation of brilliant researchers. Diversity on campus is essential to the individual growth and well-being of each and every member of our university.

**Gateway to New Ventures**
Ratio of international students, international experience of Ph.D. students, financial support for Ph.D. students, number of Ph.D. students, number of Ph.Ds.

**Commitment for Change**
Tohoku University is committed to becoming a new knowledge enterprise that pursues both excellence and growth. We will establish effective university governance that enables the realization of all the goals described and promised here.

**Responsive and Responsible Governance**
Ratio of independent funding, business scale, own funds, corporate strategic financing, international executives

**Founding Principles & Core Values**
Research First – Pursuit of Excellence
Open Doors – Diversity and Openness
Practice-Oriented Research and Education - Creating Societal Value
Amplifying research impact

Tohoku University’s Achievements

Fostering research excellence through diverse ideas and strategic collaboration
“Three-layered Research Enhancement Package”

Review of research activities from an international perspective

World Leading Research Clusters

Core Research Clusters in Earth System Science (NEW), Disaster Science, Materials Science, Spintronics, Next-Generation Medicine

Joint research organization (with 6 institutes)
Technology Co-Creations (semicon., quantum, AI, etc.)
International Research Clusters (with Int’l Joint Grad. Prog.)

Interdisciplinary Research Groups

Identify strategically important research fronts to facilitate key projects of the next generation

Reinforce Research Support
Securing research hours, support staff (URAs, technicians, etc.), core facilities, independent research environment for early career researchers, job opportunity, international sabbaticals, incentives & benefits, etc.

Diverse Research Activities as a Basis of Excellence

Promote diverse research activities based on free ideas of PIs from a long-term perspective

Research Strategy Board (RSB)

Promote strategic research considering strengths and demands of society
Establish world-class critical mass
Empowering Dynamic Research Ecosystem

**Actions & Policies**

- Reduce administrative and teaching duties etc. for faculty members (securing research hours)
- Opportunities for early- and mid-career researchers (EMCRs) to engage in challenging research

**Current Initiatives**

50 Early career researchers engage in top-level research at the Frontier Research Institute for Interdisciplinary Sciences (FRIS)

**Strategic Transition of Research System**

1. **Provide equal leadership opportunities for all 1,800 researchers as independent PIs**
2. **Promote independence of early career researchers (ECRs) through tenure-track system**
3. **Provide basic funding to empower ECRs as independent PIs**
4. **Enable the formation of subject-based research groups**
5. **Expand professional staff (1,100 members for URAs, technical staff, and IP managers, etc.)**

**I-A-2**

**I-A-3**

**ECR: Early-Career Researcher, EMCR: Early- & Mid-Career Researcher**

**1st MEXT’s Minister Awards for Starting Researchers**
- FY2022: 14

**1st University Fellowships approved**
- FY2021: 120

**2nd Emergent Research approved**
- FY2020～21: 40

**2nd JSPS Awards**
- FY2021: 5

**2nd JSPS Ikushi Prize**
- FY2021: 3

**Unit-Based System**

- Prof. (PI)
  - Research Fellows
  - Graduate Students

- Asso. Prof. (PI)
  - Research Fellows
  - Graduate Students

- Asst. Prof. (PI)
  - Research Fellows
  - Graduate Students

**Core facilities**

**Support Staff**

**Common Basic funds**

**Unit based**

830 Labs → 1,800 Research Units
Enriching Career Pathways and Research Ecosystem

Actions & Policies
- Foster career opportunities for EMCRs
- Expand opportunities for early independence & success

Current Initiatives
- “Tohoku University ECR Promotion Initiative” with 3 billion JPY per year
- “Faculty HR Strategy Council” for university-wide monitoring

Three Key Policies

A: Empowering EMCR careers: Comprehensive support for diverse researchers through Human Capital Management (HCM).

B: Providing merit-based attractive environment: Flexible research units for vibrant research ecosystem.

C: Expanding support for PIs: professional staff and core facilities.
Tackling Global Challenges and Creating Global Values

Open Knowledge Action Platforms

Contributing to global value creation through collaboration with diverse stakeholders

- New research frontiers for global challenges leading to “Streamlined multi-actor global action”

Disaster Science
Globalizing the “BOSAI” concept through initiatives, such as post-Sendai Framework for Disaster Risk Reduction (DRR), World BOSAI Forum, DRR ISOs, DRR MBA, DRR startups and “Fukushima Campus” activities

Disaster Science

Sustainability
Leveraging biodiversity researches, contributing to COP (on climate change and biodiversity), TCFD/TNFD, post-SDGs, etc.

Nihon-gaku
Enriching humanities and social sciences by juxtaposing Japanese values with global perspectives. Collaborating with 25 universities worldwide

Tohoku University’s Contributions

- 2011.03: Great East Japan Earthquake
- 2011.04: Reconstruction Actions
- 2012.04: International Research Institute of Disaster Science (IRIDeS)
- 2015.03: 3rd UN World Conference on Disaster Risk Reduction in Sendai
- 2015.07: Research with Social Impact

Three Global Agendas (2015)

- 2017.11: 1st World BOSAI Forum in Sendai
- 2019.11: 2nd World BOSAI Forum in Sendai
- 2021.04: Green Goals Initiative
- 2023.03: 3rd World BOSAI Forum in Sendai
- 2023.05: Mid-term evaluation of the Sendai Framework for Disaster Risk Reduction, UN meeting in NY
- 2023.05: G7 Science and Technology Ministers’ Meeting

Harnessing convergence knowledge
Contribution to global agenda & policies
Creation of borderless businesses
Fostering global problem-solving experts
Urban Campuses as a Hub of Innovation

Creating Data-Driven Innovations

**Tohoku Medical Megabank**

**Research Institutes**

**International Research Institute of Disaster Science (IRIDeS)**

**NanoTerasu**

**Science Park** 40,000m²

**Scientific Big Data**

**Global Coalition Network**

Integrated analysis of massive data, visualization of all phenomena and simulations to create solutions to a wide range of issues.

**Solution**

**Core Facilities**

**Semiconductor Technology Co-Creation**

**Japan’s Largest Academic Semiconductor R&D Platform**

**Next-gen. synchrotron radiation facility NanoTerasu**

**Unique coalition-type facility maintenance**

**Expenses for the construction of the new campus & maintenance covered by own funds & the sale of property (26B JPY)**

**Tohoku University Hospital**

**Clinical data (800,000 patients)**

**Tohoku Medical Megabank Organization**

**Japan’s largest population-based biobank (150,000 participants)**

**Operational since 2015 in collaboration with Sendai City**

**90min from Tokyo**

**Sendai**

**Subway**

**Research Institute Organization**

**Joint research centers as international research platforms**

**Global Coalition Network**

**Creating Data-Driven Innovations**
Current Initiatives

- Rapid growth of private investments by 13% p.a. (FY2022: over 10B JPY, 2x compared to FY2017)
- Development of advanced facilities (incl. Next-generation Synchrotron Radiation Facility “NanoTerasu”)

Expanding STI Platform & Science Park to Attract Investments

Leading Flagship Facilities (Leveraged by Private Investments)
- NanoTerasu, Tohoku Medical Megabank, Semiconductor Technology Co-Creation, etc.
- Super Facility Network through integration of advanced research facilities on campus

Our unique Science Park Initiative
- Establishing key research hubs in critical national tech. domains (quantum, bio, etc.)
- Developing an innovation ecosystem for public-private co-creation

On-campus R&D Centers
- Expanding Partnerships with industry through Co-Creation Research Centers

New Business Strategies
- University bonds for the Science Park
- Japan’s first university joint venture subsidiary business (TU Co-creation Initiative, Inc.)
Accelerating Tohoku University Startups

Tohoku University’s Achievements

179
Tohoku University Startups
+108% compared to FY2017

2,071
Participants per year
Entrepreneurship Programs

84
Business Incubation Programs
Seed Funding

Tohoku University Venture Partners
Fund No.1 9.68B JPY, 26 investments
Fund No.2 7.8B JPY, 12 investments

5
IPOs e.g. ispace, inc.

2
M&As

12
Seed Funding for 10 Universities from Tohoku & Niigata

Unicorn Company

Survey on University-Developed Venture Businesses by METI
Participants in FY2022

University’s Innovation Ecosystem × University Startups

Innovation ecosystem with diverse actors
Joint venture subsidiaries with banks※ (first among national universities)
※Sumitomo Mitsui Trust Bank, Ltd.

Sendai Startup Studio: Collaboration with NTT & municipalities to create a startup hub in the city
Satellites of leading overseas universities, developing entrepreneurship education
Collaboration with overseas accelerators to create the globally connected “SENDAI STARTUP CAMPUS”

Collaboration empowered by IOWN technology
Graduate and Undergraduate Reforms

Tohoku University’s Achievements in Education

THE Japan University Rankings
1st for 4 years

Asahi Shimbun University Rankings
Overall Rating from High Schools
1st place for 15 times in 2006-2022

International Research Cluster
10th AO entrance as of FY2021

1.8M JPY p.a.
Financial Support for all Ph.D. Students
Effectively free tuition per student

AO entrance as tool to uncover talent
Strategic Admission
Acquisition of near full SAT score students in collaboration with high schools

Graduate School Reforms
for Global Openness

Increasing number of Ph.D. students to foster future leaders
- Expanding financial support (1.8 → 3.6 M JPY), treatment as researchers
- Integrated program with international perspective starting from master’s course (12,000 students)

Advanced Graduate School for unique education governance
- Management of graduate school capacities, student placements and degrees
- Flexible, cross-sectoral degree programs for academic and societal needs (17 → 50 programs, participation of all students)
- Mandatory international experience in collaboration with overseas universities

Linked to ‘Advanced Graduate School’

Undergraduate Reforms
as Research University

‘Gateway College’ with intensive international co-learning
- Reorganize capacities from existing undergraduate schools (8,000 students)
- Co-learning environment with 2,000 international and 6,000 domestic students
- Mandatory study abroad to top level overseas colleges (1st-2nd year)
- Late specialization with trans-disciplinary education
- Solid professional education with broad perspective

Students: Ph.D. (Int.) 6,000 (40%) ↑ Master (Int.) 2,700 (30%) ↑ 4,000 (17%) ↑
Driving “Change” via Responsive Governance

Based on “The role of globally competitive research universities (final summary)” (CSTI, Feb. 2022) and “Discussions for system reforms” (Meeting of the committee for system reforms to improve research universities, Dec. 2021). Governance structure will be designed considering amendments to the National University Corporation Act.

Tohoku University Corporate Strategic Council

- Decision making authority of university management, appointment and dismissal of president
- University and external members (more than half), 10+ council members in total, chair chosen among external members
- Focus on diversity (20% international and more than 30% female members)
- Participation of external members: corporate managers, former university presidents, experts in accounting and legal affairs, overseas experts, graduates working in industry, government bureaucrats, etc.
- Participation of President, Provost, CFO, CGO, etc. as university members

Selection committee for members of the Corporate Strategic Council (tentative)

- Choosing Members
  - Management & Business Policies Supervision
    - Auditors
  - Reinforced Governance
    - Selection committee, audit council, compensation committee, etc.
  - Reinforced Functionality
    - Management Policies & Business Supervision
  - Reflecting diverse stakeholder opinions
    - Promotion of endowments, alumni management, regulatory reforms, etc.

President

Academic Matters

- 10 Faculties
- 15 Graduate Schools
- 3 Professional Schools
  - Law, Public Policy, Accounting
- 6 Research Institutes
  - IMR, IDAC, IFS, RIEC, IMRAM, IRiDeS

Management

Board of Executives

- Provost
  - Executive for Academic Matters
    - Supervising academic matters, executives for research & education, overseeing HR of all tenured faculty to ensure excellence
- Executives for Research & Education
  - Research, education, faculty HR, evaluations, industry collaboration
- CGO
  - Internationalization
    - Collaboration with other executives to streamline administrative affairs (not limited to JP nationals)
- CFO
  - Financials
    - Responsible for business strategies, financial resources, fund creation and management.
- Other Executives
  - HR, legal, PR, endowments, alumni, facilities, IT&DX, etc.

Strategic Leadership Team (SLT)

Management Support Function

- Research, education, faculty HR, evaluations, industry collaboration
- Finances, global affairs, HR, legal, PR, endowments, alumni, facilities, IT&DX, etc.

Administrative Centers

- Research & education support, co-creation strategy, investment management, environmental safety

Administrative Organizations

- Student & research support, international & industry collaboration, IT promotion, frontier development,
Comprehensive Internationalization

Executive officer for comprehensive internationalization (CGO)
Transformation to a globally oriented, internationally responsive organization

Expanding networks of International Joint Graduate Schools, alumni associations, overseas offices (3), liaison offices (19), international joint labs (2), AIMR satellites (2), strategic international partners (4), consortia (5), exchange agreements (246), early career exchange (39), etc.

International Members
- Students: 30% (GS: 40%, UG: 20%)
- Researchers: 30%
- Administrative staff: 20%
- Council: 20%, Executives: 30%

International Experience
- UG students: 100% (co-learning)
- Ph.D. students: 100%
- Tenured faculty: 100%
  (9x international co-authored papers)

Inbound readiness
- JP & ENG as official languages: 100%
- Courses in English: GS 100%, UG 50%
- Reinforcing recruitment
- Staff with international expertise: 50%
- Cross-cultural dormitories: 2x, etc.

Outbound readiness
- English level at Gateway College
  TOEFL iBT® more than 79: 100%
- International co-learning seminars: 2x
- Travel expense support
- Overseas sabbaticals, etc.

Advice from top level overseas experts
- Research Strategy Board
- University Advisors
- Diverse Expert Advisors

Subsidiaries and strategic outsourcing
- Toward a global campus based on fundamental policies and necessary regulatory reforms

Policies for comprehensive internationalization
- 3 commitments, 6 goals, 19 strategies
- 5 related priority KPIs

Leadership & Structure
- Top management by
  Chief Global Officer (CGO)
- President
- Provost
- CFO

Institutional Commitment & Policy

Diversity

Leading & Experience

Global Readiness

Global Linkage & Network

Mobility & Experience

Inbound

Outbound

Global Readiness

Diversity

Leadership & Structure
Tohoku University’s Achievements

- One of Japan’s largest corporate strategic funds as national university (ca. 10B JPY). The anticipated 100B JPY will be strategically managed under the leadership of the president.
- Driving organizational renewal, assessing viability through a stage-gate process for heightened vitality.

### Strategic Resource Allocation

**A** Budgetary decisions by the Strategic Leadership Team (SLT) consisting of the President, Provost, CFO & CGO

**B** University-wide review of action proposals (incorporating insights from international advisors)

**C** SLT decides allocation of strategic funds

**D** Based on organizational evaluations using evidence data, including reorganizations, core funds is allocated.

**E** Funds are allocated in alignment with the division director’s strategy through faculty evaluations based on evidence data and external expert peer reviews.

- **Corporate Strategic Council**
- **International Advisors**
  - Approval & Advice
  - Advice

- **Strategic Leadership Team**
  - University-wide Hearing
  - Reflecting Review Results

- **Organization (Departments, etc.)**
  - Strategic Funds
  - Core Funds

- **Researchers DB**
  - Consolidating univ. data (20 categories) in a data lake for evaluations

- **Researcher DB**
  - Visualization & analysis of 50+ KPIs stated in this proposal, on the top of current 130 KPIs

- **Integrated Utilization of Evidence Data**
- **Linkage**

- **External Experts**
  - Reflecting Eval. Results
  - Review, reflecting faculty evaluations

- **Individual Researchers & Research Units**

- **Scale of Corporate Strategic Funds**
  - 2 B JPY
  - 10 B JPY
  - 100 B JPY
  - 2004
  - 2021
  - 2049 (25th year)
### Goals and Priority KPIs

#### Goal I - A Research Excellence (Academic Impact)

<table>
<thead>
<tr>
<th>Publication numbers (per year)</th>
<th>Top 10% publications (per year)</th>
<th>Top 10% publication percentile (per year)</th>
<th>Top 10% publications by starting researchers (per year)</th>
<th>Top 10% publication percentile by starting researchers (per year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>6,791</td>
<td>664</td>
<td>114</td>
<td>1,130</td>
</tr>
<tr>
<td>10 Years</td>
<td>13,200</td>
<td>2,100</td>
<td>380</td>
<td>15.9%</td>
</tr>
<tr>
<td>18 Years</td>
<td>18,960</td>
<td>3,900</td>
<td>740</td>
<td>20.7%</td>
</tr>
<tr>
<td>25 Years</td>
<td>24,000</td>
<td>6,000</td>
<td>1,130</td>
<td>25.0%</td>
</tr>
</tbody>
</table>

#### Goal I - B Impactful Research and Innovation (Social Impact)

<table>
<thead>
<tr>
<th>Research funds from private companies (1B JPY)</th>
<th>Industry co-creation centers</th>
<th>University start-ups</th>
<th>IP revenue (1M JPY)</th>
<th>Industry joint publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>9</td>
<td>14</td>
<td>157</td>
<td>481</td>
</tr>
<tr>
<td>10 Years</td>
<td>42</td>
<td>57</td>
<td>759</td>
<td>1,080</td>
</tr>
<tr>
<td>18 Years</td>
<td>96</td>
<td>102</td>
<td>1,150</td>
<td>2,120</td>
</tr>
<tr>
<td>25 Years</td>
<td>300</td>
<td>200</td>
<td>1,500</td>
<td>4,170</td>
</tr>
</tbody>
</table>

#### Goal II - A Campus for Aspiring Minds

<table>
<thead>
<tr>
<th>International researchers</th>
<th>Female researchers</th>
<th>PI research units</th>
<th>Ratio of PIs and staff members</th>
<th>Staff with international expertise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>9.1%</td>
<td>15.7%</td>
<td>880</td>
<td>9.1%</td>
</tr>
<tr>
<td>10 Years</td>
<td>17.0%</td>
<td>28.0%</td>
<td>1,500</td>
<td>23.0%</td>
</tr>
<tr>
<td>18 Years</td>
<td>24.0%</td>
<td>33.0%</td>
<td>1,800</td>
<td>38.0%</td>
</tr>
<tr>
<td>25 Years</td>
<td>30.3%</td>
<td>40.0%</td>
<td>1,800</td>
<td>58.0%</td>
</tr>
</tbody>
</table>

#### Goal II - B Gateway to New Ventures

<table>
<thead>
<tr>
<th>International students</th>
<th>Ph.D. students with International experience</th>
<th>Financial support for Ph.D. students (1M JPY)</th>
<th>Ph.D. students</th>
<th>Ph.D.s conferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>8.0%</td>
<td>1.3</td>
<td>2,730</td>
<td>500</td>
</tr>
<tr>
<td>10 Years</td>
<td>50.0%</td>
<td>2.4</td>
<td>3,420</td>
<td>719</td>
</tr>
<tr>
<td>18 Years</td>
<td>75.0%</td>
<td>3.0</td>
<td>4,800</td>
<td>1,000</td>
</tr>
<tr>
<td>25 Years</td>
<td>100.0%</td>
<td>3.3</td>
<td>6,000</td>
<td>1,400</td>
</tr>
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</table>

#### Goal III-A Global Readiness (Coinciding KPIs with other Goals)

<table>
<thead>
<tr>
<th>Independent Revenue</th>
<th>Business scale (excluding Hospital, 1B JPY)</th>
<th>Own fund (1B JPY)</th>
<th>Corporate strategic financing (1B JPY)</th>
<th>International executives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>46.4%</td>
<td>0</td>
<td>10</td>
<td>0%</td>
</tr>
<tr>
<td>10 Years</td>
<td>69.1%</td>
<td>89</td>
<td>54</td>
<td>20.0%</td>
</tr>
<tr>
<td>18 Years</td>
<td>83.8%</td>
<td>133</td>
<td>37</td>
<td>25.0%</td>
</tr>
<tr>
<td>25 Years</td>
<td>78.1%</td>
<td>224</td>
<td>37</td>
<td>30.0%</td>
</tr>
</tbody>
</table>