GMSI Global Center of Excellence for Mechanical Systems Innovation

東京大学 THE UNIVERSITY OF TOKYO

Global Center of Excellence for Mechanical Systems Innovation

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The University of Tokyo

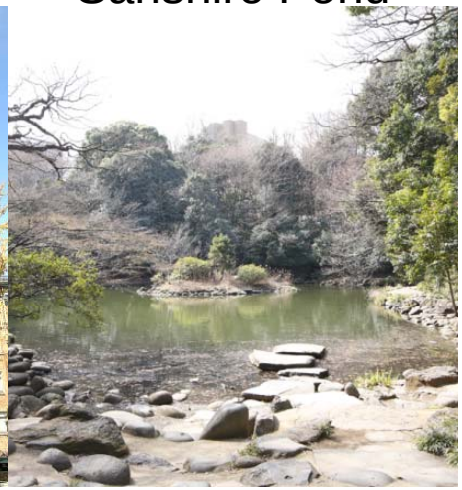
- Established in 1877 as the first national university
- College of Arts and Sciences, 9 faculties, 15 graduate schools and 11 institutes
  - Academic and Administrative Staff: 7,500
  - Students: Undergraduate:14,000, Master: 7,000, Doctor: 6,000
- Main campus located in Hongo Bunkyo-ku, Tokyo
  - About 56 hectares of the former Kaga Yashiki
  - Parts of the seventeenth century landscaping
  - Red gate: Important Cultural Property by the Japanese Government

Akamon

Yasuda Auditorium

Ginkgo tree

Sanshiro Pond



School of Engineering

- Graduate departments: 19, plus courses by guest professors and sponsored courses
- Undergraduate departments: 17
- Professors: 157, Associate Professors: 123, Lecturers: 19, Assistant Professors: 132, Total: 431; Staff: approx.1,000
- Students:
  - Undergraduate: 2,175
    - Foreign students: 97
  - Master course: 2,082
    - Foreign students: 375
  - Doctor course: 1,182
    - Foreign students: 523, Other foreign students: 115, Total foreign students: 1,110

SCHOOL OF ENGINEERING
THE UNIVERSITY OF TOKYO

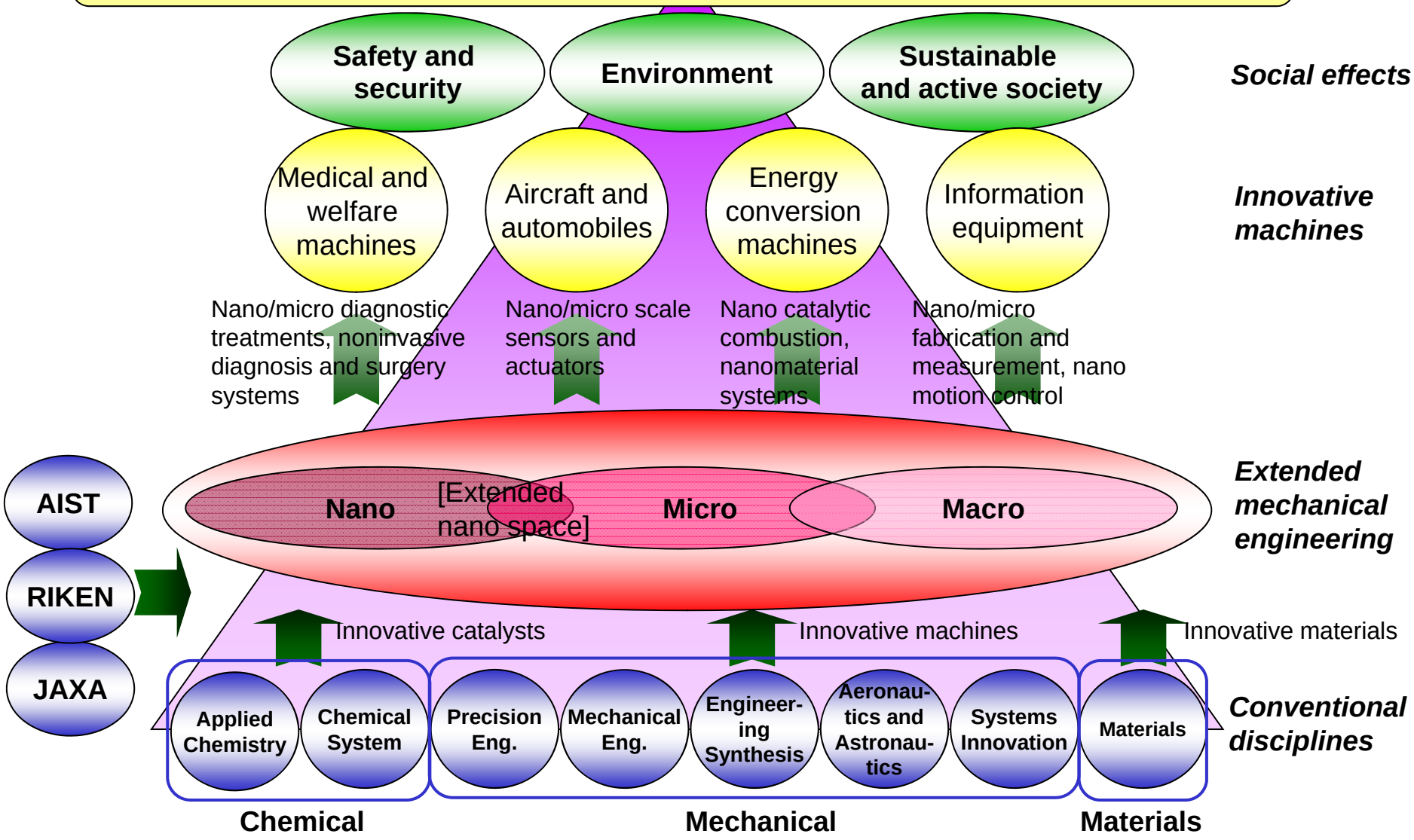
Reppin-Kan

Eng. Bldg. 1

Eng. Bldg. 2

Global Center of Excellence for Mechanical Systems Innovation

Creation of innovative machine systems that utilize nano-scale phenomena and establishment of an academic discipline based on them



GCOE Human resource development

Principle of human resource development:

The program aims at the cultivation of the following items:

(1) Fundamental attainment

Natural sciences, such as mathematics, physics, chemistry and biology, and fundamental social sciences

(2) Specialized knowledge

Specialized knowledge, such as mechanical dynamics, mechanics of materials, hydrodynamics, thermodynamics, design engineering, manufacturing engineering and material engineering, and bird's-eye-view knowledge on technology, society and the environment

(3) Literacy

Language, information literacy, technological literacy and knowledge of the law

(4) Competency

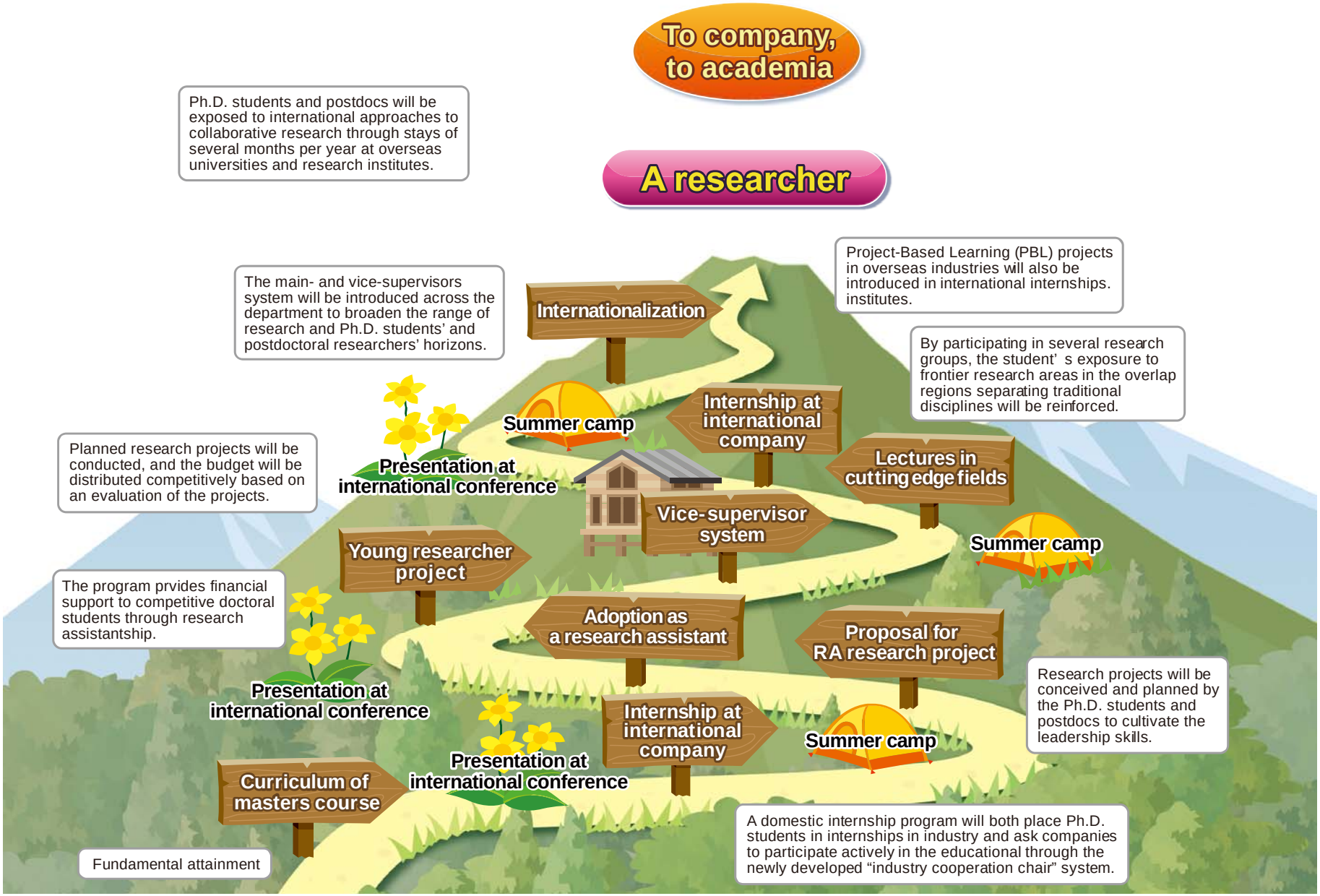
Creativity, problem identification and solution, planning and execution, self-management, teamwork, leadership, sense of responsibility and sense of duty

The goal of the human resource development program:

■ To cultivate internationally competitive young researchers with the ability to comprehend and generate both fundamental attainment and specialized knowledge, and the technical and language literacy and competency.

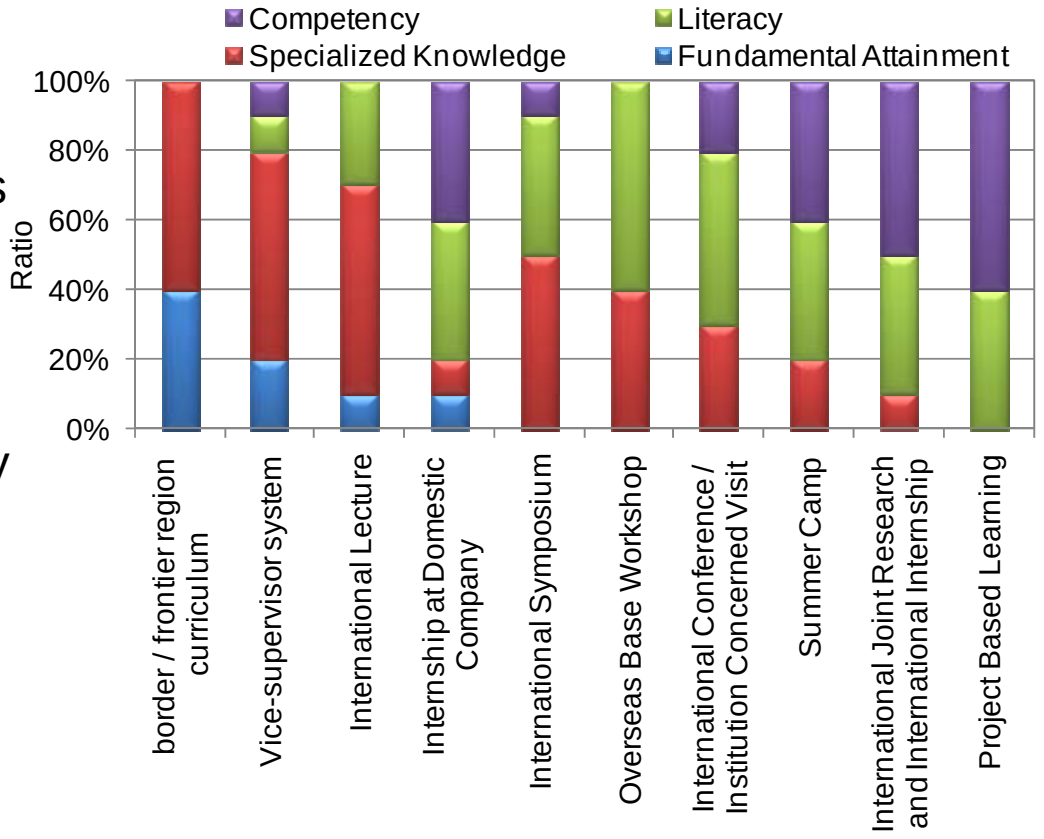
■ It is expected that these young engineers will be well-prepared to be the future leaders of industry and academia.

Overview of the education program (From the viewpoint of an RA)



Education program and required abilities

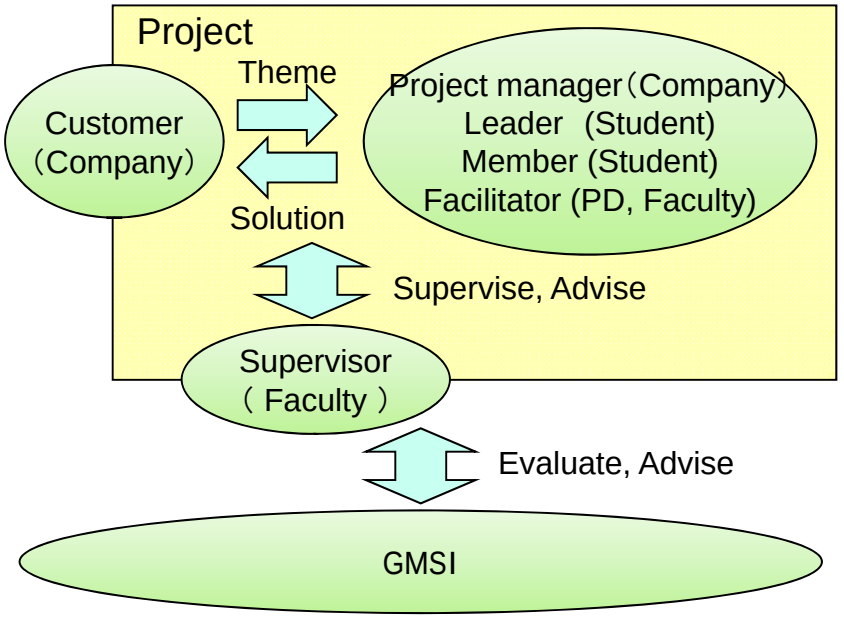
- **Fundamental attainment:**
  Mathematics, physics, chemistry and biology, and fundamental social sciences
- **Specialized knowledge:**
  Mechanical dynamics, mechanics of materials, hydrodynamics, thermodynamics, design engineering, manufacturing engineering and material engineering, and bird's-eye-view knowledge on technology, society and the environment
- **Literacy:**
  Language, information literacy, technological literacy and knowledge of the law
- **Competency:**
  Creativity, problem identification and solution, planning and execution, self-management, teamwork, leadership, sense of responsibility and sense of duty



Education objectives and program

Project Based Learning

- Business solution for themes come from company
  - Real-life problems
  - Students should submit results
- Foster
  - Teamwork
  - Project management
  - Cooperating, integrating different fields
  - Training needs-oriented R&D approach

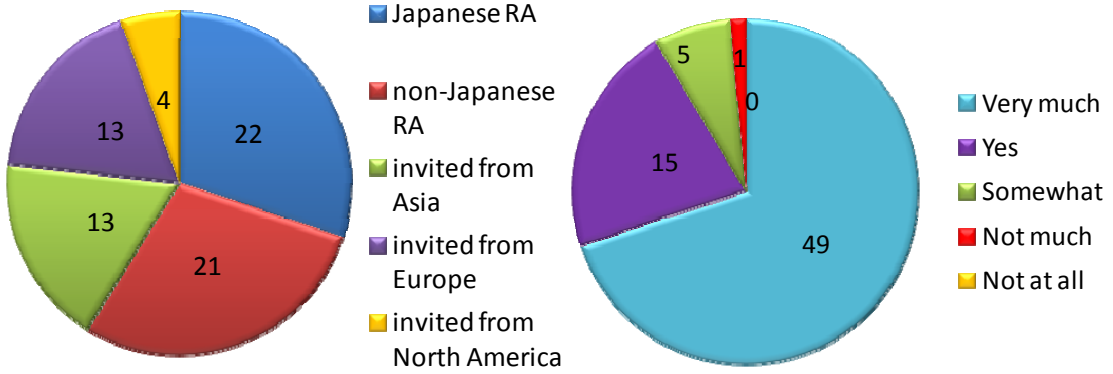


▲ PBL Framework

No.	2009 Theme	Propose/Cooperate
1	Feasibility Study for Zero-Emission in Urban Space	Hitachi Ltd.
2	Application of Energy-harvest System for Wireless Sensor	Shinkawa Technology
3	Design Guide Proposal for New Drive Actuator utilizing MEMS technology	Toshiba Corp.
4	Application of Micro Nano Technology for Rapid-Transit Rail Cars	East Japan Railway Company
5	Pratical Use of Recycling System of Underwater Demolition	Nippon Koki Co. Ltd.
6	Customer Service Innovation for Industrial Machinery	Ebara Corp.
7	Service Design Based on Customer Satisfaction	NEC Corp.

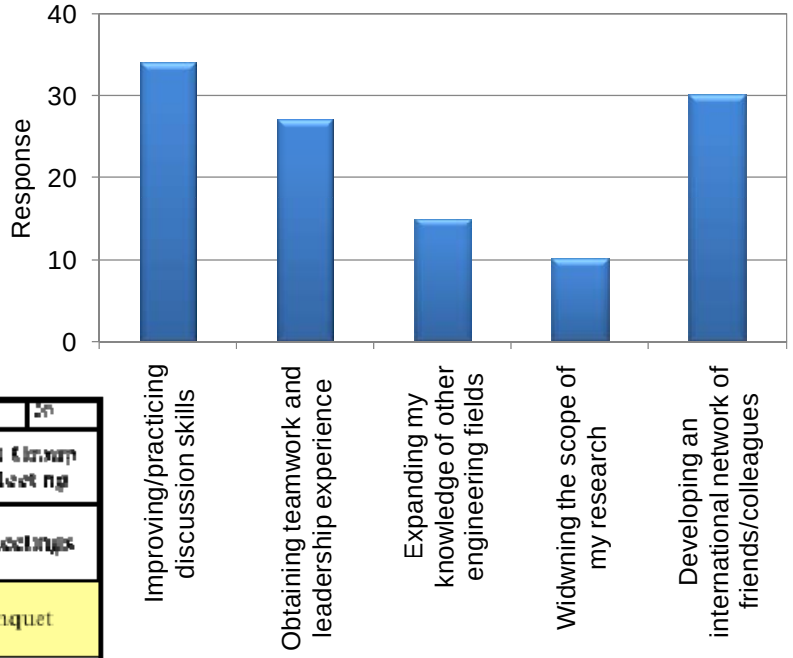
Summer Camp

- 73 PhD students from 17 world-leading universities of 12 countries
- Research presentation and discussion for a novel idea (Group work)



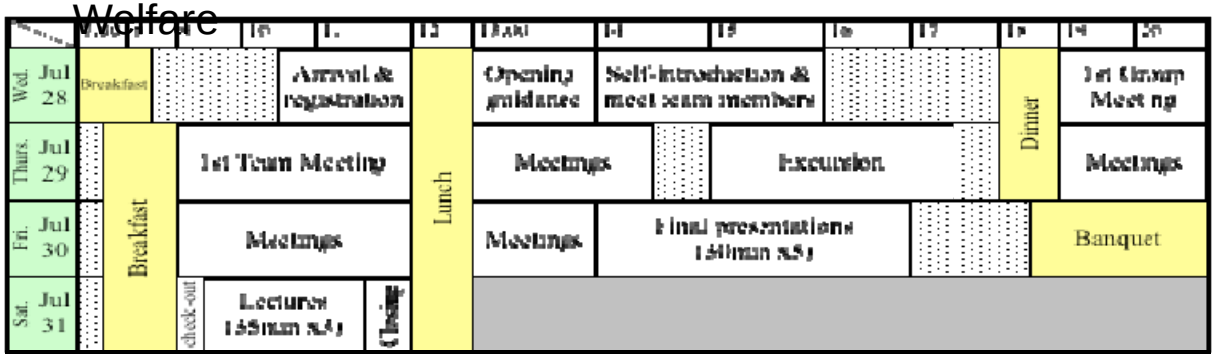
▲ Participants

▲ Enjoy camp



▲ Which areas beneficial

Topics (2011): Energy, Environment, Safety & Security, Information Technology, and Health & Welfare



International education environment (Oversea bases)

Open Seminars / Evening Seminars

- Open seminars
  - Academic topics from invite researchers active on the forefront in the world
- Evening seminars
  - Topics contribute to career formation
  - Industry-academic collaboration, Engineering ethics, Project management, etc

International workshops

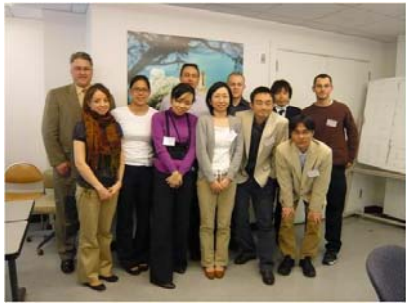
Specialized field discussion in a small group

- Mar. 8-13, 2009Mar. 8, 2009
Theme: Medical robotics
Sant'Anna School of Advanced Studies (SSSA) , Italy
Technical University of Munich (TUM), Germany
- Mar. 23-27, 2009
Theme: Leading-edge nanotech
Columbia University, MIT, USA
- Mar. 9- 13, 2010
Theme: Nanoscale thermal and energy phenomena
Stanford University, UC Berkeley, USA
- Mar.15-20, 2010
Theme: Computer Integrated Surgery
Johns Hopkins , Harvard, USA
- Feb. 14-19, 2011
Theme: Micro-scale Multiphase Flow Heat Transfer
EPFL, Switzerland, TU Darmstadt, Germany
- March 7-11, 2011
Theme:Synthesis and Modeling of Nanoscale Materials
University of Helsinki, Aalto University, Finland
University of Cambridge, UK
- March. 24-30, 2011
Theme: Biomicro/nanofludics
ETH, Switzerland, KTH, Sweden

SSSA

TUM

Columbia

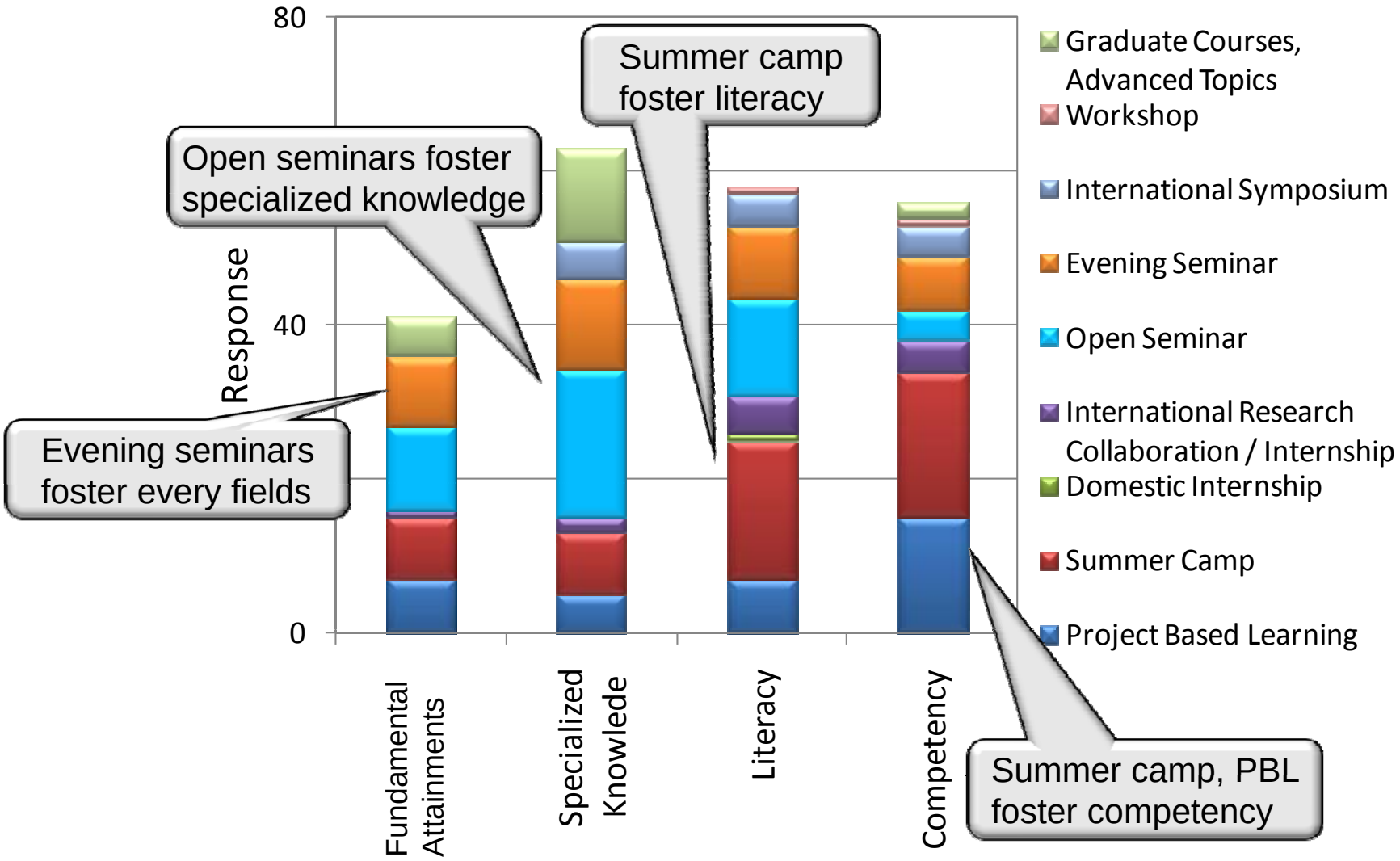


MIT

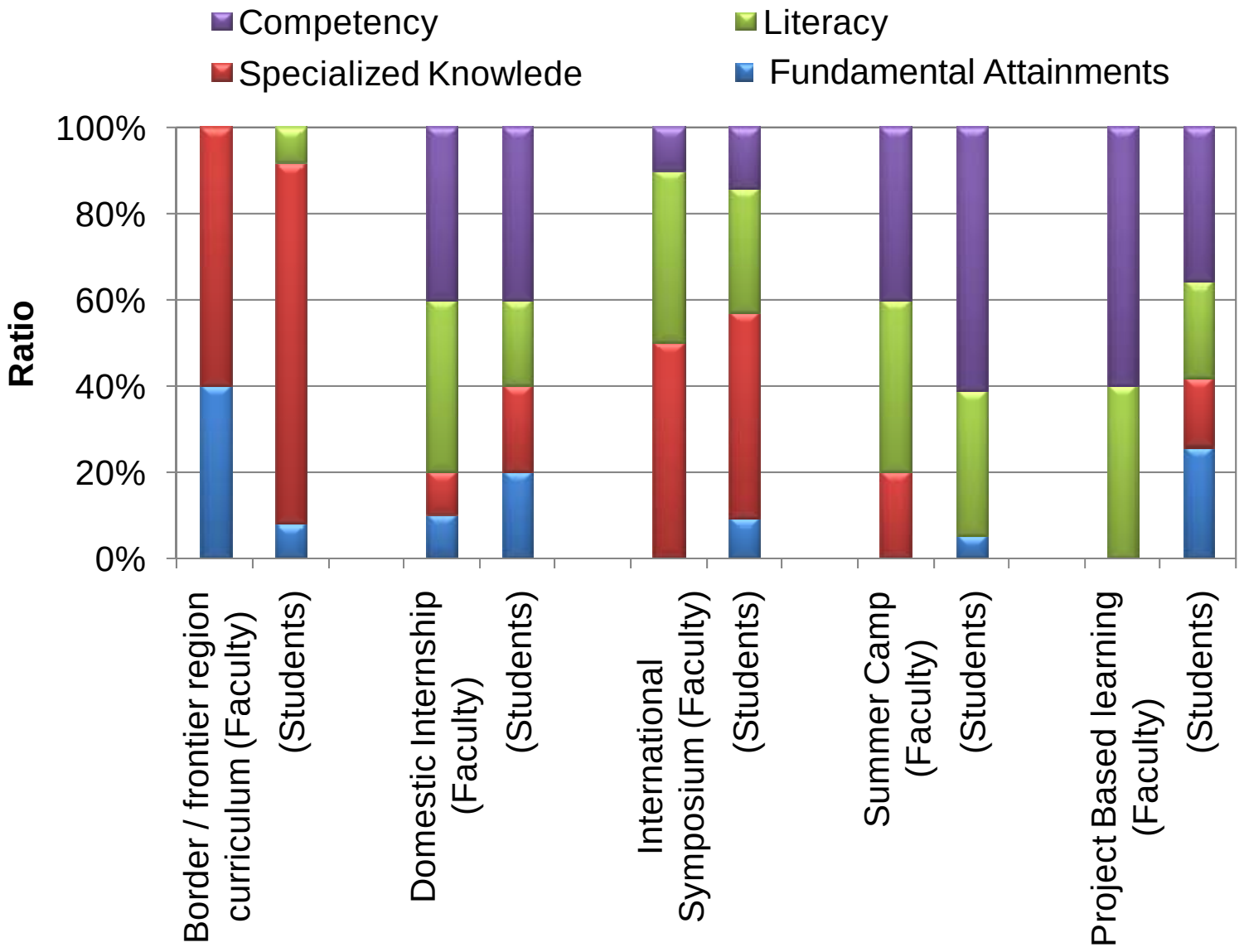
Stanford

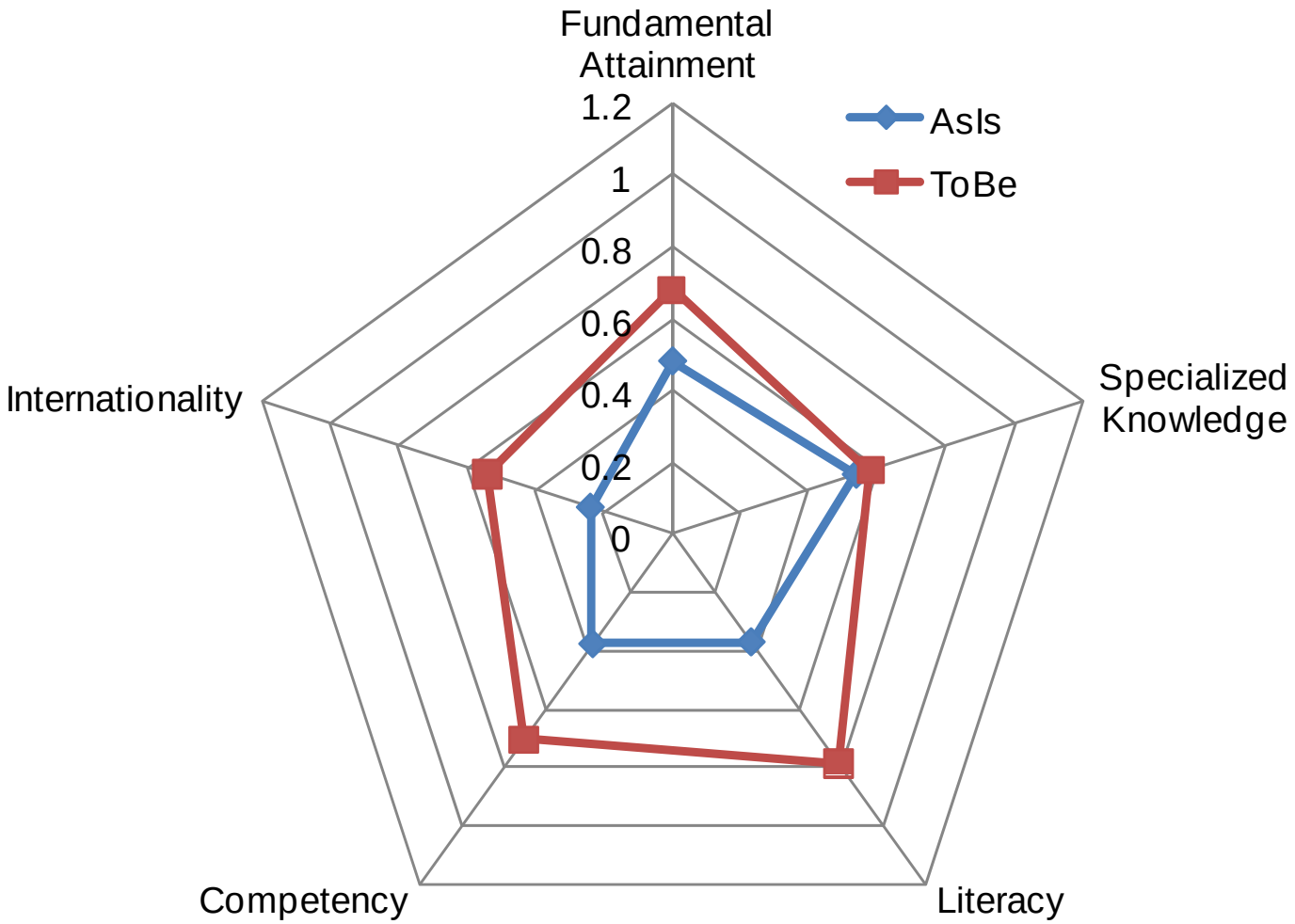
Harvard

Questionnaire to the students



Faculty vs. Students
Education objectives and program




Fundamental Attainment
1.2
1
0.8
0.6
0.4
0.2
0
AsIs
ToBe
Specialized Knowledge
Literacy
Competency
Internationality

abc