Japan - Taiwan Workshop on “Industry-Academia Collaboration” (2015.03.10)

Industry-University Collaboration Activities at TOHOKU UNIVERSITY
About Tohoku University

• **Number of Faculties/Schools:**
  Undergraduate (10), Graduate (16), Professional Graduate Schools (3), Research Institutes (6), Hospital (1)

• **Number of Students:** 17,852
  Undergraduate 11,060
  Graduate 6,757
  International Students 1,532
  ( Taiwanese Students 42)

• **Number of Staff:** 6,211

As of May 2014
Tohoku University’s Vision

3 Core Principles since its Foundation (1907)

- Research First
- Open-Door
- Practice-Oriented Research and Education

Satomi Vision (2013)

“Leap for World Class”
“Lead Reconstruction of Tohoku and Regeneration of Japan”

Focus of Industry-University Collaboration

☐ “Leap for World Class”
⇒ Implementation of Large-Scale Joint Research
   Formulation of Research Centers/Hubs
   Inducement of New Industries

☐ “Lead Reconstruction of Tohoku and Regeneration of Japan”
⇒ Contribution toward Regional Construction
   (Industry-University Collaboration leading to attraction of companies and creation of new ventures)
Tradition of “Practice-Oriented Research and Education”

1917  Dr. Kotaro Honda’s “KS Steel” (Institute for Materials Research)

1926  Dr. Shuji Yagi & Dr. Shintaro Uda’s “Yagi-Uda Antenna”
       (Research Institute for Electrical Communication)

1944  Research Institute for Electromagnetic Materials

1961  Semiconductor Research Institute

Forerunners of University Startups

1938  Former Tohoku Metal Industries Co., Ltd. (NEC TOKIN Corporation)

1952  Former Yagi Antenna Inc. (Hitachi Kokusai Electric Inc.)

Commercial Applications:
- Yagi-Uda Antenna
- TV Antenna
- Magnetron
- Radar, Microwave etc.
- Magnetic Recording
- Floppy Disk, HDD etc.
Tohoku University’s Potential

① Ranking by Research Fields
Overall: No. 77 in the World (No. 5 in Japan)

<table>
<thead>
<tr>
<th>Fields</th>
<th>World</th>
<th>Japan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Sciences</td>
<td>No. 6</td>
<td>No. 2</td>
</tr>
<tr>
<td>Physics</td>
<td>No. 12</td>
<td>No. 2</td>
</tr>
<tr>
<td>Chemistry</td>
<td>No. 28</td>
<td>No. 6</td>
</tr>
</tbody>
</table>

Thomson Reuters ESI April 2013

② Joint Research/Patent

<table>
<thead>
<tr>
<th>Item</th>
<th>Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint Research w/ Industry</td>
<td>About 800 projects/yr Around 3 billion yen</td>
</tr>
<tr>
<td>Patent Applications</td>
<td>About 400 applications/yr (Domestic 300 / Intl. 100)</td>
</tr>
<tr>
<td>Registered Patent</td>
<td>About 1,700 patents</td>
</tr>
<tr>
<td>License Income</td>
<td>About 90M yen (Yr. 2013)</td>
</tr>
</tbody>
</table>

③ Landmark Industrialization
Tohoku Metal Industries Co., Ltd.  
(NEC TOKIN Corporation)  
Tohoku Steel Co., Ltd.  
Tsuken Electric Industry Co., Ltd. etc.

④ Number of University Startups 2014

<table>
<thead>
<tr>
<th>Rank</th>
<th>Institution Name</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University of Tokyo</td>
<td>58</td>
</tr>
<tr>
<td>2</td>
<td>Tohoku University</td>
<td>32</td>
</tr>
<tr>
<td>3</td>
<td>Tokyo Institute of Technology</td>
<td>31</td>
</tr>
<tr>
<td>4</td>
<td>Kyoto University</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>Osaka University</td>
<td>27</td>
</tr>
<tr>
<td>6</td>
<td>Kyushu University</td>
<td>24</td>
</tr>
<tr>
<td>7</td>
<td>Hokkaido University</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>Keio University</td>
<td>15</td>
</tr>
<tr>
<td>9</td>
<td>Waseda University</td>
<td>15</td>
</tr>
<tr>
<td>10</td>
<td>Tsukuba University</td>
<td>14</td>
</tr>
</tbody>
</table>

"University Startup Statistics 2014" by Teikoku Databank, Ltd.

⑤ Large-Scale Projects
1. Center of Innovation Program (COI-STREAM)  
2. Tohoku Medical Megabank Project  
3. International Research Institute of Disaster Science  
4. Impulsing Paradigm Change through disruptive Technology (ImpACT) - Spintronics & Robotics  
5. Translational Research Center based on Medical-Engineering Cooperation
Focus on Industry-University Collaboration

Working toward Expansion/Extension of Joint Research Projects, Exploitation/Commercialization of Research Results, and Creation of New Industries

Main Focus:

1. Expansion/Extension of Joint Research Projects
   - PR: Tohoku University Research Profiles, Innovation Fair
   - Execution of Organizational Partnership Agreements
     (entered with 23 Organizations in total)

2. Exploitation/Commercialization of Research Results
     (exchange researchers from both sides and create full-scale results)
   - Management of Industry-University Collaboration Centers
     - Center for Innovative Integrated Electronics Systems (CIES)
     - Material Solutions Center (MaSC)

3. Creation of New Industries
   - Investment Project (Project for Public-Private Innovation Program)
     - Creation of new ventures from universities’ research outcomes
Find a Match for R&D Needs

- Research profiles in 9 technical fields are publicized on the WEB to be utilized in industry (396 Profiles in Japanese & 352 Profiles in English)


Organizational Partnerships

Promote synergistic collaborations through organizational partnerships with companies/institutes in all fields, including R&D, human resources development, and responsibility toward the local community

- Development of innovative technology & products through multi/inter-disciplinary research
- Establishment of steering committee to manage multi/inter-disciplinary joint research
- Operation of laboratory tours and technology workshops to find new research subjects
- Organization of joint symposium and seminar

<table>
<thead>
<tr>
<th>Date</th>
<th>Organization Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006. 1. 19</td>
<td>Hitachi, Ltd.</td>
</tr>
<tr>
<td>2006. 1. 31</td>
<td>National Institute of Advanced Industrial Science and Technology</td>
</tr>
<tr>
<td>2006. 2. 21</td>
<td>National Institute of Radiological Sciences</td>
</tr>
<tr>
<td>2006. 7. 27</td>
<td>Seiko Epson Corporation</td>
</tr>
<tr>
<td>2006. 12. 26</td>
<td>The Kahoku Shimpo</td>
</tr>
<tr>
<td>2007. 1. 31</td>
<td>The 77 Bank, Ltd.</td>
</tr>
<tr>
<td>2007. 3. 6</td>
<td>DOWA Holdings Co., Ltd.</td>
</tr>
<tr>
<td>2007. 8. 3</td>
<td>Japan Aerospace Exploration Agency (JAXA)</td>
</tr>
<tr>
<td>2008. 7. 25</td>
<td>Central Institute for Experimental Animals</td>
</tr>
<tr>
<td>2009. 2. 19</td>
<td>High Energy Accelerator Research Organization</td>
</tr>
<tr>
<td>2009. 3. 9</td>
<td>National Institute for Fusion Science (NIFS)</td>
</tr>
<tr>
<td>2009. 4. 14</td>
<td>RIKEN</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Date</th>
<th>Organization Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010. 2. 12</td>
<td>NTT &amp; NTT East Corporation</td>
</tr>
<tr>
<td>2010. 6. 4</td>
<td>Sumitomo Metal Mining Co., Ltd.</td>
</tr>
<tr>
<td>2011. 11. 22</td>
<td>IBM Japan, Ltd.</td>
</tr>
<tr>
<td>2012. 1. 19</td>
<td>National Institute of Information and Communications Technology (NICT)</td>
</tr>
<tr>
<td>2012. 10. 16</td>
<td>Japan Agency for Marine-Earth Science and Technology (JAMSTEC)</td>
</tr>
<tr>
<td>2013. 8. 1</td>
<td>Toshiba Corporation</td>
</tr>
<tr>
<td>2013. 11. 12</td>
<td>National Institute for Materials Science (NIMS)</td>
</tr>
<tr>
<td>2013. 12. 18</td>
<td>Tohoku Regional Bureau, Ministry of Land, Infrastructure, and Transport</td>
</tr>
<tr>
<td>2014. 8. 1</td>
<td>National Institute of Biomedical Innovation</td>
</tr>
</tbody>
</table>

(23 Organizations as of March 2015)
Centers and Facilities for Industry–University Collaboration

Centers for Collaborative Research:

New Industry Creation Hatchery Center (NICHe)
Junichi Nishizawa Memorial Research Center
Clinical Research, Innovation and Education Center (CRIETO)
Material Solutions Center (MaSC)
Center Innovative Integrated Electronic Systems (CIES)
Research Center for Rare Metal and Green Innovation

Incubation Facility:

Tohoku University Collaboration Business Incubator (T-Biz)
- Managed by Organization for Small & Medium Enterprises and Regional Innovation, Japan (SME Support, Japan)
- Accommodates more than 20 SME companies including university ventures
Liaison with Global Corporations etc.  (Business Development Division: Global)

- Follow-up contact with foreign corporations/Japanese subsidiaries
- Respond to visit request and arrange plans
- Liaise with foreign govt. agencies (embassies, chamber of commerce etc.)
- Support execution of collaboration agreements etc.

Yr. 2009～2014 Foreign Visitors

US Companies, British Companies, German Companies, Italian Companies, French Companies, Korean Companies, Chinese Companies, Taiwan Govt. Agencies, US Govt. Agencies, Finland Govt. Agencies, British Govt. Agencies, Singapore Govt. Agencies, Swedish Govt. Agencies, and others
Industry–University Collaboration Data

Research Agreements & Intellectual Properties in FY2013

Joint Research Agreements
- Breakdown of Total 897 Agreements in FY2013

Invention Disclosures
- Breakdown of Total 457 Disclosures in FY2013

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Research Agreements</th>
<th>Amount (million yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>862</td>
<td>2840</td>
</tr>
<tr>
<td>2012</td>
<td>831</td>
<td>3084</td>
</tr>
<tr>
<td>2013</td>
<td>897</td>
<td>4127</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Invention Disclosures</th>
<th>Domestic Applications</th>
<th>PCT Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>451</td>
<td>353</td>
<td>117</td>
</tr>
<tr>
<td>2012</td>
<td>427</td>
<td>305</td>
<td>103</td>
</tr>
<tr>
<td>2013</td>
<td>475</td>
<td>356</td>
<td>107</td>
</tr>
</tbody>
</table>
### FY2013 Ranking of Joint Research with Industry - Overall

<table>
<thead>
<tr>
<th>No.</th>
<th>Number of Agreements</th>
<th>Amount (thousand yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University of Tokyo</td>
<td>1,622</td>
</tr>
<tr>
<td>2</td>
<td>Kyoto University</td>
<td>1,008</td>
</tr>
<tr>
<td>3</td>
<td>Osaka University</td>
<td>961</td>
</tr>
<tr>
<td>4</td>
<td>Tohoku University</td>
<td>897</td>
</tr>
<tr>
<td>5</td>
<td>Kyushu University</td>
<td>687</td>
</tr>
</tbody>
</table>

### FY2013 Ranking of Joint Research with Industry - Foreign

<table>
<thead>
<tr>
<th>No.</th>
<th>Number of Agreements</th>
<th>Amount (thousand yen)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>University of Tokyo</td>
<td>22</td>
</tr>
<tr>
<td>2</td>
<td>Tokyo Institute of Technology</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>Tohoku University</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>Kyoto University</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Osaka University</td>
<td>9</td>
</tr>
</tbody>
</table>

(Data: Industry-University Collaboration Statistics 2013 by Ministry of Education, Culture, Sports, Science and Technology)
※ Includes amount and numbers for international agreements with Japanese subsidiaries of foreign companies
※ There was a significant increase in amount due to one exceptionally large-scale agreement
Cooperation with Taiwan

- **University-Level Academic Exchange Agreements**
  - National Cheng Kung University
  - National Chiao Tung University
  - National Chung Hsing University
  - National Taiwan University
  - Soochow University
  - National Chengchi University
  - National Chung Cheng University
  - National Taiwan Ocean University
  - National Tsing Hua University, Hsinchu

  → Cooperation in research & education, human resource exchange etc.

  (9 Taiwanese institutions out of total 190 foreign Institutions)

- **Research Cooperation Agreements:**
  - MOU between Taiwan Industrial Technology Research Institute (ITRI) and Research Organization of Electrical Communication, Tohoku University

  → Research cooperation in ICT for disaster resilience

  and a few other industry collaborations...

As of August 2014
Intellectual Property Management at TOHOKU UNIVERSITY
Tohoku University IP Policy

Tohoku university, as a research-first university, contributes to public welfare and industry development by progressively promoting prevalence of its research outcomes, while initiating the following intellectual property policy to secure the right of inventions and fully utilize such inventions in society.

1. **Clarification of IP ownership**
Intellectual properties based on the inventions generated by the university’s research activities belong to the university. The university systematically manages the intellectual property in order to secure and exploit its right.

2. **Priority for utilization of IP in society**
Acquisition and management of the intellectual property right shall be given the highest priority and the university shall promote extensive use of the intellectual property worldwide.

3. **Enhanced collaboration with industry**
In collaboration with its TLO (Technology Licensing Organization) and utilizing internal liaison framework, the university adequately responds to industry’s diversified needs for the intellectual property and research.

4. **Creation of novel wisdom through exploitation of IP**
IP exploitation revenues are allocated to the university to promote creation of novel wisdom, while those are also allocated to the inventors adequately to enhance their research incentives.

5. **Swift handling of acquisition and management of IP**
The university establishes a specialized function (i.e. IP Division) for acquisition and management of the IP right and facilitates efficient and effective decision-making.

6. **Transparency in management**
Industry and the university found a highly transparent and equal partnership based on mutual trust, and establish an audit function to achieve sufficient social accountability.
1. Utilization of University’s IP in Society
   • Contribute to public welfare and industry development through utilization of research outcomes as intellectual properties
   • Elevate incentives to create inventions and realize IP creation cycles through reduction of IP exploitation revenues into subsequent research projects

2. Prevalence of University’s Research Achievements and Potentials
   • Lead to higher assessment of the university, laboratories, researchers etc.
   • Expand the university’s research potentials through acquisition of external funds from joint/sponsored research, academic consulting, and MTA etc.
   • Facilitate industry-university collaboration while the university creates basic inventions and the industry creates more innovative technologies through further development

3. Promotion of Industrialization
   • Respond to industry’s diverse needs by providing intellectual properties to local companies and ventures

4. Development of Human Resource
   • Educate the minds of university researchers and students for importance intellectual property
   • Develop IP-minded human resource through foundation of organized management of intellectual properties and confidential information

Significance of Filing IP Rights
In principle, “the right to obtain a patent” for inventions made by the university faculty is given to the university.

(Tohoku University Policy of Invention Article 4.1)

University retains the right when the inventions are patentable and marketable
- Patentability: Satisfies both novelty and inventive step
- Marketability: Has a good prospect of being assigned or licensed to industry

The right is given to individual inventor(s) if University does not seek the right
- Inventor(s) may file the patent application
- Inventor(s) may assign the right to an industry partner

Student Inventions
- University may file the application in its name if the faculty member(s) is/are involved as inventor(s) for the student invention
- “The right to obtain a patent” has to be assigned to University at the student’s own discretion (i.e. the assignment cannot be forced)
- University does not seek rights for students’ sole inventions
FY 2013 Classification of Invention

After invention disclosures are examined by an internal IP evaluation committee, they are divided in five different Classes:

<table>
<thead>
<tr>
<th>Class</th>
<th>Ownership</th>
<th>Costs paid by</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>University + Company or University solely</td>
<td>Company 100%</td>
<td>247</td>
</tr>
<tr>
<td>B</td>
<td>University + Company/Institution</td>
<td>Paid according to ownership ratio of the Parties</td>
<td>29</td>
</tr>
<tr>
<td>C</td>
<td>University solely</td>
<td>University (IP Division)</td>
<td>33</td>
</tr>
<tr>
<td>D</td>
<td>University solely</td>
<td>University (Lab)</td>
<td>104</td>
</tr>
<tr>
<td>E</td>
<td>Individual(s)</td>
<td>________</td>
<td>62</td>
</tr>
</tbody>
</table>

TOTAL 475

In most cases (i.e. Class A), the patent related costs are paid by the partner companies of joint research projects.
Invention Disclosures and Patent Applications Data

Number of Invention Disclosures & Patent Applications
(the rights were owned by JP government until FY2003)

Incorporation of National Universities
(April 2004)

(As of May 2014)
Invention Disclosures by Technology Fields

Invention Disclosures sorted by Technology Fields

(Years: FY2004 to FY2013)

- Medicine (incl. research tools)
- Medical Device
- Agriculture, Food
- Materials
- Chemistry
- Environment, Energy
- Civil Engineering, Construction
- Control, Measurement, Machinery
- Electronics, Information & Communication (Hardware)
- Electronics, Information & Communication (Software)
- Others

(As of May 2014)
Technology transfer agreements for University’s patents (incl. pending patents)

- The number decreased in FY2011 due to The Great East Japan Earthquake but it is on the rise afterwards
- Multi-year agreements are incrementally counted in each responding year
Allocation of IP Revenues

Licensing Fees

- Tohoku University: 2/3
- Cost of Technical Transfer by External TLO: 1/3

Internal Allocation

- Inventor(s): 30%
- Lab(s): 30%
- University Headquarters: 40%
- IP Registration & Maintenance Costs

Allocation of IP Revenues

- Inventor(s): 0~30%
- Lab(s): 30~60%

By the discretion of Inventor(s), Lab’s portion can be raised up to 60%.

If these costs had been paid from the Lab’s research budget, the amount is paid back to the Lab.
Tohoku University actively promotes Industry-University collaboration focused on commercialization/industrialization of university’s research outcomes in cooperation with both regional and global companies.

Through this Workshop, we hope to deepen our relationships with academic institutions in Taiwan and extend such relationships with global companies in Taiwan as well.

Thank you very much for your attention.