日独学長シンポジウムと日仏高等教育改革シンポジウムが開催されました。

2016年6月28-29日、ベルリンにて日独学長シンポジウム（以下、日独シンポ）が、7月1日、パリにて日仏高等教育改革シンポジウム（以下、日仏シンポ）が開催され、本学からは山口宏樹学長が参加しました。

日独シンポ*は、日本の国公私立大学団体国際交流担当委員長協議会とドイツ大学学長会議との共催で行われ、参加者は日本の27国立大学、3公立大学、14私立大学、および内閣府など政府機関や国立大学協会などから合計90人、ドイツの31大学、および政府機関などから合計58人（いずれも概数）でした。テーマは「教育、研究、イノベーション：大学がみずから抱く学問の本質的価値と社会からの要請の狭間における高等教育」です。工学系、生命科学・自然科学系、人文社会科学系のそれぞれの視点から、社会的・技術的イノベーションと社会的影響（その意義と方法、理論と実践）について認識を深めるとともに、大学の伝統的役割とイノベーションといった、相反する2つの課題を大学はどのように扱うかについて、文理の枠を超えた有意義な議論がなされました。なお、山口学長は工学系からの導入ステートメントとして「Social and Technical Innovation and Societal Impact in the Context of Engineering Sciences - In the case of Saitama Univ., a mid-sized national university -」**の発表を行いました。

一方、日仏シンポは日本の国立大学協会（JANU）とフランス大学長会議（CPU）との共催であり、日本側の参加者は18国立大学、3公立大学、10私立大学、および国大協から合計51人、フランス側は13大学、および7関係機関から合計27人（いずれも概数）でした。高等教育におけるイノベーション、大学マネジメントにおけるイノベーション、日仏間の学生交流の活性化の3セッションにおいて、日仏それぞれの発表後に活発な討議がなされ、有意義な情報交換の場となりました。なお、シンポジウムに先立ち、6月30日にJANUとCPUとのFollow up meetingが開かれ、山口学長（国大協理事）も出席して、今後の日仏間の交流の可能性について密度の濃い議論がなされました。

*ベルリン日独センターHP http://www.jdzb.de/jp/events/singleview/id/1488/
**山口学長の発表スライドは次ページ以降に掲載
Social and Technical Innovation and Societal Impact in the Context of Engineering Sciences
- In the case of Saitama Univ., a mid-sized national university -

Hiroki YAMAGUCHI
President, Saitama University

Fast Facts of Saitama University (SU)

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>Student</th>
<th>Graduate School</th>
<th>Student</th>
<th>Master</th>
<th>Doctor</th>
<th>Exchange Student Etc.</th>
<th>Total No. Student</th>
<th>Faculty</th>
<th>Staff</th>
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<tbody>
<tr>
<td>Liberal Arts</td>
<td>847</td>
<td>Humanities &amp; Social Science</td>
<td>179</td>
<td>87</td>
<td>73</td>
<td>9</td>
<td>2,572</td>
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<tr>
<td>Economics</td>
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<td>Education</td>
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<td>2,118</td>
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<td>108</td>
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<tr>
<td>Education</td>
<td>1,974</td>
<td>Science &amp; Engineering</td>
<td>843</td>
<td>98</td>
<td>174</td>
<td>98</td>
<td>3,894</td>
<td>271</td>
<td>227</td>
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<tr>
<td>Science</td>
<td>902</td>
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<td>1,266</td>
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<td>Engineering</td>
<td>1,975</td>
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<td>3,235</td>
<td>194</td>
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<tr>
<td>Others (Education Bureau, Research &amp; Development Bureau)</td>
<td>126</td>
<td>104</td>
<td>8,710</td>
<td>552</td>
<td>471</td>
<td>224</td>
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<td>Total</td>
<td>7,171</td>
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<td>1,166</td>
<td>194</td>
<td>247</td>
<td>107</td>
<td>8,870</td>
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<td>34</td>
</tr>
</tbody>
</table>

Number (included in Number): International Student, Faculty and Staff

As of May 2016

2016: 67 years old

Congratulations!
Nobel Physics Prize 2015
Prof. Takaaki Kajita
(graduated from SU in 1981)
How can universities in Germany and Japan react to current societal demands while at the same time safeguarding the true mission of universities?

Missions of and Societal Demands to National Universities in Japan

- 86 National Universities in Japan since 2004 Incorporation
  - Globalization, Innovation
  - University reform, Functional enhancement

- National University Management Strategy (2016〜)
  - To maximize the creation function of intellect
    as an engine of social reform
  - International (Global), National, Regional, Specific field

Way of Achieving True Mission and Reacting Societal Demand

- In the Case of Saitama University
  - COE in Specific Fields of Studies: Strengthening of Research & Education Functions
  - Regional R/D & Education Center Importance of Int. Cooperation
National Universities in Japan since 2004 Incorporation

The 1st Period of Medium-Term Goals
(2004 - 2009)
Start-up period of national univ. corporation system

The 2nd Period of Medium-Term Goals
(2010 - 2015)
Implementation of full-scale university reform utilizing merits of incorporation

The 3rd Period of Medium-Term Goals
(2016 - )
Toward national universities producing high added values with sustained competitiveness

National University Management Strategy

1. Promotion of functional enhancement based on future vision of university

A framework of 3 Priority Supports is introduced in the national budget allocation to carefully support a functional enhancement action of each national university. In this way, national universities are converted into the organizations performing the development of frontier research areas and the human resource cultivation depending on regional needs.

**Priority Support 1**
Promotion of HRD and research depending on regional needs

55 national universities

**Priority Support 2**
Promotion of establishment of COE and network in specific field covered by univ.

15 national universities
THE World University Ranking 401–500: Tokyo Medical and Dental U, 601–800: Kyushu Institute of Tech

**Priority Support 3**
Establishment of COE in competition with the world's top universities

16 national universities
Saitama University, All in One Campus at Capital Sphere, Saitama
- Embodiment of Diversity, Synergy and Integration -

SU aggressively takes a role of regional R/D & Education center to activate the capital sphere around Saitama by the industry-university-government collaboration and by the regional communication.

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<tbody>
<tr>
<td>Strategy 1: RD and education in integrated sciences for innovation and regional activation</td>
<td><strong>Action 1:</strong> Establishment of Graduate School of Integrated Technology &amp; Service</td>
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<td></td>
<td><strong>Action 2:</strong> Doctoral expert in tech.</td>
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<td></td>
<td><strong>Action 3:</strong> Establishment of Frontier Industry International Laboratory</td>
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<tr>
<td>Strategy 2: HRD and teacher training based on regional needs</td>
<td><strong>Action 4:</strong> Establishment of Career Center SU</td>
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<td></td>
<td><strong>Action 5:</strong> Establishment of Teaching Profession Graduate School and its enhancement</td>
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<td><strong>Action 6:</strong> Advancement of teacher training</td>
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<tr>
<td>Strategy 3: Establishment of COE in specific fields of studies</td>
<td><strong>Action 7:</strong> Promotion of international joint researches in Strategic Research Units, Grad. S. of Sci. &amp; Eng.</td>
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<td><strong>Action 8:</strong> Enhancement of Graduate School of Science &amp; Engineering</td>
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<td></td>
<td><strong>Action 9:</strong> Lab-to-Lab Program in Sci. &amp; Eng.</td>
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<tr>
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<td><strong>Action 10:</strong> Enhancement of global human resource development at SU</td>
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</tbody>
</table>
THE World University Rankings among 18,000 Unvvs.

**Saitama University**

Japan

<table>
<thead>
<tr>
<th>Area</th>
<th>Performance indicator</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching</td>
<td>Reputation survey</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Staff-to-student ratio</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>Doctorate-to-bachelor’s ratio</td>
<td>2.25</td>
</tr>
<tr>
<td></td>
<td>Doctorates awarded-to-academic staff ratio</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Institutional income</td>
<td>2.25</td>
</tr>
<tr>
<td>International Outlook</td>
<td>International-to-domestic-student ratio</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>International-to-domestic-staff ratio</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>International collaboration</td>
<td>2.5</td>
</tr>
<tr>
<td>Industry Income</td>
<td>Knowledge transfer</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Research</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Research income</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Research productivity</td>
<td>6.0</td>
</tr>
<tr>
<td>Citations</td>
<td>Research influence</td>
<td>30</td>
</tr>
</tbody>
</table>

- Academic staff in Science and Engineering is about 50%.
- Quality of research paper is relatively high.

New Scheme of Cooperation in HE at Saitama Univ.

2014-: **Lab-to-Lab Program for Graduate Students in Science & Engineering**
- A research-oriented student exchange program based on Lab-to-Lab or Prof-to-Prof relation with partner universities.

**Strategy Building Ability**
- Overview of Peripheral Areas
  - On-Campus Across-Labs Project
- Strategy Understanding
  - Analysis of Research Strategy

**Local-Based Student Exchange**

**International Cooperation**
- Lab-to-Lab Outbound Scheme
- Lab-to-Lab Inbound Scheme

- Joint Project to study the process from extraction to resolution of problem with counterpart professor
- Understanding of diversity

- Prof. S. Nakabayashi and his Lab students
- Saitama University, Japan

- Prof. I. Ortega-Blake and his Lab students
- National Autonomous Univ. of Mexico

**Lab-to-Lab**
How do we define “innovation” and “societal impact” in the context of engineering science?

Science and Technology Policies in Japan

- The 5th Science and Technology Basic Plan
  Realizing a world-leading “super smart society” (Society 5.0)

- Japan Revitalization Strategy 2016
  For the 4th Industrial Revolution

  ➡ The most important key is innovation.

What is innovation?

Innovation is not mere technology renovation nor a spark of genius, but overall new concept to spread in human society. Paradigm Shift

- Innovation in Earthquake Engineering
  New Technology of Seismic Isolation and Control
  New Concept of Resilient Society

Science and Technology Policies in Japan

● The 5th Science and Technology Basic Plan (Jan. 2016, CITI, Japan)

Realizing a world-leading “super smart society” (Society 5.0)
where the various needs of society are finely differentiated and met by providing the necessary products and services in the required amounts to the people who need them when they need them, and in which all the people can receive high-quality services and live a comfortable, vigorous life.

● Japan Revitalization Strategy 2016 - for the 4th Industrial Revolution – (June 2016)

The most important key is innovation.
Innovation in Earthquake Engineering

The Great Hanshin/Awaji Earthquake (Kobe Quake M7.3) Jan. 17, 1995
- World's pre-eminent antiseismic techniques → Disillusionment with Japanese seismic engineering
- The honest explanation of bridge engineers: “The earthquake far exceeded what was assumed in the design.”
  Improvement of design standard and introduction of seismic isolation & control

Science & Technology Innovation

The Great East Japan Earthquake (Tohoku Quake M9.0) Mar. 11, 2011
- No severe damage of bridges by direct quake action → Experience and lesson of Kobe Quake
- The disaster and accident due to the tsunami were far beyond imagination !
  Introduction of new concept of Resilient Society
  Creation of resilient society is to create a disaster-resistant and flexible community.

Innovation by integration of Science & Technology and Humanities & Social Science

Looking back on the history, human beings have always learned from tragic disasters and moved forward.

The 2016 Kumamoto Earthquake ➞ ?

The hardware measures for disaster prevention which only prepare for a disaster as "pre-risk" based on the past way of thinking for natural disaster, are powerless when the "outside assumption" happens.

A new way of thinking is to create the society, which is resilient to natural disaster, by adding "on-risk" at the time of disaster and " post-risk " after disaster to "pre-risk" before disaster.

International Institute for Resilient Society

which aims at research, education, and international contributions in the areas of disaster prevention, environment, and infrastructures for constructing truly resilient society.

Issue No.3

What kind of training and education do today’s graduates in the engineering sciences require to act successfully as technically expert and interculturally sensitive citizens of the world?

In the Case of Saitama University

- Frontier Industry International Lab. & New Graduate School
  Globalization, Innovation
  Liberal Arts, Technology and Service
  Integration of Arts and Sciences

- Frontier Industry Creation Project by Saitama Prefecture
  Project Based Learning
  Industry-University-Government Collaboration

Innovation is not a spark of genius. An ability to take the initiative in solving problems with a diversity of people is a key factor for innovation.
Frontier Industry Creation Project by Saitama Prefecture (2014~)

The baby-boom generation becomes elderly aged 75 or over. ⇒ Explosive increase in medical demand and drastic decrease in productive age population ⇒ Shrinkage of workforce and economic recession

To increase regional ‘earning power’

Frontier Industry Creation Project is promoted to strongly support practical realization, productization, commercialization and industrialization, by integrating advanced study seeds of university/research organization and superior technologies of industrial firm. It aims to bring up pioneering industries in 5 key areas and to accumulate them in Saitama prefecture by the cooperation with AIST, NEDO, and financial institutions.

Frontier Industry Research Salon on 23 May 2015
Development of Detectable Drugs and Diagnostics Drugs

Project 1: Quick detection for Toxins and Infectious Viruses on the basis of Next Generation Antibodies

Vero toxin,
Influenza viruses,
Noro Viruses,
Dengue Viruses,

ELISA & ImmunoChromatography, etc.

ELISA assay
Immunochromatographic assays

Sprays

Project 2: Quick diagnostics for Cancer (Tumor) Markers on the basis of Next Generation Antibodies

Survivin,
Other known tumor makers,

ELISA & ImmunoChromatography, etc.

Use of cDNA display method for screening

Merits
• High affinity
• High selectivity

Successful Discovery
Anti-Tumor Marker!!
(Next-Generation Antibody)

ImmunoChromatographic assays

New Business

ELISA assay
Novel Devices

Development of Rehabilitation Robots with Visualization Techniques

What is the merit of introducing robot to rehabilitation when robots are bulky, expensive? Additionally, it is less-skilled than therapists.

• Robot can measure accurately and automatically with the equipped sensors.
• Augmented reality is also good solution for enhancing rehabilitation.

Proposal in this project

Effective training based on visualization of force information

6 out of 7 participants had much shorter time after 1 month training. This is a possible beneficial effect of improvement in ambulatory function

Time-up and Go [second]

Image of Timed up and go test

3 m
Solution-Processed Flexible/3D Curved Surface Organic Thin Film Solar Cells

Organic Thin Film Solar Cells by Electro Spray Deposition (ESD) method provide light weight, flexible / 3D curved surface and versatile applicability for mobile and energy-harvesting fields.

![An example of flexible organic solar cell fabricated on a PEN substrate.](image)

Typical C-V curves and conversion efficiencies of fabricated organic solar cells: (a) An inverse-type cell on a flexible PEN by spin-coating, 8.1%, and (b) A conventional-type cell on a glass by the ESD, 8.6%.

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**Concluding Remarks**

In the case of **Saitama University,**

*For true mission as an intellectual institution*

- Global Center of Research & Education
  - Co-existence

*For innovation and societal impact*

- Regional Center for Frontier Industry Creation & Human Resource Development

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**Important keywords:**

- International Cooperation
- Industry-University-Government Collaboration
- Technology and Service
- Integration of Arts and Sciences

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**Diversity, Synergy and Integration**

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**THANK YOU!**