Brief Introduction of Research Activity about "A Cyber-Physical System Technology for Smarter World Realization" in Kobe University

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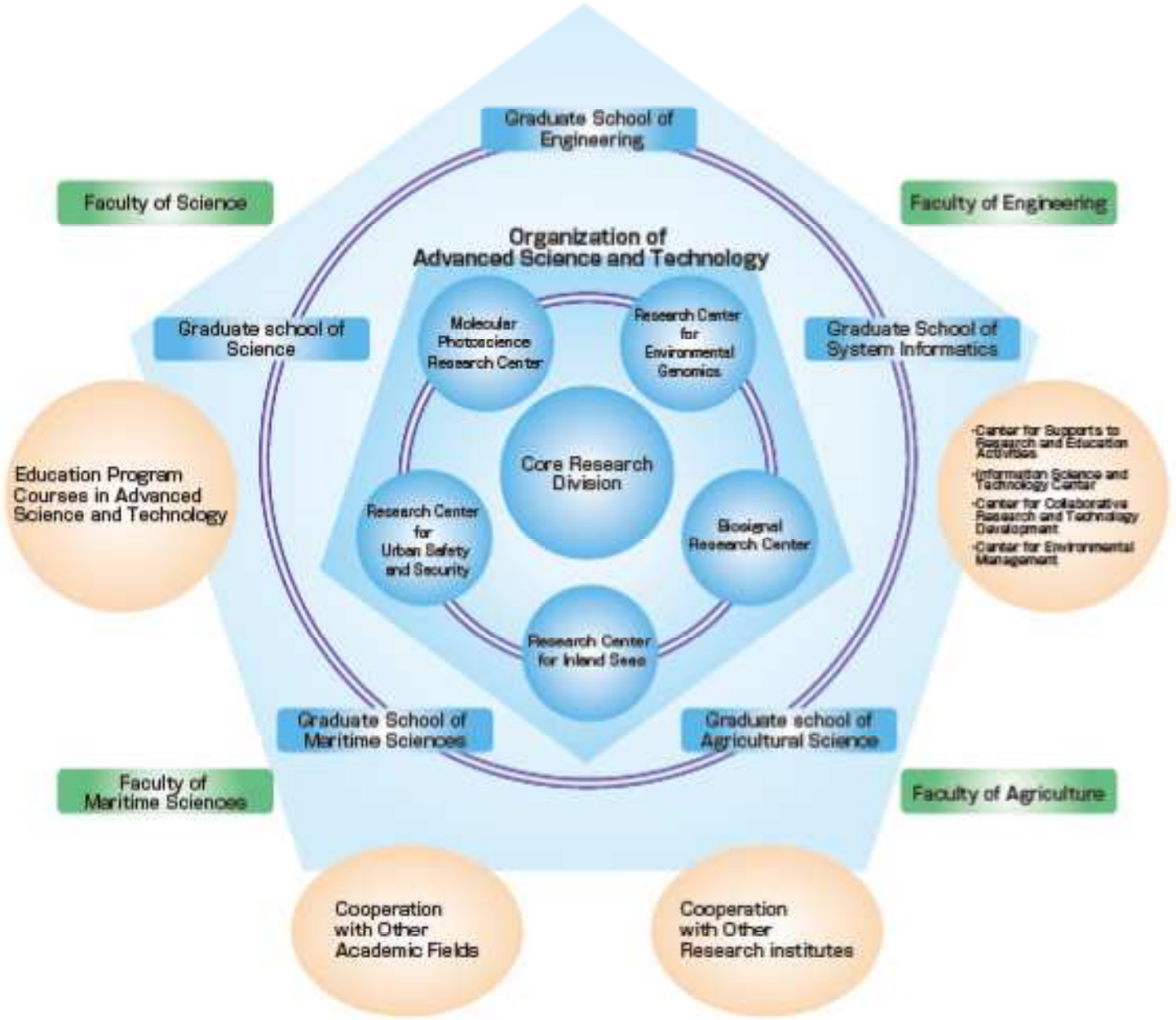
“The Organization of Advanced Science and Technology”

The organization is an interdisciplinary entity comprising a Core Research Division made up of 19 core research projects.

“The Organization of Advanced Science and Technology”



19 Core Research Projects

1 Geometric Aspects of Mathematics
2 Experimental Particle Physics for Exploring Space-time Structure
3 Molecular Systems Assembled by Non-covalent Bonds
4 Development and Integrity of Multicellular Organisms
5 Integrative System Between Aquatic Environments and Photosynthetic Organisms
6 Water in the Solar System: Its Origin and Role in the Planetary Evolution
7 Smart Materials Science and Engineering
8 Biomaterials and Medical Engineering
9 Next-generation Infrastructure
10 Construction of Next-generation Eco-production System
11 Disaster Prevention and Mitigation for Earthquakes and Heavy Rain
12 Systems Design and Operational Strategy
13 A Cyber-Physical System Technology for Smarter World Realization
14 Study on Rural Design toward Load Reduction and Disaster Mitigation
15 Integration and New Horizons in Plant Health Sciences
16 Health Bioscience
17 Studies of Signal Transduction Mechanisms for the Development of Bioresource Animals
18 Analysis of Tsunami Disaster Impact and Development of Safety Management System
19 Research and Development of Marine Renewable Energy and Hydrogen Engineering

Core Researchers for Cyber-Physical System

Physical world






Humans
Objects
Society
Environment
Nature

Cyber world

Physical world ⇒ Cyber world

Sensing — Collection of information

- Environmental sensing — Nakamoto
- Bio-sensing — izumi
- Low power device — Yoshimoto
- Optical sensing — Matoba

Interface

- Ubiquitous interface — Terada
- Wearable/ubiquitous — Tsukamoto
- Computer Vision

Information processing

Processing

- Machine learning — Ozawa
- Pattern recognition — Takiguchi
- Data mining — Ohkawa

Information processing infrastructure

- Cloud computing — Ohta
- Network — Nagata
- Security — Miura
- AI architecture — Kawaguchi

Big data

Accumulation, search, conversion, and analysis of information

Cyber world ⇒ Physical world

Actuation

- Manipulation — Yokokoji
- Robot hand — Kobayashi
- Intelligent robot — Murakami
- Robotics

Integration — Acting on the physical world

- Decision-making support
- Smart system Integration — Kaihara, Tamaki, Fujii, Nakamura

Application Targets (Smart XX)

Social Issues	Outstanding Technologies in Kobe University							
	Low Power Device	Structure Health Monitoring	Network	Wearable Computing	Data Mining	Media Processing	Cloud Computing	Auto Mechanics
Smart Health	◎		○	◎	◎		◎	○
Smart Agriculture	○	○	◎	○	◎	○	◎	◎
Smart Infra-structure	◎	◎	◎	○	○	◎	○	◎
Smart Trans-portation	○		◎	○	◎	○	○	◎
Smart Energy	◎		○		◎		○	
Smart Home	○		○	◎		○		
Smart Water	○	○	◎		○		◎	○

Aims of Joint Workshop

The first aim : To know each other and conclude collaboration agreement between UGA and Kobe-University

Research

- Individual Collaborations
- Joint application for Europe-Japan collaboration program

Education

- Student exchange program
- Double degree program

Technical Presentation from Kobe-U.

	Presenter	Field	Presentation Title
1	Dr. Masahiko YOSHIMOTO	Sensing	A Low Power Sensing Technology
2	Dr. Shintarou IZUMI	Sensing	A Wearable Biomedical Sensing System with Normally-off Computing Architecture
3	Dr. Hiroyuki NAKAMOTO	Sensing	Nondestructive Evaluation and its application using Electromagnetic Sensor
4	Dr. Seiichi OZAWA	Processing	Machine Learning for Big Data Analysis, Cyber security, and Privacy Preserving Data Mining
5	Dr. Hiroshi KAWAGUCHI	Processing	Hardware Optimization in Disributed Deep Learning
6	Dr. Tetsuya TAKIGUCHI	Processing	Speech and Image Processing for Support of Human Com
7	Dr. Noriyuki MIURA	Processing	Hardware Security and Safety for Smart World Foundation
8	Dr. Futoshi Kobayashi	Actuation	Human Asssistive Robotic System

Technical Presentation from Kobe-U.

	Presenter	Field	Presentation Title
9	Dr. Takenao Ohkawa	Application	Innovation in management of breeding cows
10	Dr. Masahide Nakamura	Application	Technology and Value of Service-Oriented Smart System
11	Dr. Nobutada Fujii	Application	Real-Virtual fusion Manufacturing Systems