KOBE UNIVERSITY

Takenao Ohkawa, Vice dean
Graduate School of System Informatics

Kobe City

6th largest city in Japan
population 1,540,000

Kobe City

6th largest city in Japan
population 1,540,000

Kobe University's Core Values

真摯

Integrity

KOBE UNIVERSITY

Freedom

自由

Cooperation

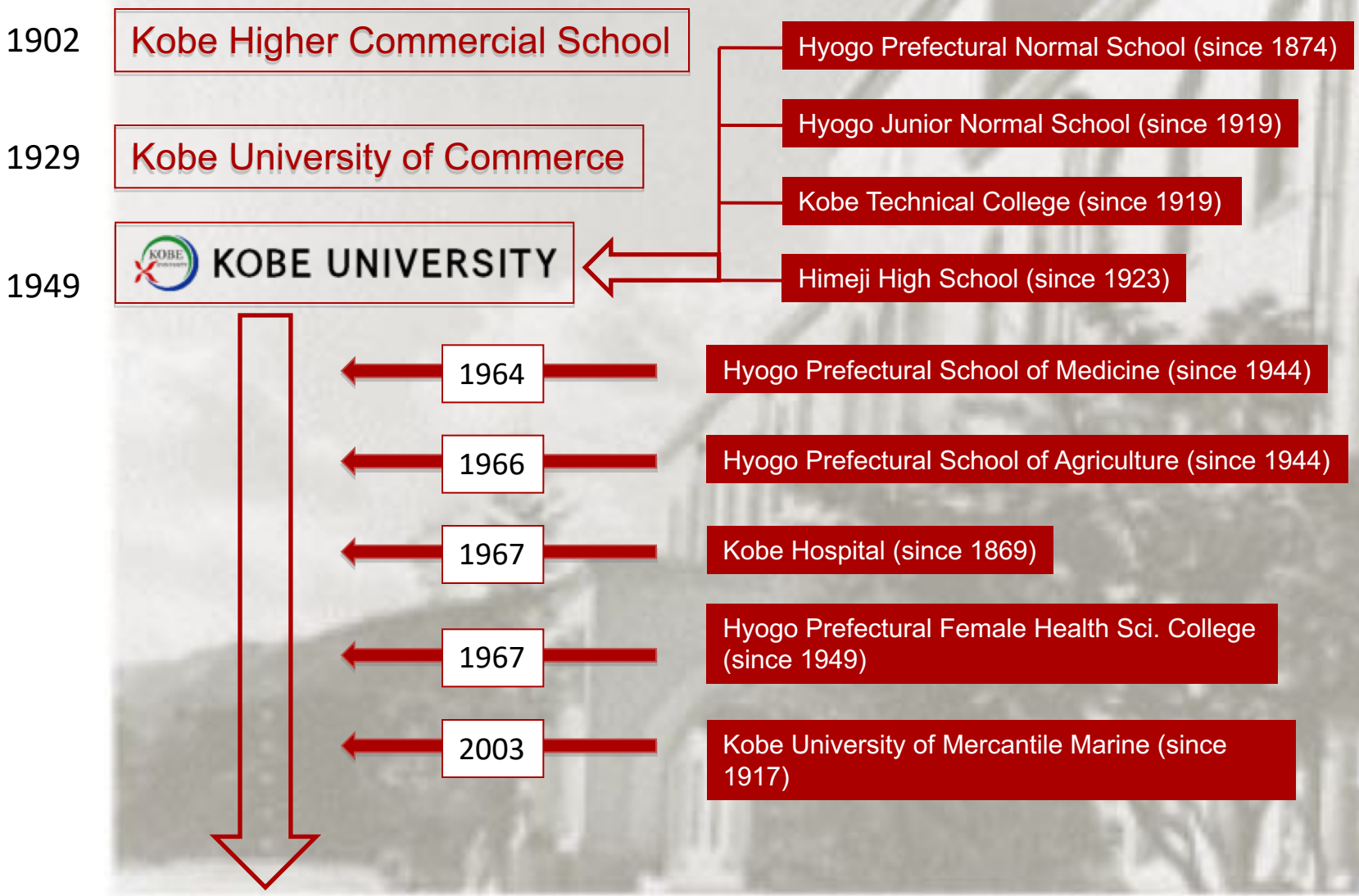
協同

Our Vision

"Initiative for Excellence"

Kobe University – towards an outstanding research university excelling in advanced and integrated research in the humanities and sciences

116 Years of History



10 faculties/schools & 15 graduate schools

KOBE UNIVERSITY

Faculties & Schools

(Undergraduate)

Faculty of Letters
Faculty of Global Human Sciences
Faculty of Law
Faculty of Economics
School of Business Administration
Faculty of Science
School of Medicine
Faculty of Engineering
Faculty of Agriculture
Faculty of Maritime Sciences

Graduate Schools

Graduate School of Humanities
Graduate School of Intercultural Studies
Graduate School of Human Development and Environment
Graduate School of Law
Graduate School of Economics
Graduate School of Business Administration
Graduate School of Science
Graduate School of Medicine
Graduate School of Health Sciences
Graduate School of Engineering
Graduate School of Agricultural Science
Graduate School of Maritime Sciences
Graduate School of International Cooperation Studies (GSICS)
Graduate School of System Informatics
Graduate School of Science, Technology and Innovation

Research Organizations

Research Institute for Economic and Business Administration
Organization for Advanced and Integrated Research

KOBE UNIVERSITY

Global Strategy of Kobe University

Institute for Promoting International Partnerships

Office of Americas
- Honolulu Office

Centre for EU Academic Collaboration
- Brussels Centre
- Kraków Office

Center for Asian Academic Collaboration
- China Office
- Beijing Research Base
- Hanoi Base

North America
Inter-University 11
Inter-Faculty 19

Europe
Inter-University 61
Inter-Faculty 78
(Double Degree Programme 11)

Asia
Inter-University 76
Inter-Faculty 111

Central & South America
Inter-University 5
Inter-Faculty 3

Africa
Inter-University 1
Inter-Faculty 13

Middle East
Inter-University 2
Inter-Faculty 3

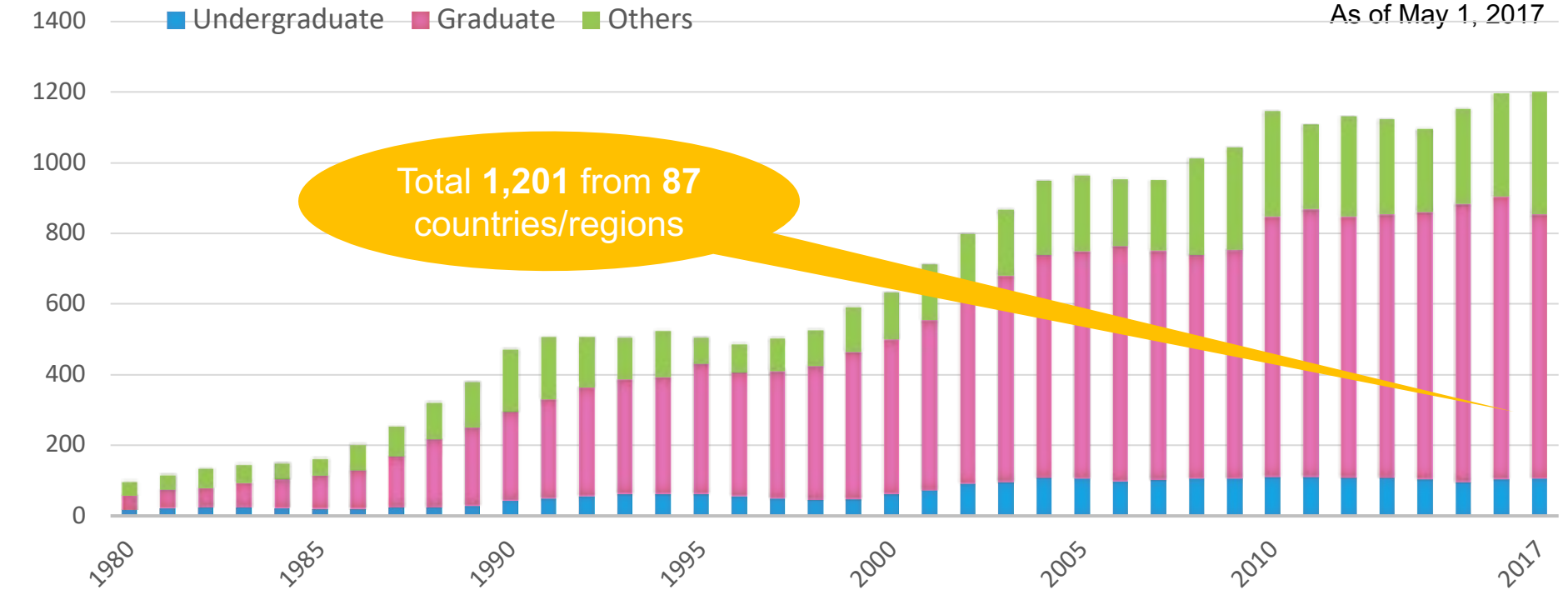
Oceania
Inter-University 4
Inter-Faculty 4

As of May 1, 2017

334 universities & institutes holding Academic Agreements with KU

KOBE UNIVERSITY

Number of Overseas Students

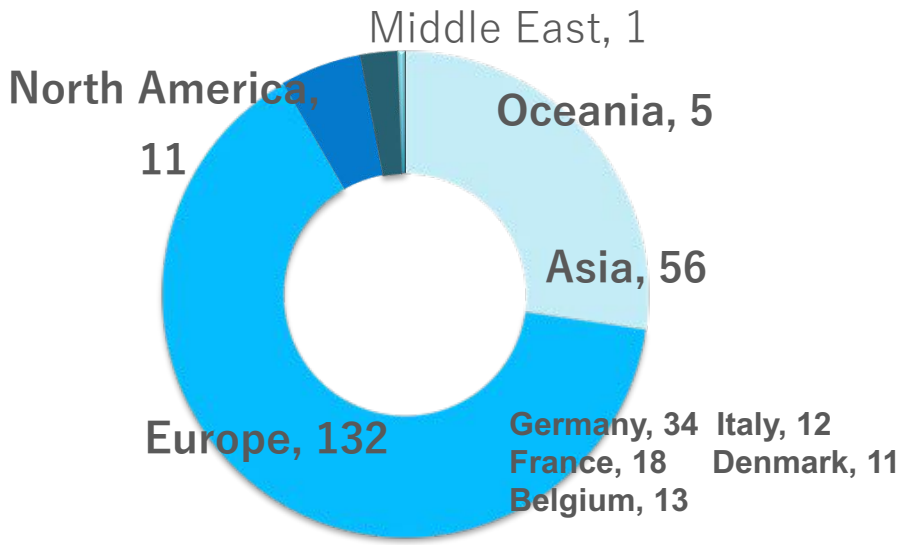


Mobility of Students

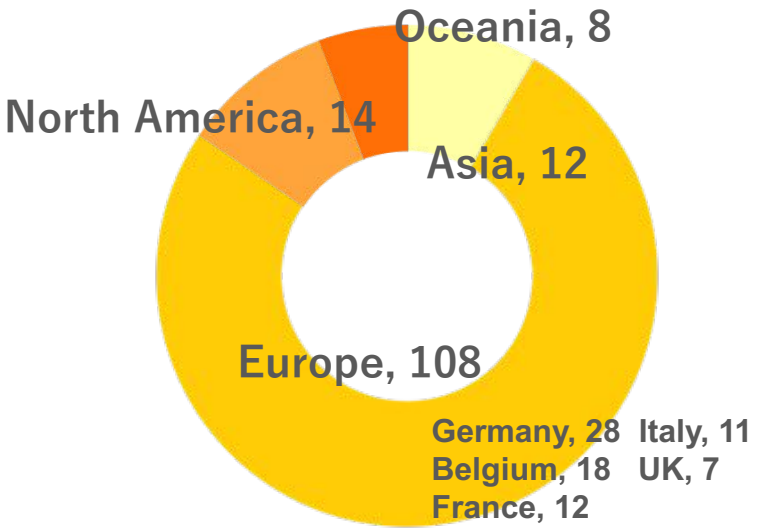
- **The Number of Exchange Students**

As of May 1, 2017

Incoming



Outgoing



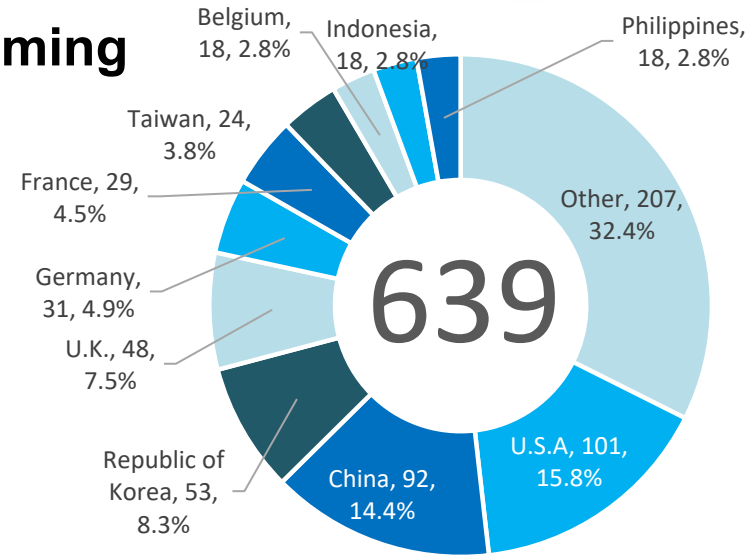
- **The Number of Outgoing Students (2015-2016)**

Based on Exchange Agreements	Language Training Program	Internship	Global English Course	Privately-Financed	Others	Total
142	37	36	63	79	527	884

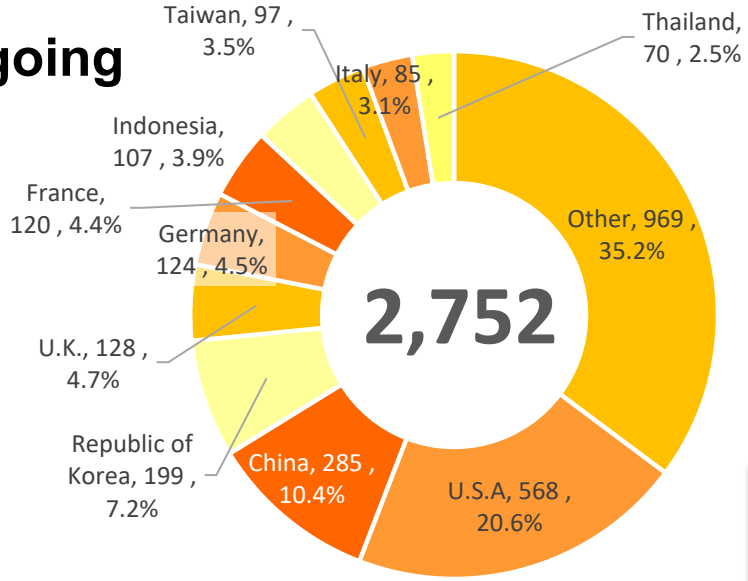
Researcher exchange & Joint research projects

KOBE UNIVERSITY

Incoming



Outgoing



- **Number of joint research projects (Top Ten Ranking)**

1	USA	71
2	South Korea	26
3	France	22
4	China	21
5	U.K.	20
6	Germany	20
7	Australia	14
8	Canada	12
9	Taiwan	10
10	Thailand	10

Total: 318 (46 countries/regions)

(As of May 1, 2017)

Overseas deployment for young researchers
More than 140 researchers (2009-2017)

Graduate School of System Informatics

Outline — Positioning

(Undergraduate) (Master & Doctoral Programs)

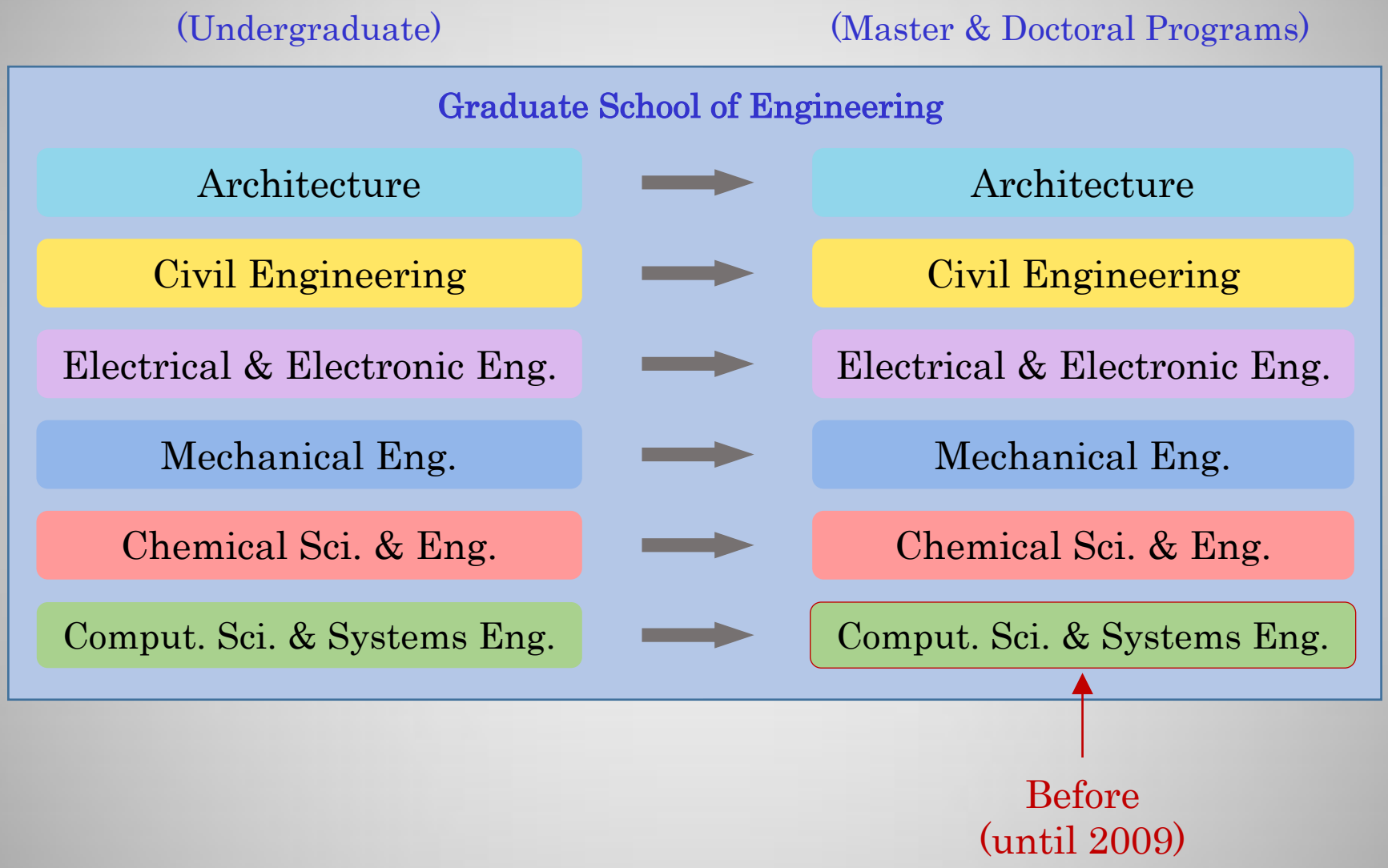
Graduate School of Engineering

Architecture	→	Architecture
Civil Engineering	→	Civil Engineering
Electrical & Electronic Eng.	→	Electrical & Electronic Eng.
Mechanical Eng.	→	Mechanical Eng.
Chemical Sci. & Eng.	→	Chemical Sci. & Eng.
Comput. Sci. & Systems Eng.	→	**Grad. School of System Informatics**

- Systems Science
- Information Science
- Computational Science

The Graduate School of System Informatics was established in **2010**.

Outline — Positioning



Outline — Positioning

(Undergraduate) (Master & Doctoral Programs)

Graduate School of Engineering

Architecture	→	Architecture
Civil Engineering	→	Civil Engineering
Electrical & Electronic Eng.	→	Electrical & Electronic Eng.
Mechanical Eng.	→	Mechanical Eng.
Chemical Sci. & Eng.	→	Chemical Sci. & Eng.
Comput. Sci. & Systems Eng.	→	**Grad. School of System Informatics**

- Systems Science
- Information Science
- Computational Science

The Graduate School of System Informatics was established in **2010**.

Outline — Faculty Staff and Students

Graduate School of Engineering & Faculty of Engineering
Graduate School of System Informatics

Faculty members

Faculty members : 137/41

Professors	53/19
Associate Profs.	52/12
Senior Assist. Profs.	1/5
Assistant Profs.	27/4
Assistants	4/1

Students

Students : 3,435 (incl. 505 women)

Undergraduate Students	**2,404** (incl. **345** women)
Master's Course Students	**694/155** (incl. **103/24** women)
Doctoral Course Students	**128/54** (incl. **24/9** women)
Foreign Students (Undergraduate)	**36** (incl. **8** women)
Foreign Students (Master & Doctor)	**66/31** (incl. **26/10** women)

As of May 2017

Outline — Scope & Organization

- To contribute to the development, processing, and utilization of "System Information".
- System information: meaningful information within large-scale, complex systems based on high-speed, large-capacity computing technologies.
- System: not refer to the so-called information system, but rather to broad systems covering a variety of areas, from engineering to nature and society.

Graduates: 209
International students: 31
Faculty members: 41 (May 2017)

Department	Division
Systems Science	Fundamentals of Systems Science
	Innovation of Systems Science
Information Science	Foundation of Information Science
	Intelligent Informatics
Computational Science	Fundamentals of Computational Science
	Innovation of Computer Science

CPS (Cyber-Physical Systems) with IoT (Internet of Things)

Computational Science & Engineering

Department — Systems Science

Division	Research Group	Research Topics
Fundamentals of Systems Science	**Systems Planning**	Operational Research, Production Systems Engineering, Social Systems Engineering, Optimisation, Multi-Agent System, Management Engineering, Decision Support System, Knowledge Engineering
	Optimum System Design	Optimization, Optimum Structural Design, Optimal Control, Robotics, Adaptive Control, Vibration Control, Finite Element Analysis, Image Recognition, Biomechanics
	Applied Optics	Instrumentation Optics, Information Photonics, Computational Optics, Physical Optics, Image Processing, Optical Tomography, Optical Data Storage, 3D Display System, Optical Supercomputing, Quantum Information Science
	Systems Control	Control Systems Theory, Systems Optimization, Computer Aided Design of Control Systems, Robust Control, Advanced Control, Optimal Control, Vibration Control, Hybrid Systems, Large Scale Systems, Modeling
Innovation of Systems Science	**Mathematical System Analysis**	Optimal Control Theory, Inverse Problem, Differential Operator Theory, Nonlinear PDE's, Numerical Analysis, Distributed Control System Theory, Infinite Dimensional Dynamical System, Distributed Stabilization Theory, Variational Problem
	System Analysis	Condition Monitoring, Safety Management System, Maintenance Science, Inverse Analysis, Intelligent Robotics, Sensor Fusion, Robot-Human Interaction, Tele-Operation System, Soft Computing
	Intelligent Systems	Intelligent Decision Making, Virtual Reality, Mixed Reality, Medical Engineering, Computer Aided Diagnosis and Treatment
Applied Robot Science (Mitsubishi Electric Corporation)	**Applied Robot Science**	Manufacturing System, Instrument and Control System, Motion Planning System, Robot Control System, Human Interface System

Systems approach and problem-solving skills for effectively practicing analysis and synthesis, with a focus on large-scale complex systems

Department — Information Science

Division	Research Group	Research Topics
Foundation of Information Sciences	**Mathematical Logic and Statistics**	Mathematical Logic, Mathematical Statistics, Foundations of Mathematics, Foundations of Informatics, Axiomatic Set Theory, Model Theory, Proof Theory, Computa
	Processor Architecture	Processor Archit ecture, VLSI Systems, VLSI Memory, Low Power Design, Media Processin
	Software Science	Logic Programm ming, Declarative Programming, Programming Language Processing Systems, Theorem Provers, Combinatorial Optimization, SAT
	Telecommunications	Information and Communication Engineering, Protocol Design, Performance Evaluation, Parallel and Distributed Processing, System Software
Intelligent Informatics	**Integrated Information Systems**	Integrated Circuit Design, Electromagnetic Compatibility, Advanced Packaging, Ubiquitous Hardware Systems, Hardware Security
	Knowledge and Information Processing	Biodata Processing, Agricultural Data Processing, Information Retrieval, Content Analysis, Network Analysis, Data Integration, Data Mining, Statistical Machine Learning, Large-scale Data Analysis
	Media Informatics	Speech/Image/Movie Recognition, Media Integration, Semantic Understanding, Dialogue/Conversation Processing, Intelligent Communication, Universal Communication, Disaster Information Processing, Music Information Processing, Signal Processing, Pattern Recognition
	Emergent Computing	Emergent System, Autonomous Decentralized System, Mathematical Programming Model, Agent Model, Adaptation/Learning Algorithm, Scheduling, Interaction
Kansei and Media Art (ATR)	**Kansei and Media Art**	Human-Robot Interaction Technology, Voice Interaction Technology, Haptic Interaction Technology, Communication Media, Partner Media, Media Presentation Technique, Multilingual Speech Translation, Situation Recognition Technology, Network Robotics

From basic theories related to information science and utilization of valuable information, to the social application

Department — Computational Science

Division	Research Group	Research Topics
Fundamentals of Computational Science	Basics of Computational Science	Numerical Analysis Finite Difference Method, Finite Element Method, Parallel Algorithms, Large Scale Simulation, Program Tuning Tools, Discrete Mechanics, Engineering
	Computational Intelligence	Artificial Intelligence, Mining, Text Mining, Service/Cloud Comp
	Computational Fluid Dynamics	Computational Flui Method, Massively Complex and Comp Moving Boundary M Vehicle Aerodynamics, Automotive Engine
	Simulation Techniques	Simulation Methods in General, Computational MHD and Its Visualizations, Yin-Yang Grid and Its Applications, Scientific Visualization, Solar Dynamo, Geodynamo
Innovation of Computational Science	Computational Molecular Engineering	Massiv Structur Electro Molecu Method
	Computational Biology	Biomo Large-Scale Applica Monte Carlo Method
	Computational Robotics	Environ Biomim Compu
	Computational Space Science and Engineering	Space Applica Satellit
Applied Computational Science (JAMSTEC)	Applied Computational Science	Earth Simulator, Multiscale Simulation, Atmosphere-Ocean Coupled General Circulation Model, Typhoon Simulation, Nonhydrostatic/Hydrostatic Ocean Model, Earth Sciences, Lithosphere Dynamics, Earthquakes, Plate Motion, Discrete Element Method
Large Scale Computational Science (RIKEN AICS)	Large Scale Computational Science	Simulation of Complex Climate System, Numerical Software Library, Quantum Material Science, Lattice QCD, Biosimulation, Cellular Simulation

Basic sciences via large-scale simulation using supercomputers, and the research and development of innovative algorithms, visualization techniques

Intensive Computational Science Course

An integrated education course that continues from the Masters Program onto the Doctoral Program, aiming to foster researchers and engineers who have acquired a superior ability to explore, develop, and practice innovative science and technology using high-performance computations.

Research Center

Integration of CPS-related Techniques toward Actualization of SSC (CPS³C)

- To contribute to the development, processing, and utilization of "System Information".
- [illegible] large-scale, complex systems based [illegible]ies.
- System: not refer to the so-called information system, but rather to broad syste[illegible] covering a variety of areas, from engineering to na[illegible]nd society.

Industrial and Social Implementation

Graduates: 209
International students: 31
Faculty members: 41 (May 2017)

Department	Division
Systems Science	Fundar[illegible]tals of Syste[illegible]cience Innova[illegible] of Syste[illegible]cience
Information Science	Founda[illegible] of Inform[illegible]n Science Intelli[illegible] Informatics
Computational Science	Fundamentals of Comput[illegible]nal Science Innovation of Computer Science

Core Principles

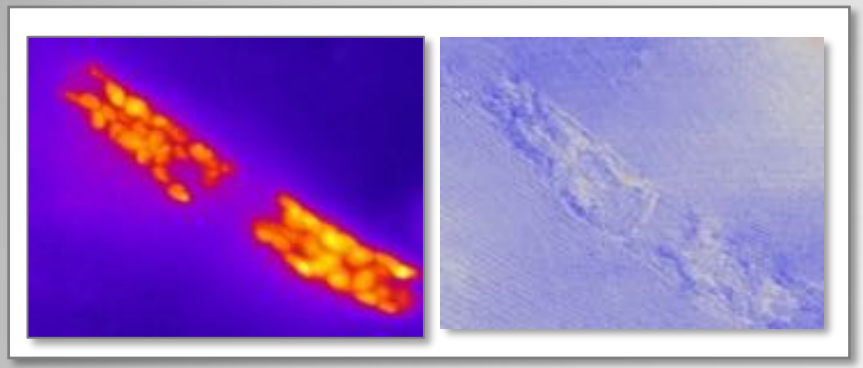
Research Topic — System Dynamics & Control

Design & Control of a Spherical Rolling Robot

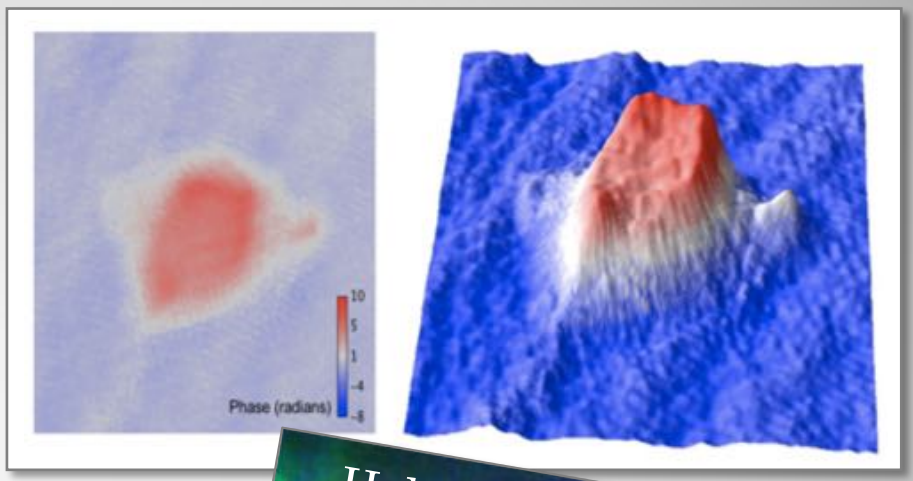
Design & Control of Tilt Rotor UAV
(Unmanned Aerial Vehicle)

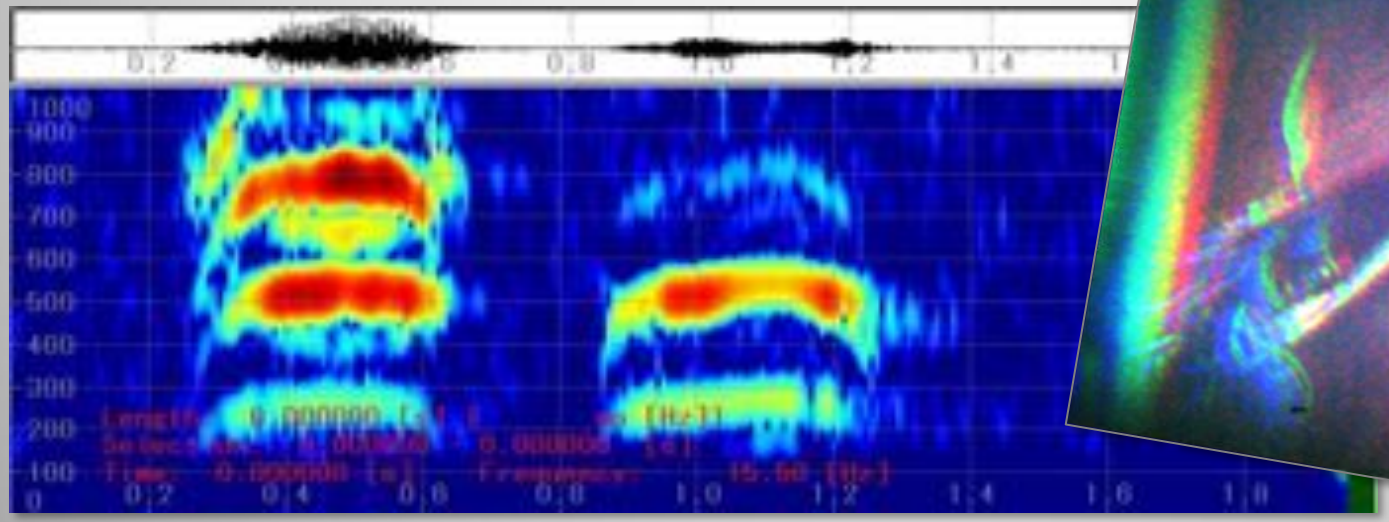
Optimum System Design Group

Research Topic — Optical Sensing & Visualization

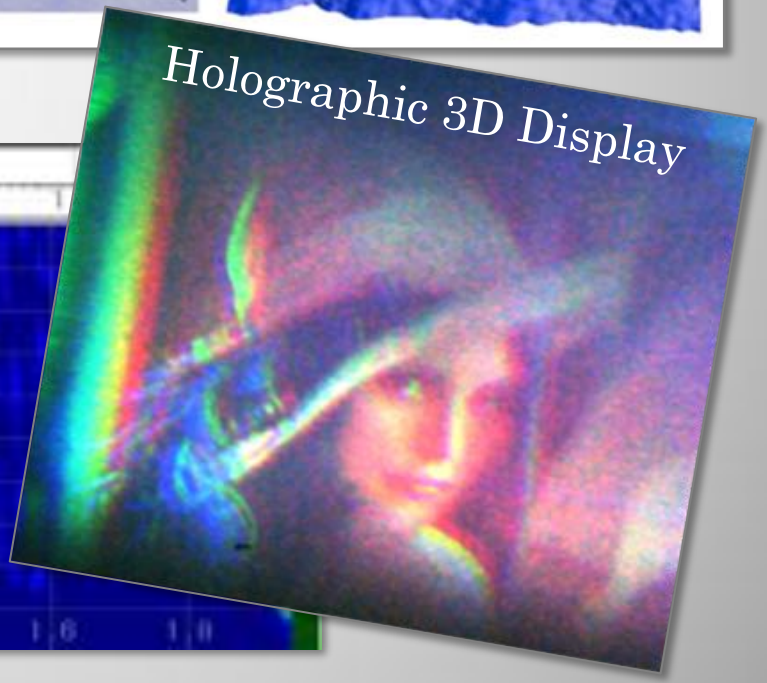


High-speed 3D Sensing





Optical Voice Recorder



Applied Optics Group

Research Topic — Robotics & Sensing

Robot-Human Interaction

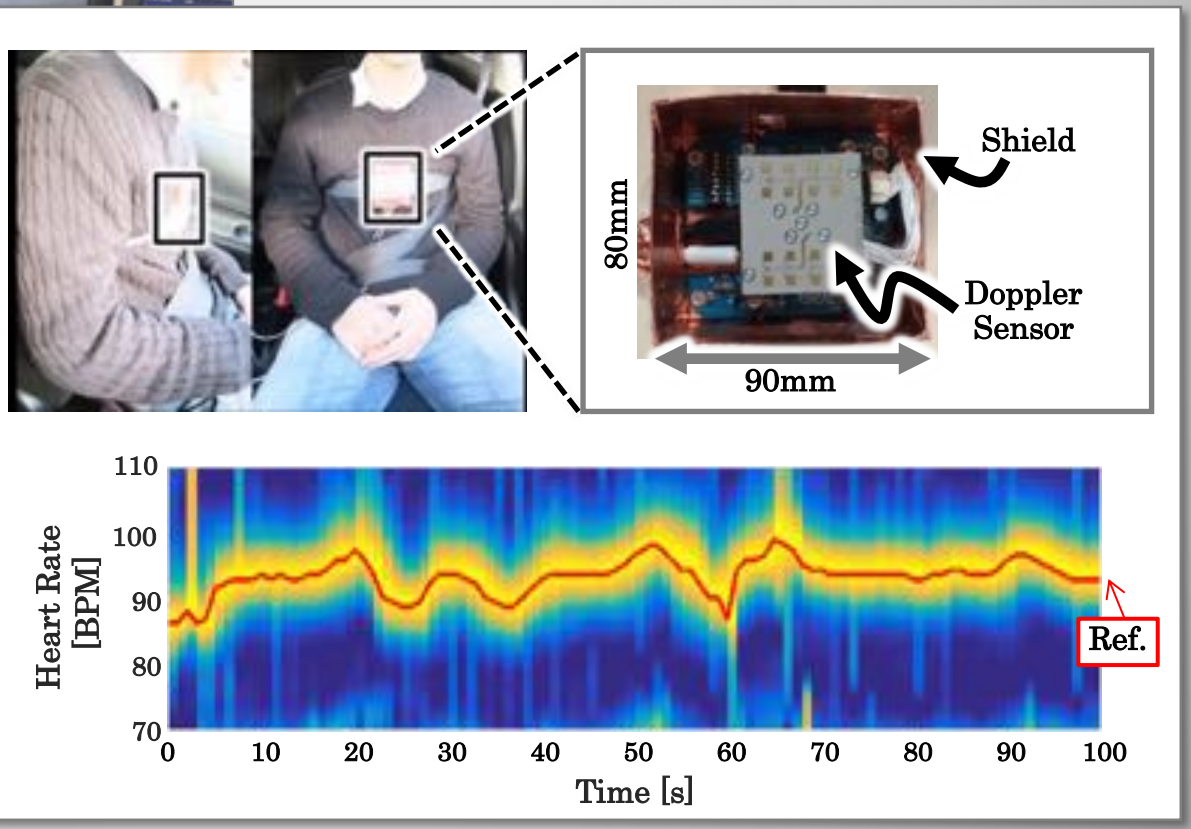
Flexible Sensing

Profs. Kobayashi and Nakamoto

System Analysis Group

Research Topic — CPS with IoT Core

Real-time Video Recognition



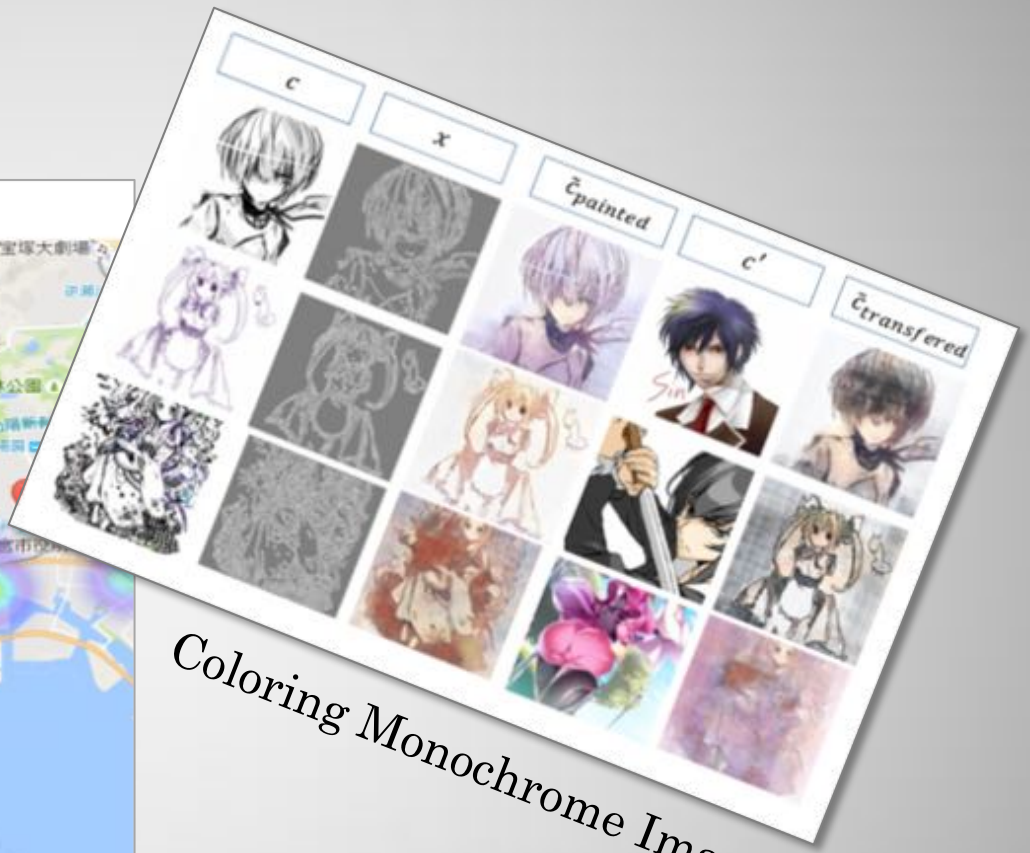
Profs. Yoshimoto, Kawaguchi, and Izumi

Healthcare (Monitoring)

Processor Architecture Group

Research Topic — AI & Smart XX

Service for Smart City



Coloring Monochrome Images

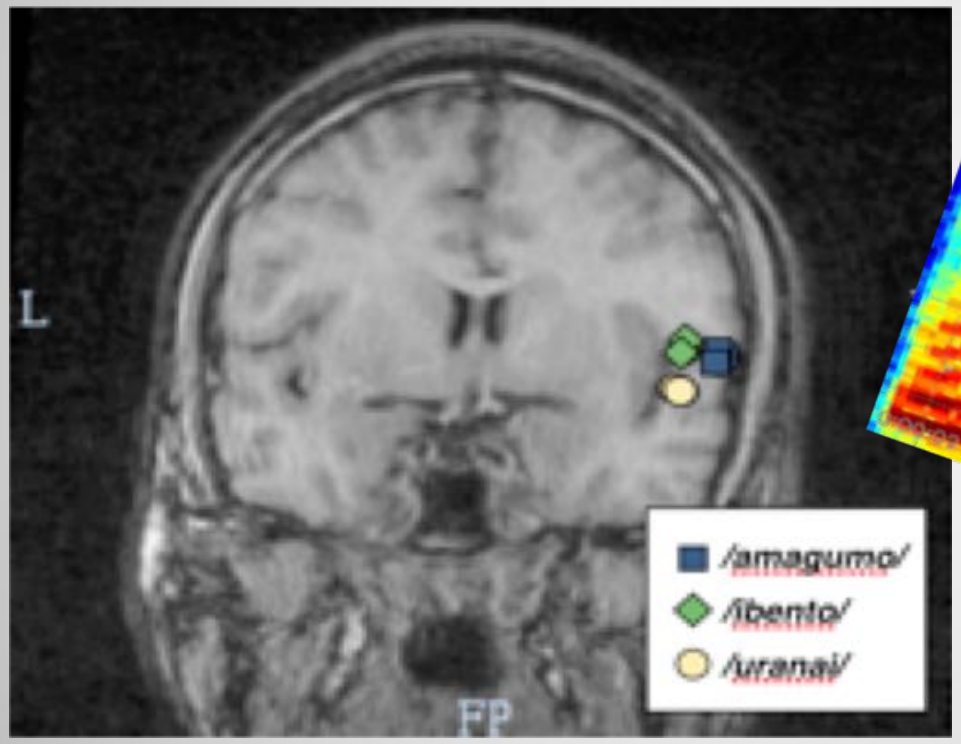
Prof. Nakamura

Computational Intelligence Group

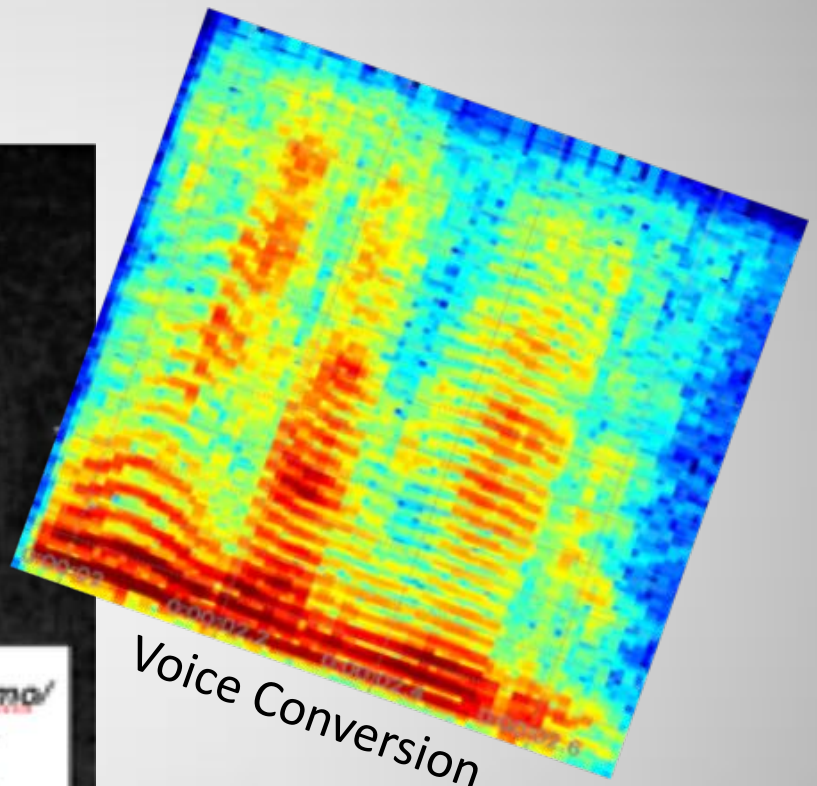
Research Topic — Optimization & Simulation

Emergent Computing Group

Research Topic — Voice Signal Processing



Brain activity estimation by MEG

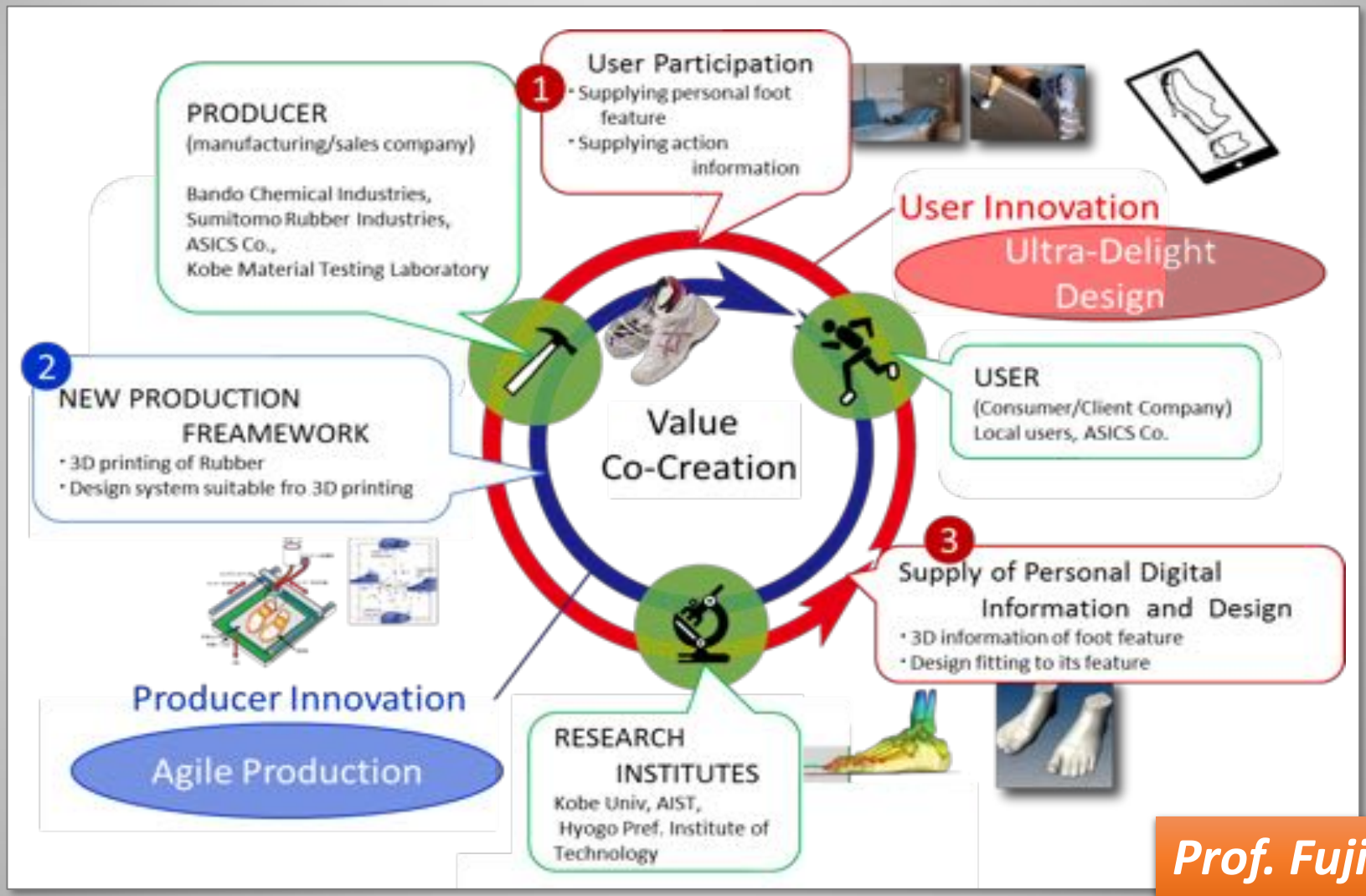


Voice Conversion

Prof. Takiguchi

Media Informatics Group

Research Topic — Smart Manufacturing

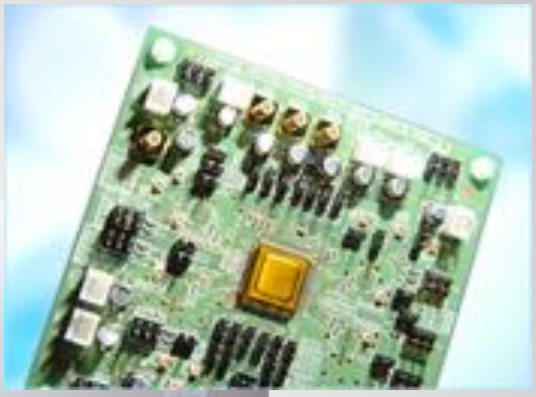


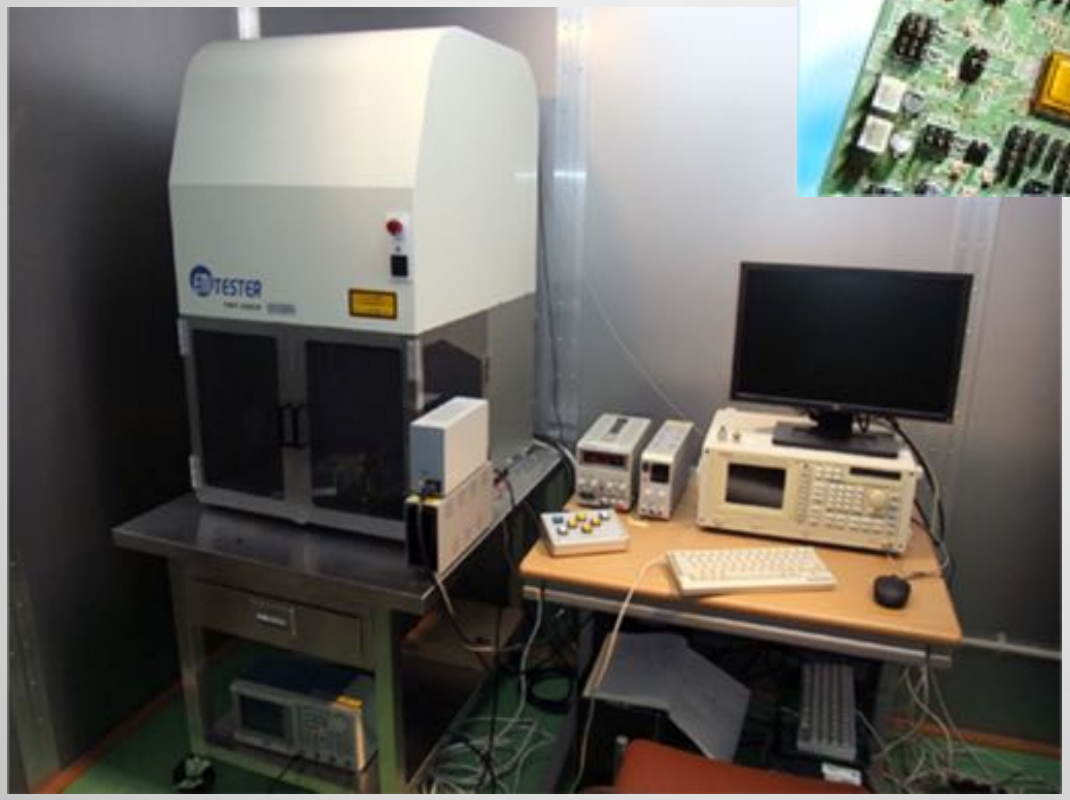
Value Co-creation Platform

Prof. Fujii

System Planning Group

Research Topic — Hardware Security

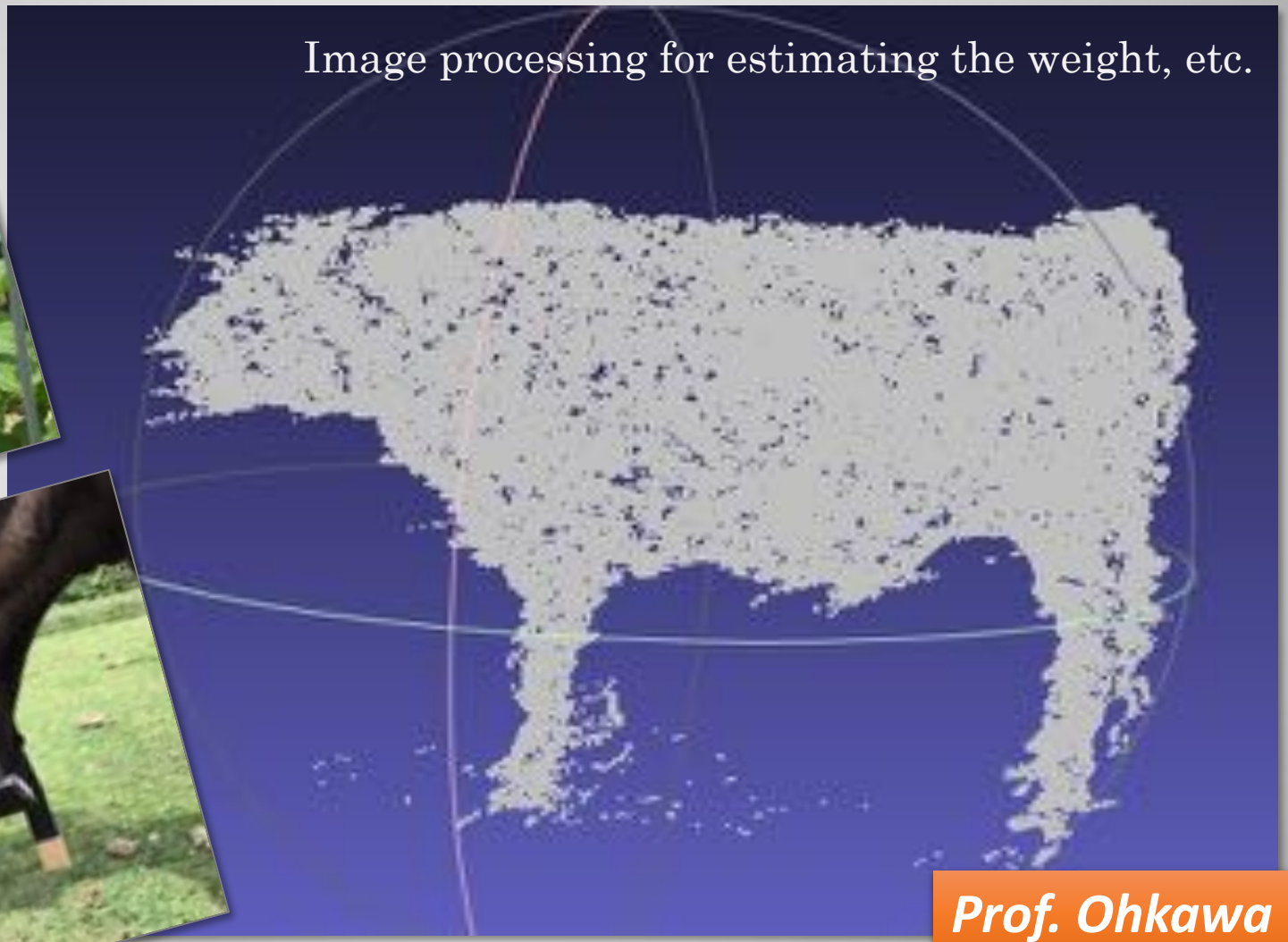




Prof. Miura

Integrated Information Systems Group

Research Topic — Smart Agriculture



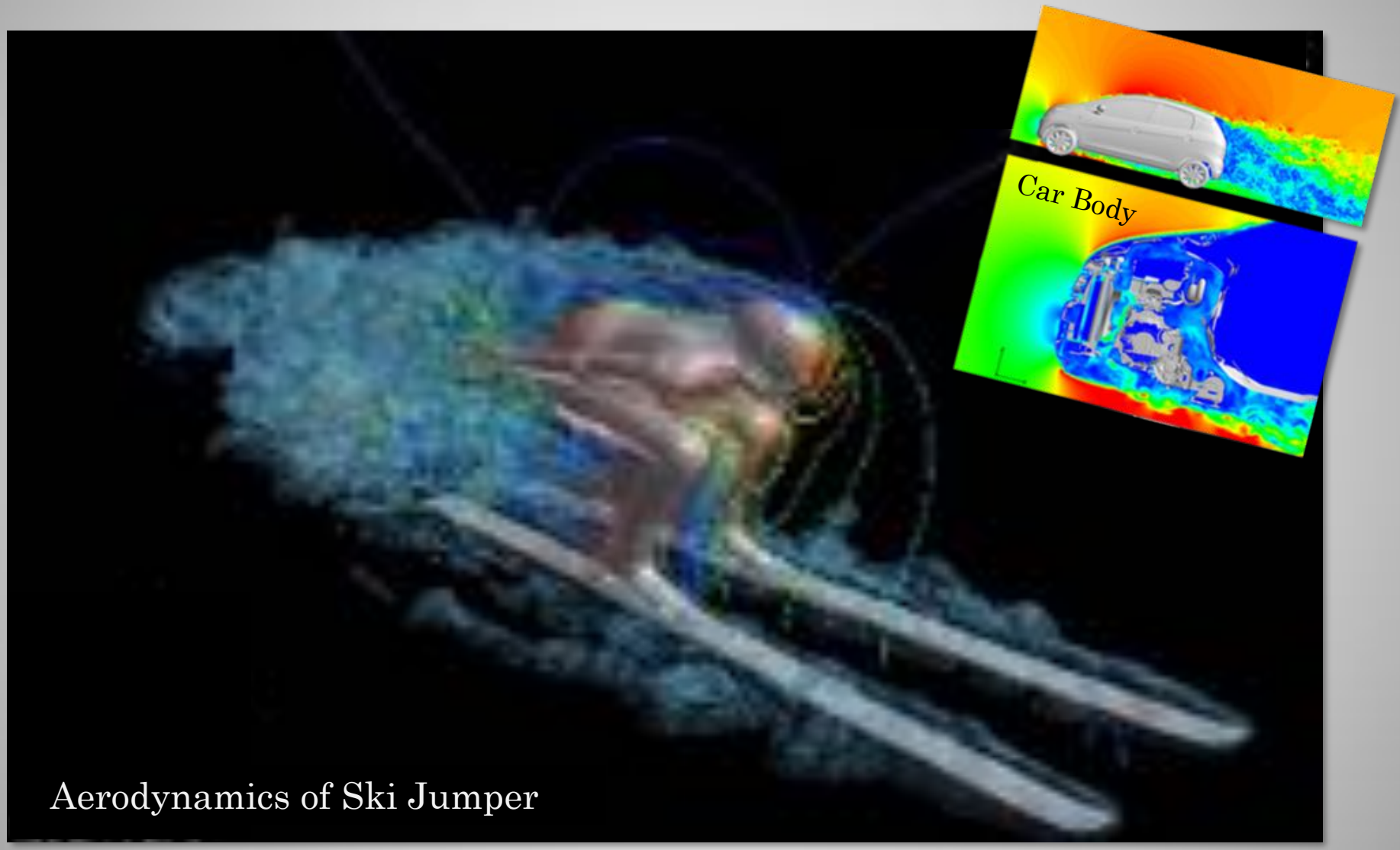
Prof. Ohkawa

Knowledge and Information Processing Group

Research Topic — Simulation & VR Visualization

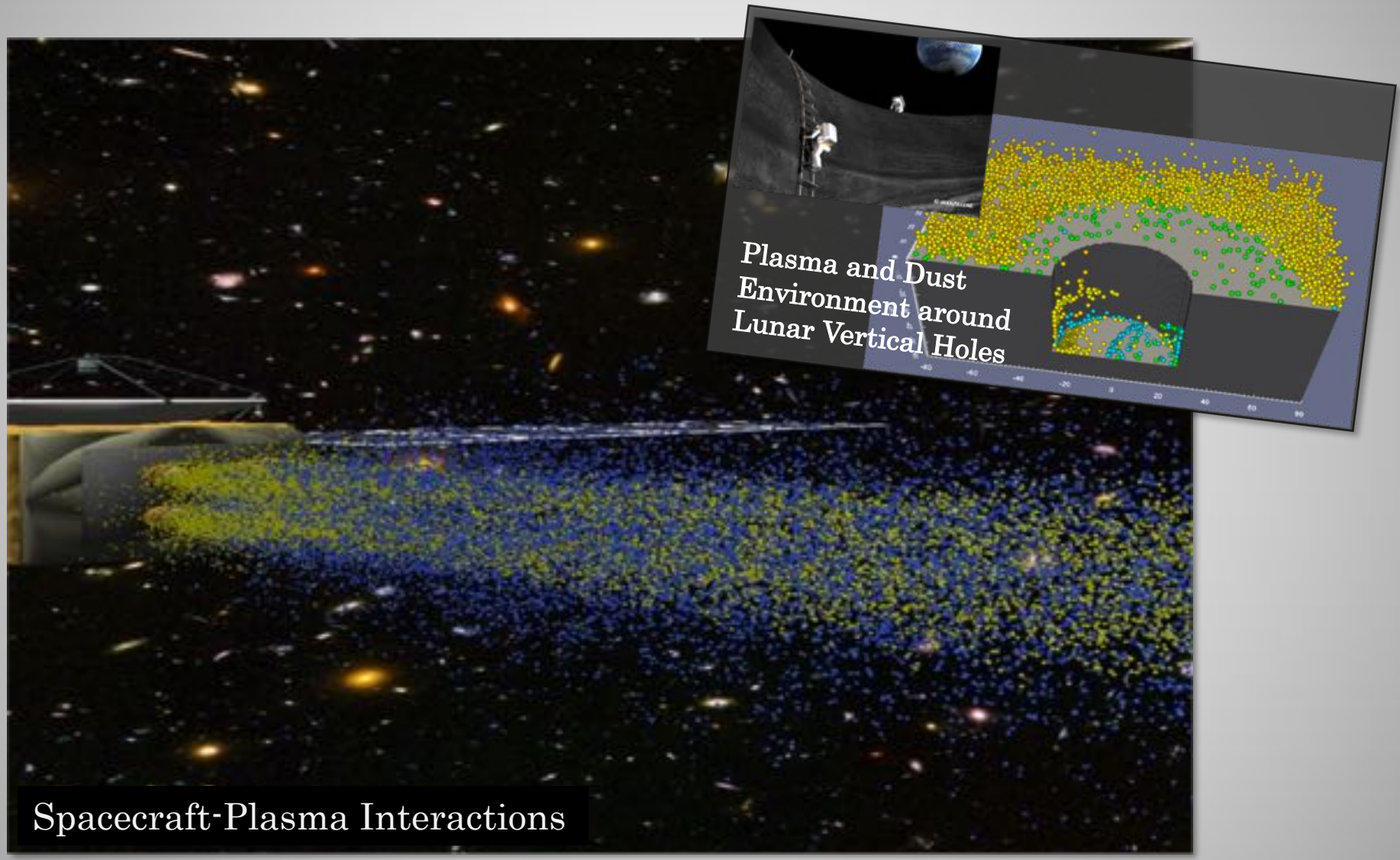
Simulation Techniques Group

Research Topic — Aerodynamics Simulation



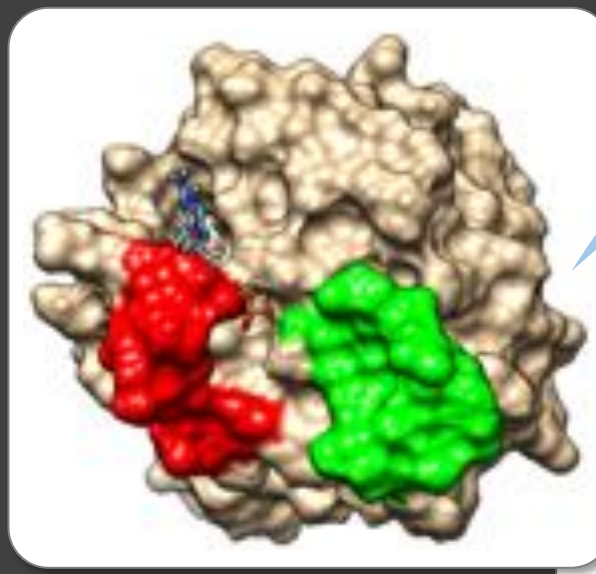
Computational Fluid Dynamics Group

Research Topic — Space Environment Simulation

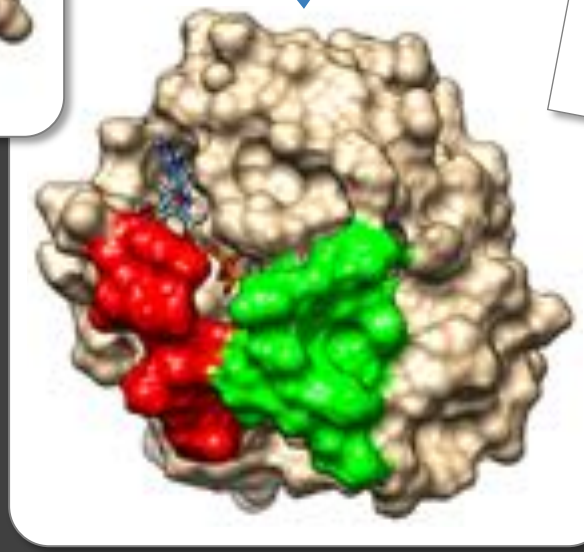


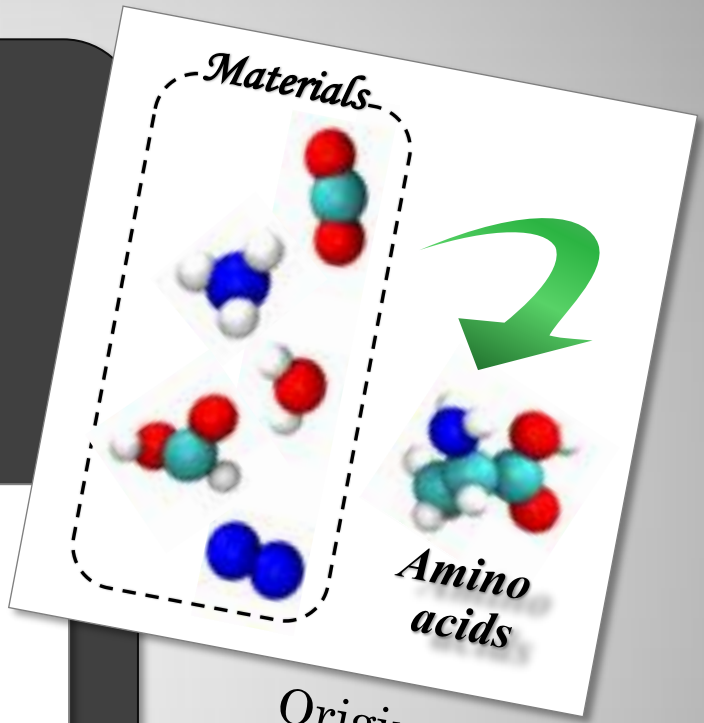
Computational Space Science and Engineering Group

Research Topic — Molecular Simulation



Drug Design





Origin of Life

Computational Biology Group

Graduate School of Engineering & Faculty of Engineering

Undergraduate and Graduate Course since 2007

(Undergraduate)	(Master's Course) (Doctoral Course)
Graduate School of Engineering	
Architecture	Architecture
Civil Engineering	Civil Engineering
Electrical & Electronic Eng.	Electrical & Electronic Eng.
Mechanical Eng.	Mechanical Eng.
Chemical Sci. & Eng.	Chemical Sci. & Eng.
Comput. Sci. & Systems Eng.	**Graduate School of System Informatics**
	Systems Science
	Information Science
	Computational Science

(The Graduate School of System Informatics was established in 2010)

Architecture

- Eminently universal field of learning, creation of housing, architectural facilities, basis of human life.
- 4 main divisions
  - Spatial Design
  - Architectural Planning, History and Theory
  - Engineering of Building Structures
  - Architectural Environmental Eng.

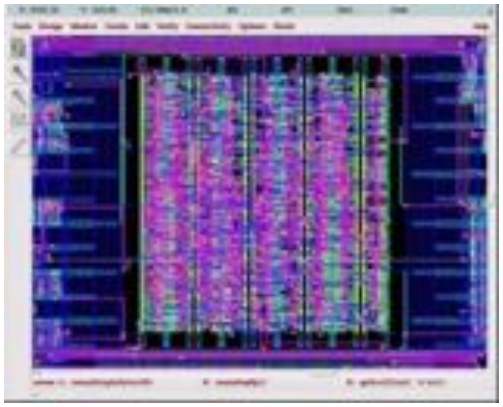
Civil Engineering

- Creating a safe society in harmony with the environment, through the construction and preservation of fundamental social facilities.
- 2 main divisions
  - Human Safety Engineering
  - Environmental Symbiosis Engineering

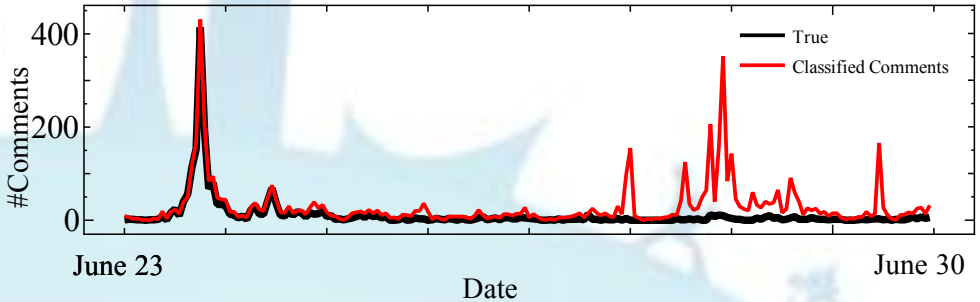
Electrical & Electronic Engineering

- offers the balanced interdisciplinary core subjects and studies on both education and research in the state-of-the-art scientific and technological fields.
- 2 main divisions
  - Physical Electronics
  - Computer and Information Engineering

Prof. Ozawa



LSI lay-out Design

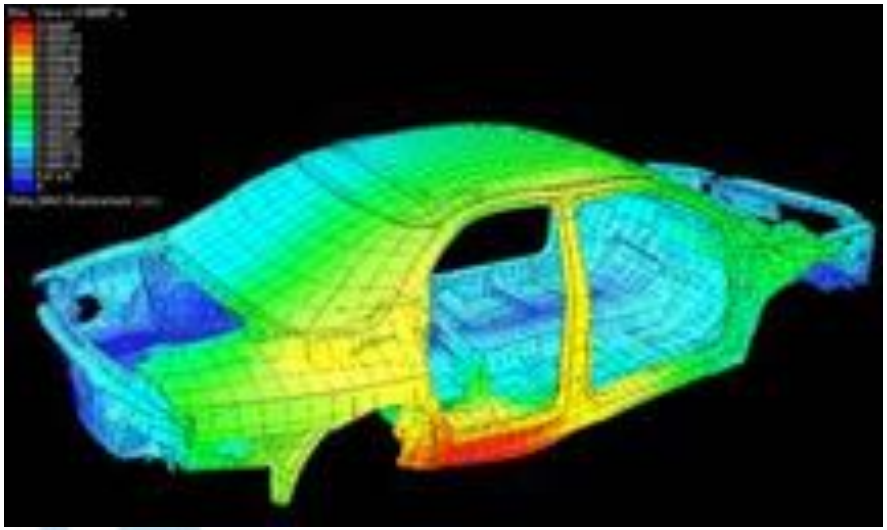


Flaming Detection

Flower Detection

Mechanical Engineering

- presents many of the basic disciplines that can be applied for industrial productions that may enrich human life with environmental friendship.
- 3 main divisions
  - Thermo-Fluid Dynamics
  - Mechanics and Physics of Materials
  - Design and Manufacturing



Stiffness Simulation

Chemical Science & Engineering

- To foster the next generation of researchers and engineers of chemical engineering on a global scale by education and research to meet the needs of industry and society.
- 2 main divisions
  - Applied Chemistry
  - Chemical Engineering

We are open to cooperation with the world!

Thank you very much for your attention.