International Partnerships of Collaborative Graduate Program in Design, Kyoto University

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Chairperson of Education Committee

Dept. of Mechanical Engineering, Graduate School of Eng., Kyoto University

About the Program

Program for Leading Graduate Schools

- **This new government initiative, launched in autumn 2011, aims to assist universities in setting up new PhD degree programmes. Those programmes are to develop PhD holders who can contribute to society not only as academics but also as highly skilled research staff beyond academia. High-quality PhD programmes will be delivered through trans-disciplinary approaches and through the combined expertise of academia, industry, and government.**
- **Budget : JPY 3.85 billion (for FY2011), 3.90 billion (for FY2012)**
- **21 programmes (categorized into 6 types: All-round; Interdisciplinary(ID) -Environment; ID-Life & Health; ID-safety and security; ID-Material; ID-Information; ID-Symbiotic Society with Multi-Cultures; ID-Crossover; Unique)**
- **Supervising organisation: JSPS (MEXT)**

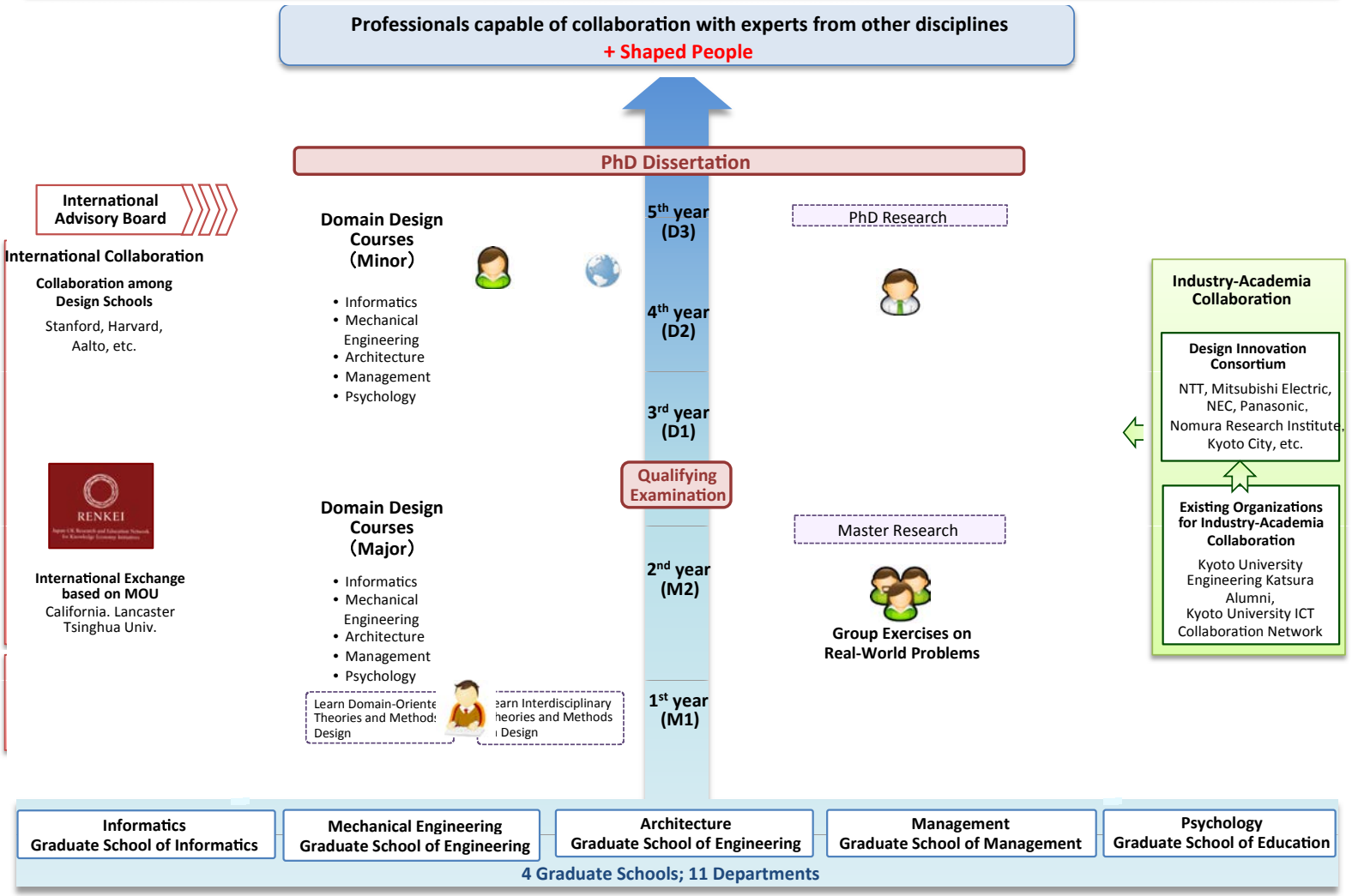
Purpose of our Program

- Design "systems or architectures of society" by a team of different types of specialists.
  - We need to solve complex problems including global worming, deserter management, food shortage, aged society etc.
- The judicious application of knowledge for the good of humanity, resulting from bringing together different expert perspectives to address issues in their full complexity
  - Mathematics, Mechanics and Dynamics, Optimization, Control, Computer Science, and System Sciences
- Specialists on Cyber (Informatics) and Physical (Engineering) cooperatively work with specialists of Management Science and Art to solve complex problems.
- Teach Design as a common language among different specialties so that they can create a team to change the world ("+ shaped" People).

Education

- The Design Program is a five-year degree program (M.S. and Ph.D. degrees) hosted by the five different disciplinary schools (Informatics, Mechanical Engineering, Architecture, Management and Psychology).
- The students are actually studying alongside students who are specializing in different subjects.
- Each disciplinary domain provides Doman Design Courses, while General Design Courses are given as well. Thus, distinguished design specialists with inter-disciplinarity grounded in expertise are cultivated.
- Through wide spectrum of the disciplinary backgrounds of our academic supervisors and multidisciplinary spectrum of research portfolio, the interdisciplinary purpose is being delivered by FBL and PBL, etc.
- The students do a leading project in the doctoral years, where teams of students design, build and test a system, then produce innovative solutions to key emerging research challenges of the society.

Curriculum for Global Leaders in Design



Students

- **Eligibility**
  - Students are enrolled in the Design School being recommended by their originally affiliated schools
- **Qualification**
  - Students are obliged to pass qualification exams in the design school at the end of master course program.
  - In addition at the beginning of doctoral study students are obliged to have passed the entrance exams for the doctoral course held by their originally affiliated schools
- **Degrees**
  - Ph.D.（Doctor of Philosophy）
  - M.S. Degree and Ph.D. graduated by their originally affiliated schools (with annotation of the design school)

Real Problem Line-up for Training Creativity

Real-world problems provided from industries and public sectors

Field-based Learning Problem-based Learning (Exercise)

A few week

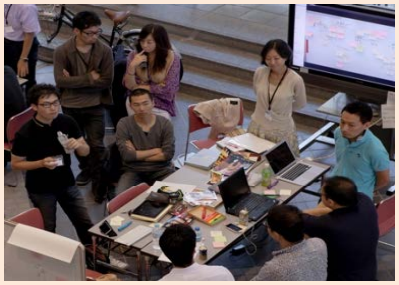
Traffic Control at a Festival

Design Methodology

Open Innovation (Practice)

10 weeks

Participatory Design of an Urban Area



Workshop with Stakeholders

Leading Project (PhD Research)

100 weeks

Design of Compact City for Sustainable Society

Industry-Academia-Government collaboration

Students

Form a team with students from different fields

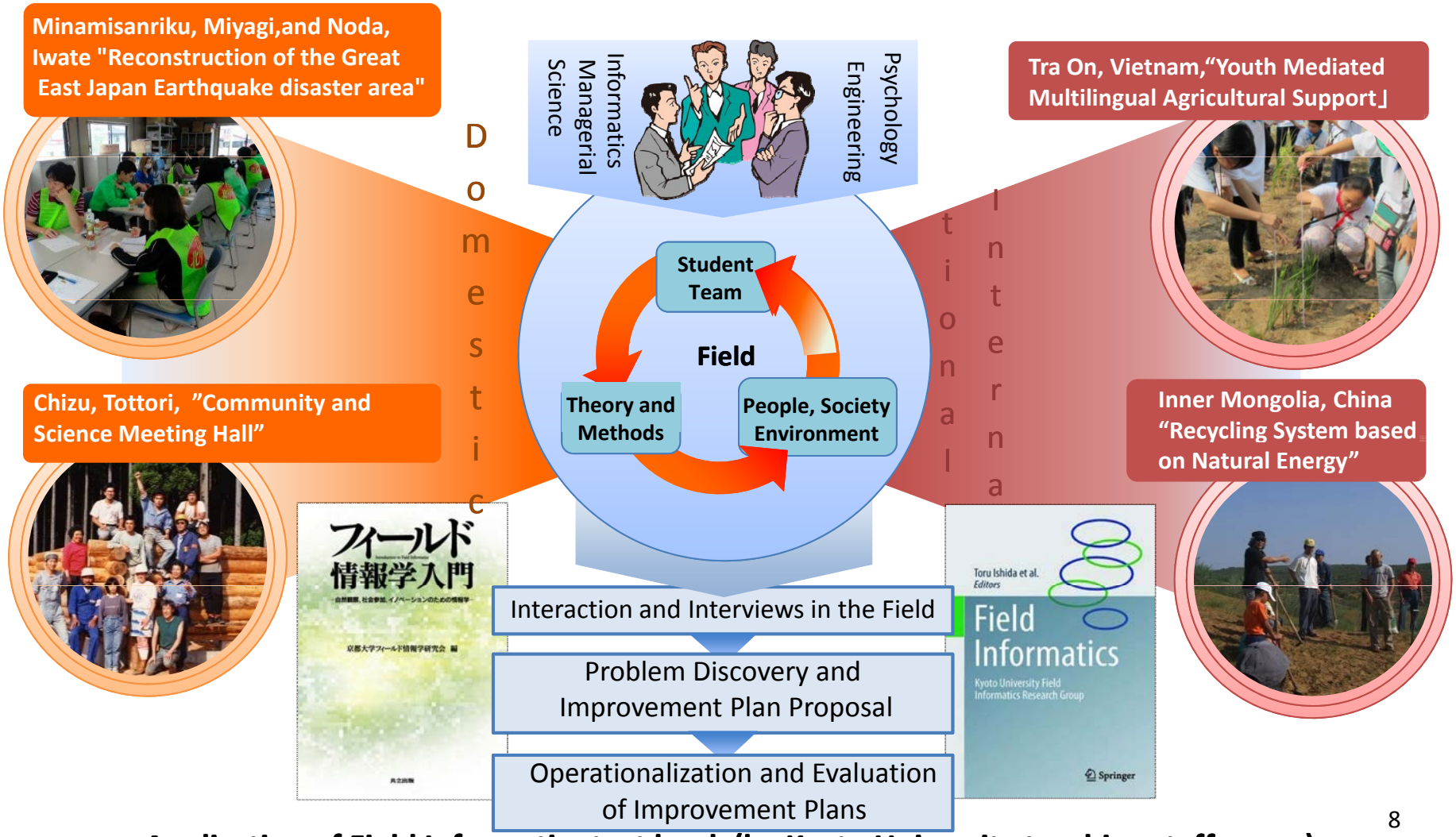
Organize experts from different fields

Solve a real-world problem that requires collaboration in the problem field

Field Internship to Increase Problem Discovery Ability

Put "Teaching Power of the Field" in practical use!

Group students from various disciplines and send them on the field for weeks or months.



Application of Field Informatics text book (by Kyoto University teaching staff group)

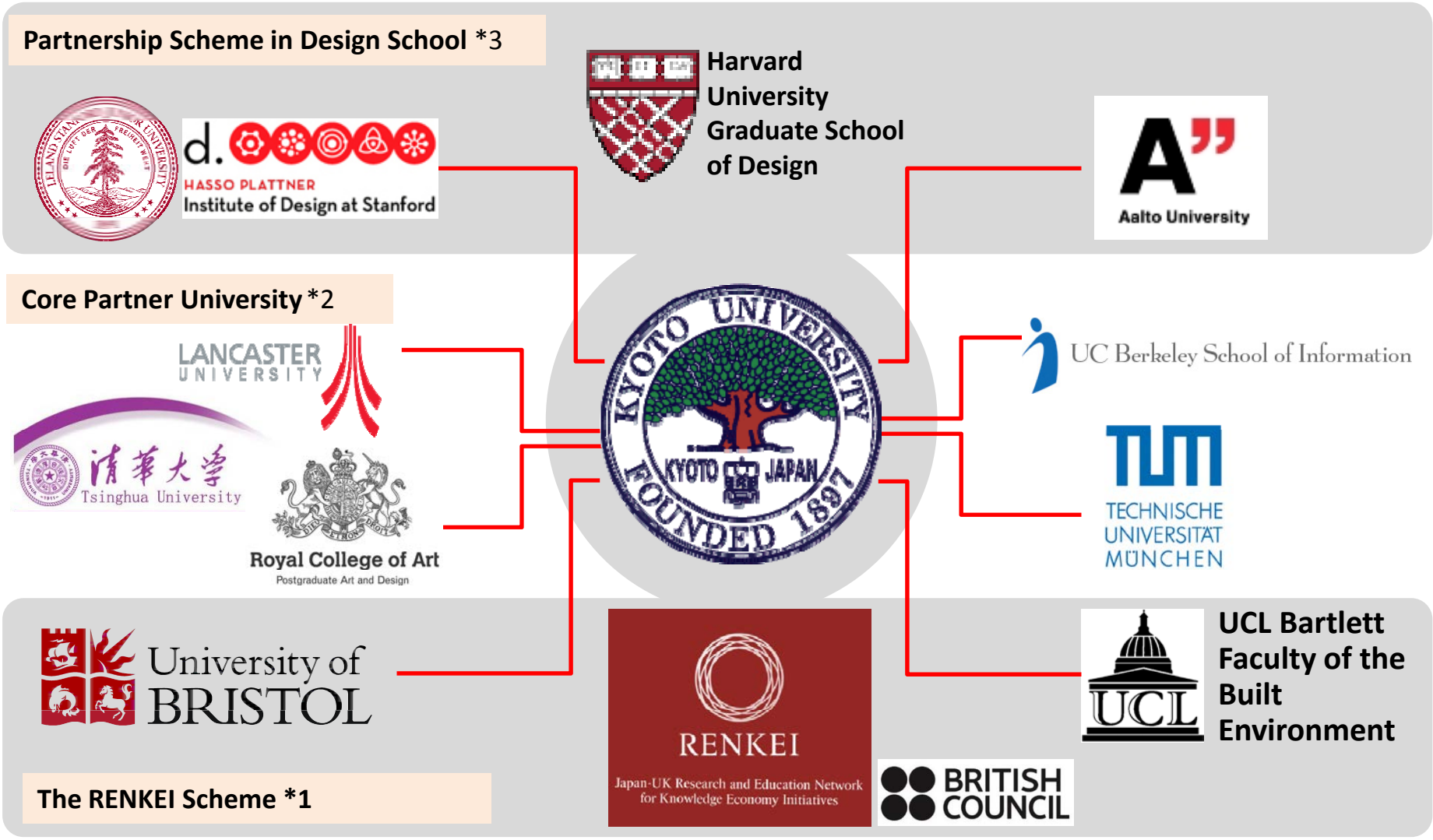
Strategic Partnerships

- As for domestic inter-university partnership, Faculty of Fine Arts, Kyoto City Univ. of Arts are participating in our design school.
- As for international partnership, Kyoto University is involved in the UK-Japan RENKEI scheme, and our design school will form pilot projects for collaboration. Among the pilot projects are summer/winter schools for postgraduates and early career researchers, and a bilateral skills development program for PhD students.
- Along the lines of RENKEI, our design school will be involved in the formation of the collaborative scheme for the worldwide design schools.
- Partnerships established during the past Global COEs will be preserved as Core Partner University and developed further.
- As for academia-industry partnership, Centre of Design Innovation is being established at Kyoto Research Park (KRP). In addition, Future Centre will be formed as a platform for open innovation that contributes in strengthening ties between academic research projects and industrial needs.

Unique Selling Position

- **The program will produce a new type of PhD graduate: one who is intellectually leading, creative, mathematically and mechanically rigorous and who understands commercial implications of their work; people who are the future technical and business leaders in the sector.**
  - **A good general understanding of all the main design disciples**
  - **An understanding of the social, legal and economic factors that often are critical in determining the viability of a project**
  - **Excellent communication skills, both written and oral**
  - **Team working skills**
  - **A specialist skill and knowledge of some area**

Multi-Layered International Partnership (tentative and to be added)

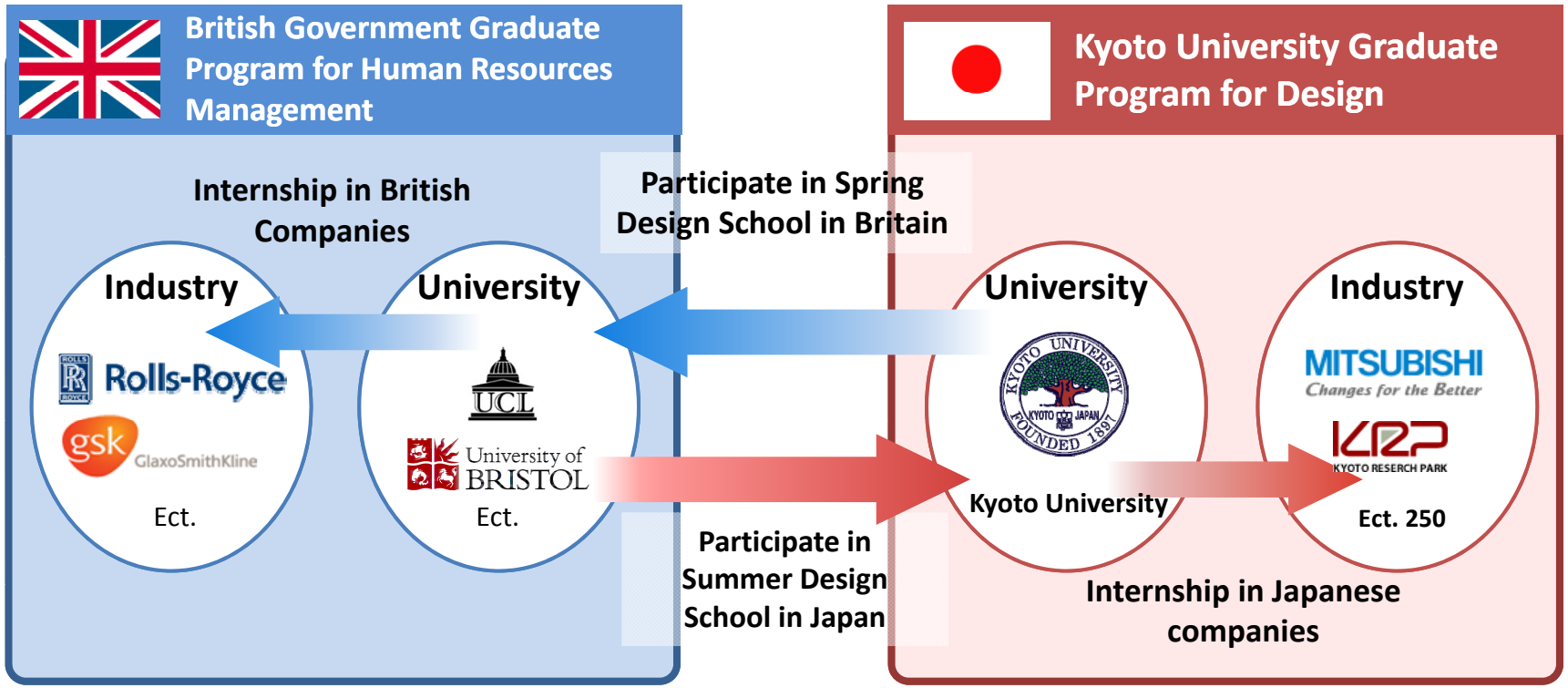


*1 The UK-Japan Academic-Industrial Alliance
Japan-UK Research and Education Network for Knowledge Economy Initiatives
*2 Partnerships established during the past Global COEs
*3 Newly established collaborative scheme for the worldwide design schools along the lines of RENKEI

Global Leader Training through I-U-U-I Collaboration

Example: I-U-U-I（Industry-University-University-Industry）collaboration promotion

Students participate in partner Design Schools and intern in partner companies in other countries



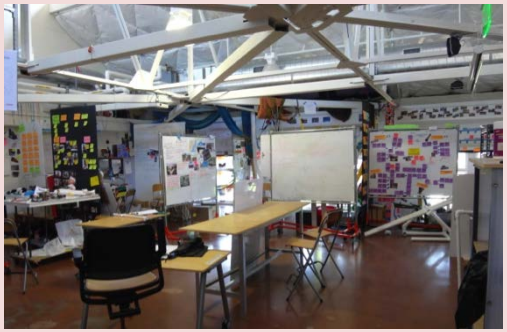
Implement a multilateral Design School Collaboration scheme in Worldwide

Including all international partner institutions

International cooperation (The U.S.)

Stanford d.school (2012年5月8日訪問)

- デザイン思考の教育では世界をリード．デザイン思考の方法論を提唱し，Stanford全学に提供する授業は絶大な人気を誇る．例えば，授業でデザイン思考を学んだ後，途上国で調査を行い，デザインを行っている．
- NPOやベンチャーが立ち上がり，数多くの成果を出している．



Prof. **Bernie Roth**
学術的な側面のトップ
(Academic Director)
11月に京都大学を訪問予定．

Perry Klebahn
起業家でありd.school
設立メンバーの一人．

Adam Royalty
9月24-26日の京大サマーデザインスクールに訪問予定．

Harvard Graduate School of Design (2012年5月12日訪問)

- 建築やランドスケープを中心とした大学院．Doctor of Design Studiesというデザインの様々な側面を学ぶ新しい取り組みをある．
- GSDの建物のデザインも有名．地下に大規模なFabrication Labがある．今後連携していく予定．

Prof . **Martin Bechthold**

Harvard Innovation Lab (2012年8月7日訪問)

学生のイノベーション能力を高めるために設立された全学組織．週2回，8週間の授業に年間4000人程度が受講する．学生がチームを作り，会社に見立てて，起業を行う．途上国をターゲットにしたプロジェクトが多い．

Neal Doyle, Manager

MIT D-Lab (2012年8月7日訪問)

- MIT全学に対する開発途上国向けデザインイノベーション教育．10年前に一つの授業として始まったが，現在20人のスタッフをかかえる．
- 年間400人の学生が受講している．授業では，途上国で調査，デザインを行う．

Victor Grau Serrat（右）設立メンバー
松井教授（左）

Berkeley Institute of Design (2012年5月8日)

- 教員が運営しているデザインラボ．大学院生が自主的に集まってくる人気のスペース．情報学，機械，建築などの教員・学生が協業．

Prof. Kimiko Ryokai

IDEO (2012年5月9日訪問)

- パロアルトの世界をリードするデザイン会社．2011年東京オフィスも開く．
- 2012年9月の京都大学サマーデザインスクールに参加．

Dr. Barry Katz, Fellow

Sungene Ryang, IDEO Tokyo

International cooperation (Europe)

Aalto University, Helsinki, Finland (2012年5月14日訪問)

- ヘルシンキ工科大学，芸術大学，商科大学が合併し2009年設立されたInnovation University”．オープンイノベーション基盤としてDesign Factory，Media Factory，Service Factory を擁する．
- デザインのニーズは，ヘルスケア，加齢社会，地球温暖化等の複合的問題の解決．アカデミアの連携だけでなく，産業界との結びつきを重視．
- 日常品のデザイン，人に向き合い，社会に向き合うデザインの理念が徹底されている．

Design Factory at Otaniemi
キャンパス

Prof. **Hannu Seristö,**
Vice President,（Knowledge Networks
（中央）
太田教授（左），椹木教授（右）

Dr. **Juhani Tenhunen**
Factory Manager of Media Factory，at
Arabiaキャンパス（中央）

Dr. **Paivi Hovi-Wasastjerna**,
Research Director，School
of Arts，Design and
Architecture

University of Bristol, UK (2012年5月16日訪問)

- 英国大学ランキングで常にトップ10に位置し，オックスフォード，ケンブリッジと共に，英国を代表．工学デザイン分野では欧州でトップ．英国政府の若手研究者育成施策を推進．
- Thomas学長，Guy Orpen 副学長が中心となり京大–ブリストル大コラボレーション・フォーラムを開催（2010年）．
- 来年1月にはブリストル大学で，全学イベントとして京大–ブリストル大シンポジウムを開催．

Prof. **Guy Orpen**
Pro Vice-Chancellor
(Research)
RENKEI 英国側代表

Prof. **Chris Melhuish**
Director Bristol
Robotics Laboratory
(BRL)

Prof. **Nishan Canagarajah**
Dean of the Faculty of
Engineering

University College of London, UK (2012年5月17日訪問)

- The Bartlett School of Architecture は世界的評価が高い．一線の教授陣に世界中から学生が集まる．Globally sustainable energy system に関して，政策立案まで含めた産官学連携教育を推進．
- UCL Interaction CenterはPsychologyとComputer Scienceの教員で構成．Cognition，Physical，Affective，Socialの4軸を統合する研究を展開．

Prof. **Michael Worton**
Vice-Provost (Academic and International),
UCL (University College London) and Higher Education
Advisor to the British Council，RENKEI 英国側代表

Royal College of Art, UK (2012年5月18日訪問)

- デザインでは欧州トップの大学．
- 数学，物理，金融などの幅広いバックグラウンドの学生を受け入れ“interdisciplinary”な教育を推進．

Prof. **Naren Barfield**
Royal College of Art (RCA)

Prof. **Miles Pennington**
Head of Programme，Innovation
Design Engineering (IDE)，School of Design

Comparison of Design Schools

	Kyoto University Unified Graduate School Program on Design	Stanford University d.school	Aalto University Design Factory
Establishment	———	• Established in 2004 is centering around Professor David Kelly, with a donation from SAP founder Hasso Plattner.	• The project was established in 2008 as a place for industrial design focusing on product development through collaboration with industry.
Field of Design Science	• Informatics, Mechanical Engineering, Architecture, Business Administration, Psychology, (Arts)	• Mechanical engineering, business administration, Informatics	• Business Administration, Architecture, Arts, Informatics
Target field of design	• A wide range of fields, including medicine, agriculture, humanities and social sciences	• Engineering, management, medicine, law, humanities, science, education, earth sciences, ect	• Architecture, management, economics, social sciences, law, design
Human resource training and structure	• PhD training with creativity and ability to synthesize • Strong cooperation between 11 participating fields • Development of people who can work in multiple fields（+shaped people)	• Place for connecting people through "Design Thinking" • d.school does not offer a degree • T-shaped human resources development	• Founded as an organization to serve as a platform for collaboration between students, researchers and companies. Students selected from multiple schools • T-shaped human resources development
Approach	• Design for synthesis of complex problem solving in societies • Training not just for bottom-up, but also top-down problem identification	• Design Thinking（Inspiration，Ideation，Implementation） • Organizing methodologies • Targeting problem solving, but weak connection between different problems	• Train professionals with a unique educational program that emphasizes subject discovery and design. • Buried under the spirit of learning problem-solving, and promoting practical activities. • Development of student-centered learning culture.
Connection to “Information”	• Linking optimization theory, control theory and multiagent systems to latest informatics expertise	• Strong ties with mechanical engineering • Inexperienced in software prototyping and user testing	• Positioning at students majoring in different fields, with design as one educational point.
Field	• Urban area redesign • Targeting connections to country, prefecture, city -level administration from the start	• Solar systems to East Africa, ect. • Weakness in seeing the big picture, due to focusing on specific points	• Social issues such as climate change, poverty, and population growth • Cooperative projects with Nokia, Philips and others
Conclusion	• Following the tradition of Kyoto University on inquiring the essence of things in a multilateral way, and collaboration between various fields and to train experts.	• Pioneer of Design Thinking, starting point in product and graphic design, education based on IDEO design methodology	• Integrate different universities, and an aiming for a cross-discipline approach, current stage was set out to establish a campus

International Advisory Board (partial)

- Prof. Martin Bechthold, Graduate School of Design (GSD), Harvard University, USA.
- Dr. Barry Katz, IDEO, Consulting Professor, Dept. of Mechanical Engineering, Stanford University, USA.
- Prof. Bernie Roth, Director of d.school, Dept. of Mechanical Engineering, Stanford University, USA.
- Prof. AnnaLee Saxenian, Dean of UC Berkeley School of Information, UC Berkeley, USA.
- Prof. Pekka Korvenmaa, Department of Design, working as Vice-Dean of the Aalto University School of Arts, Design and Architecture, Aalto University, Finland.
- Dr. Alison Leggett, University of Bristol, UK. (RENKEI)
- Prof. Maosong Sun, Head of Computer Science, Tsinghua University, China.
- Prof. Dennis Sylvester, Department of Electrical Engineering and Computer Science, University of Michigan, USA.
- Prof. Wolfgang Wahlster, CEO and Scientific Director of the German Research Center for AI, Germany
- Prof. David C. Plaut, Departments of Psychology and Computer Science, and the Center for the Neural Basis of Cognition, Carnegie Mellon University, USA.
- Associate Professor Diann Brei, Program Chair of the Design Science PhD Program, Mechanical Engineering, University of Michigan, USA.
- Professor Christine Hawley, CBE, Bartlett School of Architecture, UCL, UK.

Thank you!