

India-Japan Partnership - New Global and Strategic Perspectives, *November 15, 2007*

# Science and Technology Development and Research under International Cooperation

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The University of Tokyo

# Outline

- University of Tokyo
- Challenging Problems in the 21<sup>st</sup> Century
- India - Japan Partnership

# University of Tokyo

Established in 1877, UT is the oldest university in Japan. As a representative of Japan, it has greatly contributed to the development of the modern Japanese state. In 2004, UT and the other national universities won autonomy from the Ministry of Education in the biggest reform for a century.



Red Gate

**10 Faculties**

**15 Graduate Schools**

**32 Research Institutes & Centers**

**2 University Hospitals**

**Number of Personnel :**

**Approx 4,000 Faculty Members**

**Approx 3,000 Administrative Staff**

**Students enrolled: Approx 28,000**

**Annual Budget: Approx 2 billion USD**

# University of Tokyo: Graduate School

- Arts and Sciences
- Law
- Economics
- Humanities and Sociology
- Education
- Science
- Engineering
- Agricultural and Life Sciences
- Pharmaceutical Science
- Medicine
- Mathematical Science
- Information Studies
- Information Science and Technology
- Frontier Sciences

# School of Engineering



*Faculty of Engineering*

*School of Engineering*

*Research Institutes within  
School of Engineering*

Civil Engineering  
Architecture  
Urban Engineering  
Mechanical Engineering  
Engineering Synthesis

UT's School of  
Engineering was quite

**20 Departments with a wide spectrum of science and engineering covering from the basic to applied ones**

500 Academic Staff  
4,800 Students  
2,000 Undergraduate  
2,800 Graduate

Geosystem Engineering  
Materials Engineering  
Applied Chemistry  
Chemical System Engineering  
Chemistry and Biotechnology  
Nuclear  
Nuclear Engineering and Management  
Advanced Interdisciplinary Studies

# Greatest Engineering Achievements OF THE 20<sup>TH</sup> CENTURY

1. Electrification
2. Automobile
3. Airplane
4. Safe and Abundant Water
5. Electronics
6. Radio and Television
7. Agricultural Mechanization
8. Computers
9. Telephone
10. Air Conditioning and Refrigeration
11. Interstate Highways
12. Space Exploration
13. Internet
14. Imaging Technologies
15. Household Appliances
16. Health Technologies
17. Petroleum and Gas Technologies
18. Laser and Fiber Optics
19. Nuclear Technologies
20. High Performance Materials

The following engineering marvels were ranked as the top 20 greatest engineering achievements of the 20th century.



# Greatest Engineering Achievements OF THE 20<sup>TH</sup> CENTURY

1. **Electrification**
2. **Automobile**

Technology allows an abundant supply of food and safe drinking water for much of the world. We rely on electricity for many of our daily activities. We can travel the globe with relative ease, and bring goods and services wherever they are needed. Growing computer and communications technologies are opening up vast stores of knowledge and entertainment.

19. **Nuclear Technologies**

20. **High Performance Materials**



# Greatest Engineering Achievements OF THE 20<sup>TH</sup> CENTURY

1. **Electrification**
2. **Automobile**
3. **Airplane**
4. **Safe and Abundant Water**
5. **Electronics**
6. **Radio and Television**

How many of the 20th century's greatest engineering achievements will you use today? A car? Computer? Telephone? Explore our list of the top 20 achievements and learn how engineering shaped a century and changed the world.

**As the world's leading school of engineering, UT has contributed directly to many of the major scientific and technological developments that transformed the 20th century**

14. **Imaging Technologies**
15. **Household Appliances**
16. **Health Technologies**
17. **Petroleum and Gas Technologies**
18. **Laser and Fiber Optics**
19. **Nuclear Technologies**
20. **High Performance Materials**





# Universities in the 21st Century

In a world increasingly influenced by scientific and technological innovation, engineers can provide important leadership to the society in the 21st century.

We, **UT** and **IITs**, strive to make significant contributions to solving the societal challenges of the 21st century by pursuing a course of leadership through technical excellence and innovation.

# Challenging Problems on Earth Today



Environmental Issue

Global Warming

Energy Problem

Expanding Population

Aging Society

World Food Problem

Water Supply

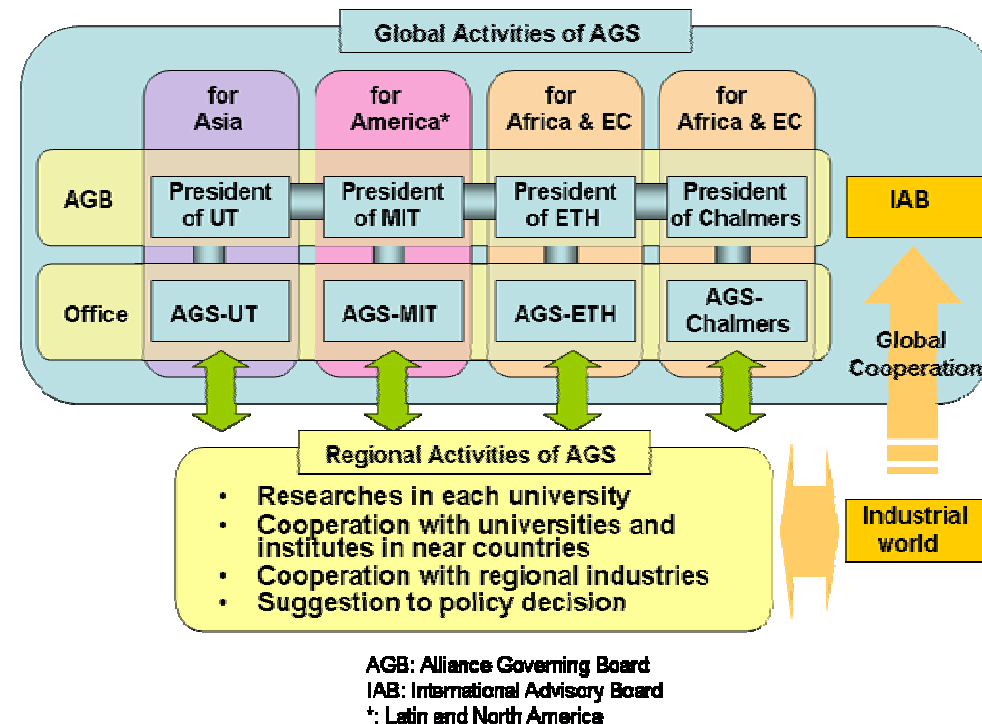
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**Global Sustainability** and **Innovation** are the key words of the 21st century. We are expected to play an important role in solving the world's complex problems.

# Alliance for Global Sustainability (AGS)

- **AGS:** a unique, international partnership between four of the world's leading science and technology universities **for forming a cooperative venture that seeks solutions to the issues around global sustainability.**
- Partner Universities:
  - **The University of Tokyo (UT)**
  - **Massachusetts Institute of Technology (MIT)**
  - **Swiss Federal Institute of Technology (ETH)**
  - **Chalmers University of Technology (Sweden).**
- Three-fold Mission of the AGS:
  - **Research: Improving scientific understanding of global environmental challenges** by creating new knowledge through research
  - **Education: Educating new generation leaders** with the knowledge and skills required to meet the challenges of sustainable development
  - **Outreach: Taking a step beyond normal academic dissemination of results to facilitate implementation**

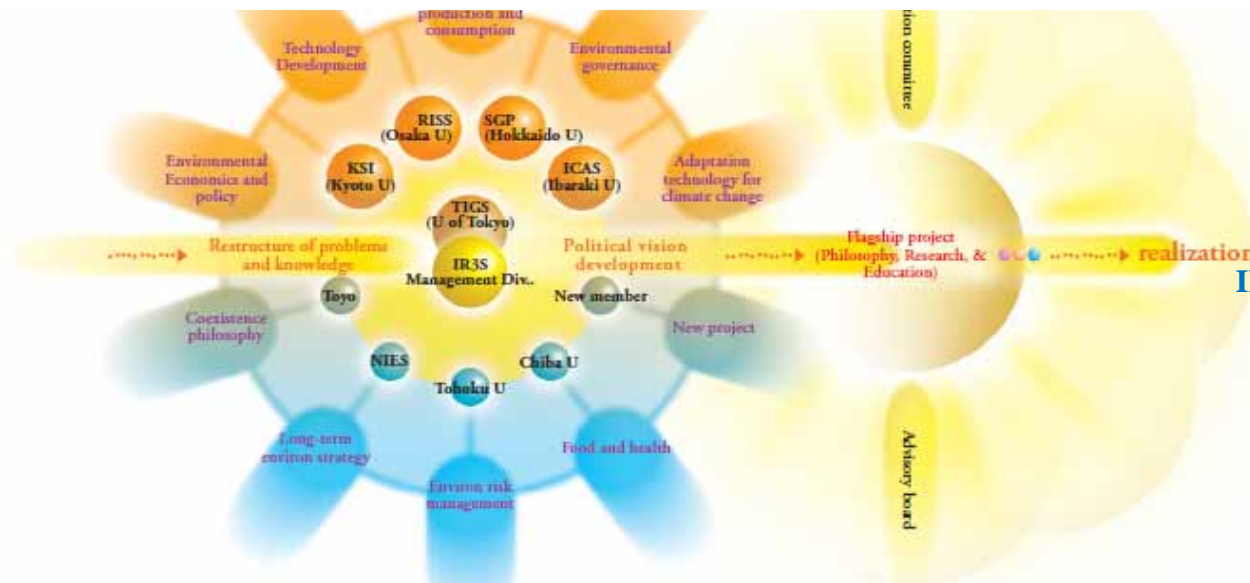
Management chart of the AGS



Created in 1997, AGS today brings together hundreds of university scientists, engineers, and social scientists to address the complex issues that lie at the intersection of environmental, economic and social goals.

# Integrated Research System for Sustainability Science (IR3S)

- IR3S: A research network serving as a global research and educational **platform for sustainability scientists**.
- **Partner University:** Kyoto Univ., Osaka Univ., Hokkaido Univ., Ibaraki Univ., and UT.
- **Flagship Project:**
  - Sustainable measures to mitigate and adapt to **global warming**
  - Building a **resource-circulating society** in Asia
  - **Global sustainability** – conception and development



IR3S New Delhi Research Unit



- **Sustainability Science:**
  - **Transdisciplinary discipline destined to play a fundamental role in addressing critical global issues and developing visions that can lead to a sustainable global society.**

TERI (India Habitat Center, Lodhi Road, New Delhi)



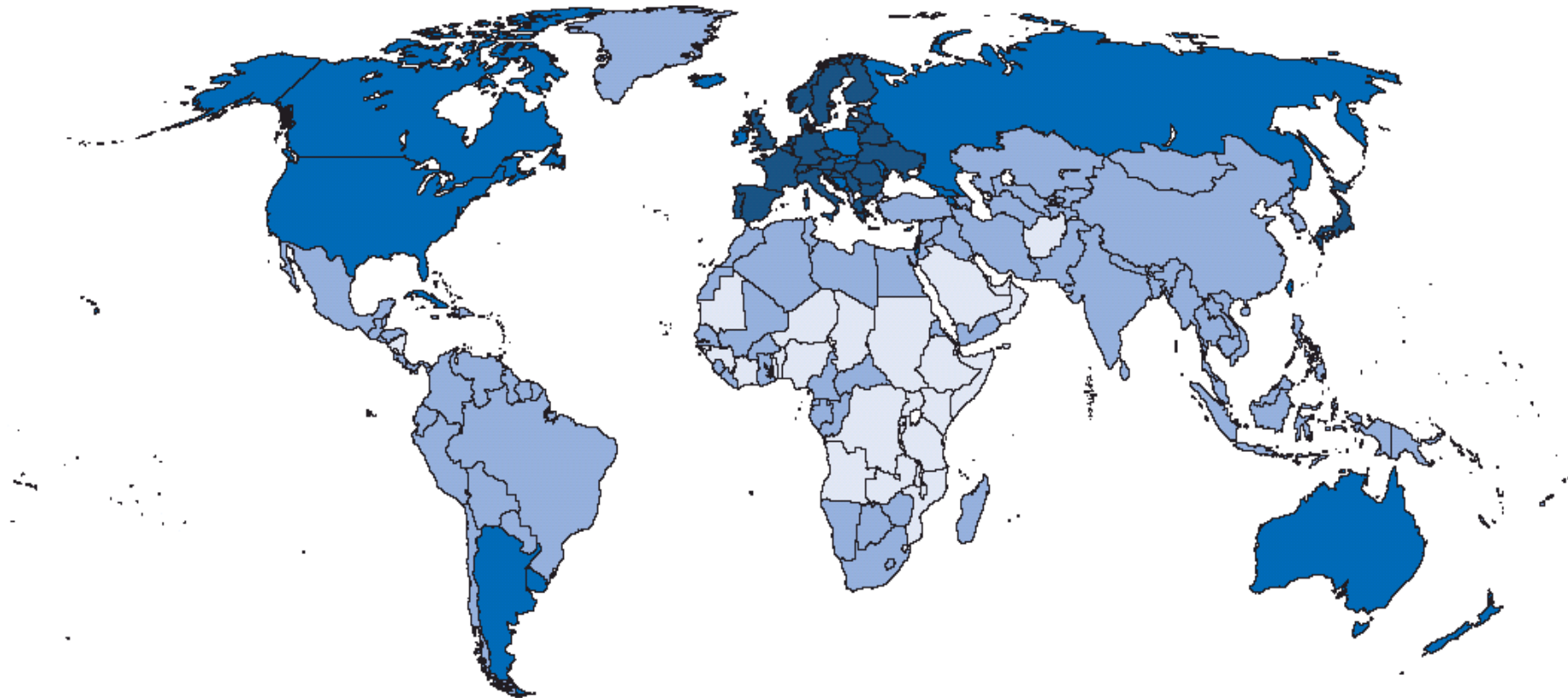
More... <http://www.ir3s.u-tokyo.ac.jp/>

## Aging (Gerontological) Society

The aging of our societies over coming decades will require comprehensive reform addressing the fiscal, financial and labor market implications of aging, as well as the implications for social benefits and systems of health and long-term care.

## Percent Aged 65 and Over: 2000

Our global population is aging, and aging at an unprecedented rate.

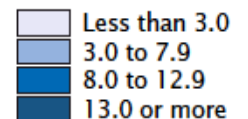


An Aging World: 2001, International Population Report

U.S. Dept. of Health and Human Services

U.S. Dept. of Commerce

Kevin Kinsella and Victoria A. Velkoff

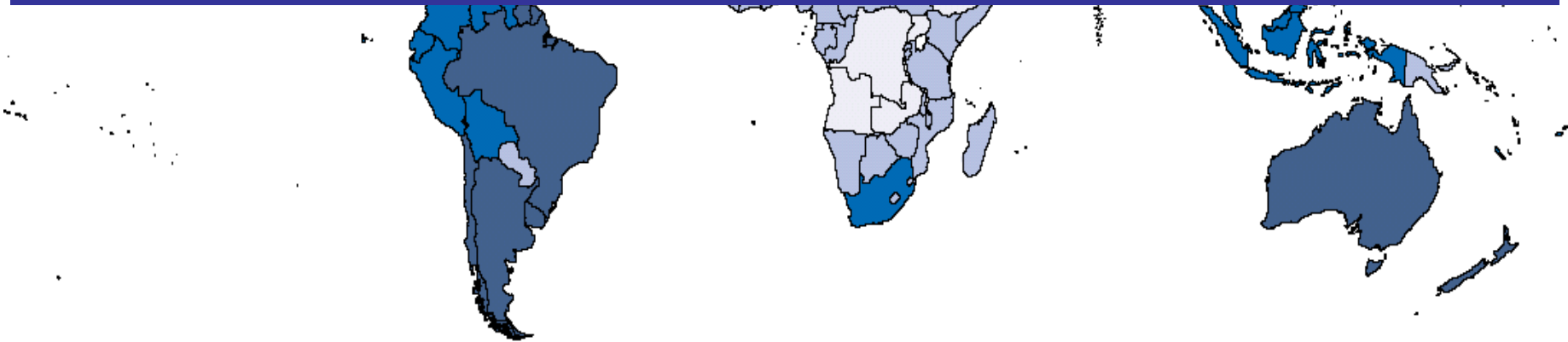


## Percent Aged 65 and Over: 2030

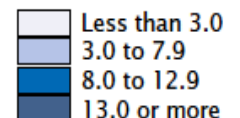
Well over half of the world's elderly (people aged 65 and over) now live in developing nations (59 percent, or 249 million people, in 2000). By 2030, this proportion is projected to increase to 71 percent (686 million).



Research is required on aging to improve the quality of life as one ages.



An Aging World: 2001, International Population Report  
U.S. Dept. of Health and Human Services  
U.S. Dept. of Commerce  
Kevin Kinsella and Victoria A. Velkoff



# Bioengineering

Bioengineering is a new multi-discipline fusing biological sciences or medical science with engineering to develop effective biology-based technologies for applications across a broad range of societal needs including breakthroughs in diagnosis, treatment, and prevention of disease, in design of novel materials, devices, and processes, and in enhancing environmental health.



# UT Center for NanoBio Integration

Nanobiotechnology has emerged in recent years as an important new field of research — especially the area of nanomedicine. Nano-scale cancer research, for example, has produced new means of detection, diagnosis and drug delivery. It expected to have a dramatic impact on medical practices in the future.

# Globalization is given high priority at UT

A commonality among the world's top universities is globalization. It means the globalization of human resources and promotion of interdisciplinary educations and researches... Globalization of a university is not only required but also inevitable in the intellectual society.

To meet global demands, UT is transforming itself and undergoing necessary reforms. In particular, UT will strive to strengthen its links with Universities and Institutes in Asian countries, China, Korea, Thailand, ..., **India**.

**India is on the move!**

# UT trails the world's top universities

## THE WORLD'S TOP 200 UNIVERSITIES

Criteria



Peer Review

Employer Review

Staff/Student

Citations/Faculty

Int'l Faculty

Int'l Student

Total

RANK	NAME	COUNTRY	Peer Review	Employer Review	Staff/Student	Citations/Faculty	Int'l Faculty	Int'l Student	Total
1	Harvard University	US	100	100	100	96	93	91	100
2	Cambridge University	UK	100	100	99	83	98	91	97.6
2	Oxford University	UK	100	100	100	82	97	96	97.6
2	Yale University	US	100	98	100	91	84	75	97.6
10	MIT	US	100	99	85	98	34	94	94.6
17	UT	Japan	100	92	96	88	25	44	91.1

91.1

## Good News

**UT is highly regarded by the academic peers**

## Bad News

**UT scores low in the international measures**

**INT'L STUDENTS SCORE -- UT's Score is 44/100**

More than 2.5 million undergraduates now study outside their own country worldwide, and this number is growing at about 20 percent a year. A university's ability to attract them is one measure of its ambition...

**INT'L FACULTY SCORE -- UT's Score is 25/100**

Equally important is its ability to bring in the best academics from around the world...

# Academic Exchange with India

Although Japan and India are recognized to be nations having advanced science and technology, the mutual interaction and cooperation in the field has not been well promoted so far.

## Number of Exchange

	India	Total
Students from India to UT	13	2,372
Scholars from India to UT	48	3,515
UT scholars to India	93	8,164

## Academic Exchange Agreements with Indian Universities

- University of Calcutta (Department of History)
- University of Delhi
- The National Institute of Oceanography

# President's Council

The President's Council, composed of distinguished members from around the world, will provide assistance to the president of UT.



Komiyama Hiroshi,  
Ph.D. President

## Members from India

### **Mr. Sunil Kant Munjal**

Managing Director, Hero Cycles Ltd.

### **Mr. N. R. Narayana Murthy**

Chairman and Chief Mentor, Infosys Technologies Ltd

### **Mr. Ratan Naval Tata**

Chairman, Tata Sons Ltd.

**Next President's Council will be held  
in New Delhi on April 28-29, 2008.**

# Rationale for Japan - India Cooperation

- Japan and India share common fundamental values:
  - Democracy
  - Economic development
  - Advanced science and technology
- Relationship is stronger today than ever before
- Cooperation is mutually beneficial

Prime Ministers of the two countries have announced 2007 as **India-Japan Friendship Year** and its pronounced as potentially the most important bilateral relationship in the world. The Delhi Mumbai Industrial Corridor Project and the proposed **new IIT in Japanese collaboration** must be two major initiatives of far reaching implications.

# Conclusion

UT and other major Japanese Universities would like to contribute to the foundation of a new IIT and to establish a longstanding partnership and collaborations between Japan and India.

I congratulate the first IIT Alumni Japan Conference for taking this important step in enhancing our bilateral collaboration.

I do expect fruitful and productive discussions in further promoting friendship and collaborations.

**Thank you for your kind attention!**

