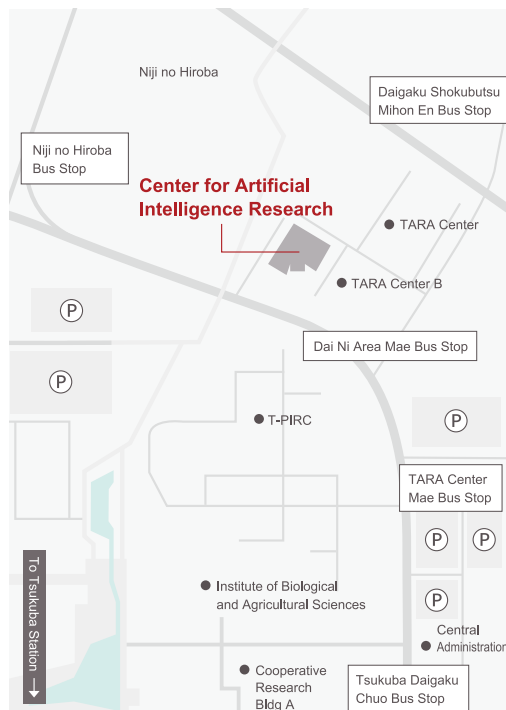




▲Map of the Tsukuba Station Area



▲Tsukuba University Campus Detailed Map

■ If coming by train

Get off at the Tsukuba Station of the Tsukuba Express Line
Go to the Tsukuba Center, Bus Stop #6
Take the "Tsukuba Daigaku Chuo" or the "Tsukuba Daigaku Junkan Hidarimawari / Migimawari" busses
If taking the "Tsukuba Daigaku Chuo" bus, get off at the Dai Ni Area bus stop
If taking the "Tsukuba Daigaku Junkan Hidarimawari / Migimawari" bus, get off at the TARA Center Bus stop
The bus takes approximately 15 minutes

■ If coming by car

Approximately 15 minutes from "Tsukuba Central IC" in the metropolitan Chuo Liaison Expressway



Website
<https://air.tsukuba.ac.jp/en/>



Center for Artificial Intelligence Research
University of Tsukuba

1-1-1 Tennodai, Tsukuba, Ibaraki 305-8577
Tsukuba Industrial Liaison and Cooperative
Research Center (ILC)

About C-AIR

The University of Tsukuba has established the Center for Artificial Intelligence Research (C-AIR) to foster groundbreaking research projects in the field of Artificial Intelligence.

This center works as a hub for Interdisciplinary Research, fostering cooperation between different departments in the university, centered around the application of interdisciplinary Big Data.

In particular, the center promotes the research of “Human-supporting Artificial Intelligence” for the realization of the next generation smart communities. To this end, C-AIR forms a spiral from basic scientific research to practical and industrial applications, which is achieved through the collaboration with various research institutes and companies.

Message from the Director

The Center for Artificial Intelligence Research (C-AIR) was founded in April, 2017. Because modern research in Artificial Intelligence (AI) requires the collaboration of different fields, and leads to diverse applications in society, it was necessary for the university to construct a structure to facilitate cross-disciplinary research and education activities.

At this center, we employ the interdisciplinary nature of our university to assemble a network of research centers and research projects from different fields, conducting basic and applied research on AI.

We also actively pursue industry-university collaboration initiatives in order to allow the AI technology developed on campus to provide concrete benefits to society.

It is also an important task to foster new human resources capable of developing AI and advanced knowledge of data analysis and putting it into practical applications. In this sense, we plan to develop activities that contribute to improving the research skills of researchers at companies and other members of society.



Tetsuya Sakurai

Director of Center for Artificial Intelligence Research,
University of Tsukuba

Organizational Structure

The C-AIR is composed of the “Artificial Intelligence Infrastructure Research Division” and the “Project Research Division.”

In the Artificial Intelligence Infrastructure Research Division, we conduct basic research on fundamental fields of AI, such as machine learning, mathematical algorithms, big data analysis, cloud infrastructure and privacy protection. In addition to these, we also conduct research on fundamental technologies that support the application of Service Engineering and Human Technology.

The Project Research Division is divided into three fields: “Health Care and Sports,” “Medical and Material,” and “Society and Arts.” Researchers from other departments and projects in Tsukuba University and other Research Institutions coordinate and collaborate with researchers from the Artificial Intelligence Infrastructure Research Division in application-oriented research projects.

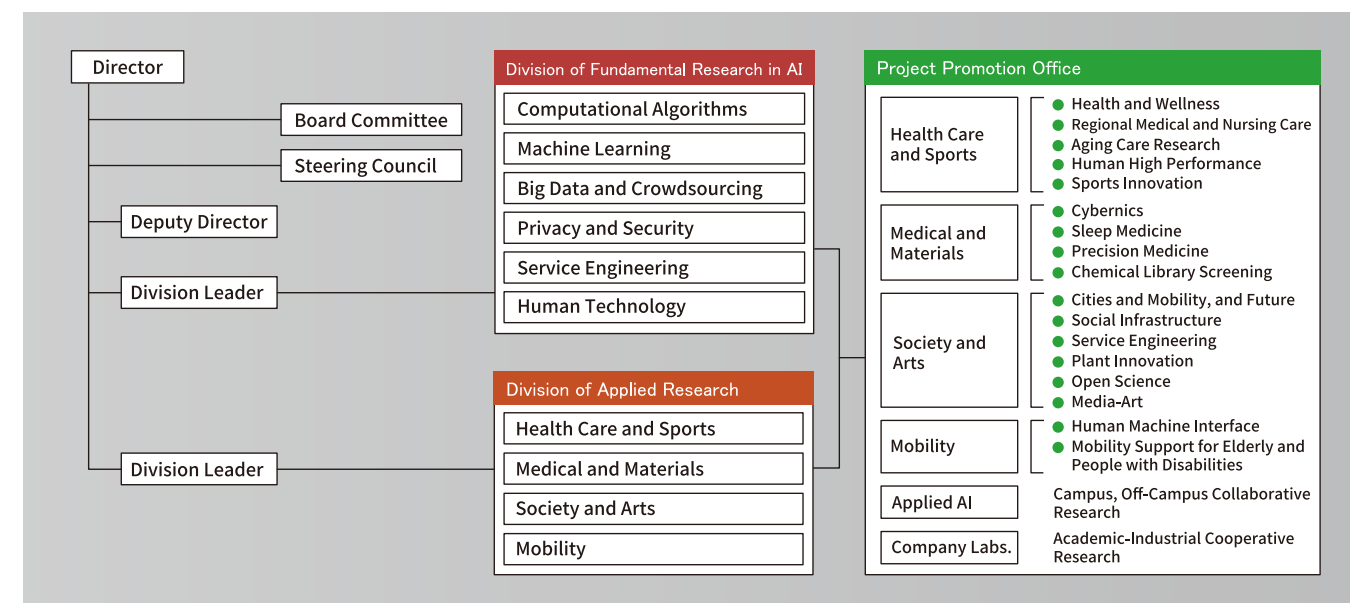
The field of “Health Care and Sports” promote research in these fields using health and medical care data held by municipalities; developing projects for the use of AI in data analysis of regional medical care, comprehensive care and services. Working in cooperation with the Human High Performance Research Center, this field also performs research on state-of-the-art sports measurement and data visualization technology and virtual reality.

In the “Medical and Materials” field, we are developing a

system for automatic sleep stage determination using machine learning in collaboration with the International Institute for Integrated Sleep Medicine (WPI-IIIS) and the Center for Computational Science Research. We are also developing research on innovative Cybernic Systems in cooperation with the Center for Cybernics Research, and research on next-generation sequencer, along with functional prediction of candidate substances using chemical screening in collaboration with the Precision Medicine Development Research Center.

In the “Society and Arts” field, we collaborate with the Future Society Engineering Research Center and municipal governments on the research of regional infrastructure and basic research on social engineering of future societies. Using data analysis and artistic approaches, we perform research work on design, service engineering, and the development of future agricultural industry.

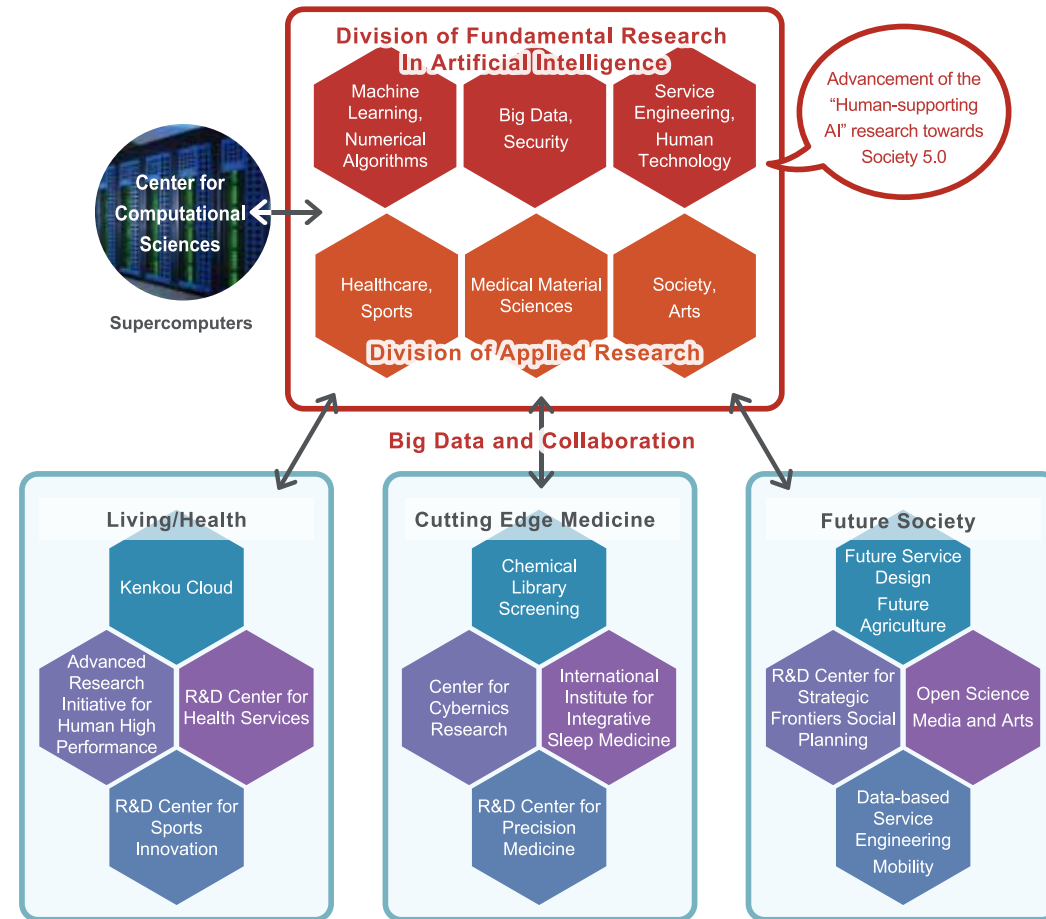
In the “Mobility” field, we investigate technologies for the development of self-driving cars and advanced driving support technology, based on driver and pedestrian movement analysis and risk assessment. This also includes applications of these technologies in the Naval and Aerospace fields. Furthermore, we cooperate with the Japanese Forum on Mobility and Innovation to promote cooperation across universities on research of self-driving vehicles, and improvement of innovative mobility in Japan.



Mission

The University of Tsukuba opened the Center for Artificial Intelligence Research (C-AIR) in April 2017 to promote advanced research and education on AI. This center supports and organizes the activities and collaborations between AI research groups from different fields in the University, promoting the interdisciplinarity which is key to the University of Tsukuba's research vision. In this sense, this center will work as a hub to mediate the cross sectional network of Research Centers and AI research projects within the University of Tsukuba.

In particular, through collaboration with the Center for Cybernics Research, International Center for Integrated Sleep Medical Science, Center for Computational Science, Center for Future Social Engineering Development, and Precision Medicine Development Research Center, among others, we aim to explore new areas of research related to the theme "Human-supporting Artificial Intelligence". Our work draws a spiral of projects which begin at basic scientific research, and reaches to applied and industrial research, contributing to the creation of new values and the realization of the future super smart-society.



Implementation of the "Super Smart Community" with Tsukuba Area as a model City

- Collaboration with Industry
- Collaboration with local National Research Institutes (NIMS, AIST, NIED, etc)
- Collaboration with TIA
- Collaboration with the AI center of AIST
- Collaboration with the Advanced Intelligence Project at RIKEN

Development of a base for Big Data utilization

Using the Interdisciplinary Character of our university, we will build a Big Data Utilization base through a network with each research center.

Development of AI technologies employing the power of Supercomputing

Through the collaboration with the Center for Computational Sciences of our university, we will develop large scale data analysis tools for Artificial Intelligence.

Use of the Tsukuba Area as an Empirical Model City

Application of new technologies in Tsukuba as an Empirical Model City through the collaborative network with national research institutes and enterprises.

Development of New Human Resources for AI and Data Analysis

Develop new human resources capable of deploying high level knowledge of AI and data analysis technologies to real world applications. We conduct education through research activities to members of society in industries, etc.

Members / Laboratories

Division of Fundamental Research in Artificial Intelligence

Specialty on Numerical Algorithms

Tetsuya Sakurai

Director of Center for Artificial Intelligence Research, Professor / Faculty of Engineering, Information and Systems



Area of Expertise

Computational Mathematics

Keywords Related to Research

High performance algorithms, Data analysis, Image analysis, Neural network computation

Shigeru Saito

Visiting Professor / SIGNATE Inc.



Area of Expertise

Wisdom of Crowds, System Life Science

Keywords Related to Research

Open innovation, Machine learning, OMICs data analysis

Akira Imakura

Associate Professor / Faculty of Engineering, Information and Systems



Area of Expertise

Numerical analysis

Keywords Related to Research

Matrix computations, Matrix factorization-based algorithms for deep neural network computation

Akira Terui

Associate Professor / Faculty of Pure and Applied Sciences



Area of Expertise

Computer Algebra, Symbolic Computation

Keywords Related to Research

Computer algebra, Symbolic-numeric computation, Automated deduction

Yasunori Futamura

Associate Professor / Faculty of Engineering, Information and Systems



Area of Expertise

Parallel Numerical Algorithm

Keywords Related to Research

Dimensionality reduction, High performance parallel algorithm, Parallel solver for eigenvalue problems, Parallel numerical software

Xiucan Ye

Assistant Professor / Faculty of Engineering, Information and Systems



Area of Expertise

Machine Learning

Keywords Related to Research

Feature selection, Data analysis, Clustering, Classification, Network computing

Keiichi Morikuni

Assistant Professor / Faculty of Engineering, Information and Systems



Area of Expertise

Numerical Linear Algebra

Keywords Related to Research

Least Squares Problem, Singular System, Preconditioning, Krylov Subspace Method, Eigenproblem

Tomoki Mihara

Assistant Professor / Faculty of Pure and Applied Sciences

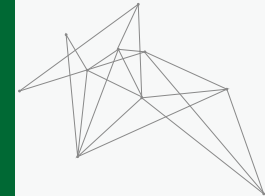


Area of Expertise

Number Theory


Keywords Related to Research

p-adic analysis, p-adic geometry, p-adic representation



Specialty on Machine Learning


Kazuhiro Fukui
Professor /
Faculty of Engineering, Information and Systems



Area of Expertise
Pattern Recognition, Machine Learning, Computer Vision

Keywords Related to Research
Subspace methods, Mutual subspace method, Object recognition, Face image analysis, Time series analysis, Motion analysis

Taro Tezuka
Professor /
Faculty of Engineering, Information and Systems



Area of Expertise
Machine Learning, Database

Keywords Related to Research
Kernel methods, Computational neuroscience


Takumi Kobayashi
Professor / Faculty of Engineering, Information and Systems, Cooperative Graduate School System



Area of Expertise
Pattern Recognition, Machine Learning

Keywords Related to Research
Feature Extraction, Feature Representation Learning, Image Recognition, Deep Learning, Sensor Data Analysis


Satoshi Iizuka
Associate Professor /
Faculty of Engineering, Information and Systems



Area of Expertise
Computer graphics, Computer vision, Machine learning

Keywords Related to Research
Image processing and generation, Image recognition, Deep learning


Claus Aranha
Assistant Professor /
Faculty of Engineering, Information and Systems



Area of Expertise
Theory and Application of Evolutionary Algorithms, Modeling and Program Generation

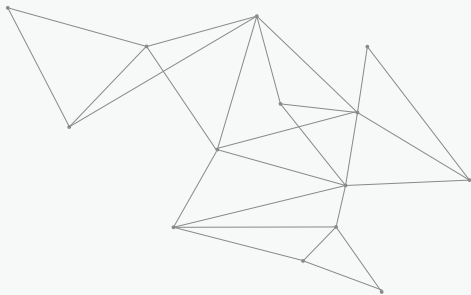
Keywords Related to Research
Evolutionary algorithms, Swarm intelligence, Artificial life

Ryotaro Sakamoto
Assistant Professor /
Faculty of Pure and Applied Science



Area of Expertise
Number Theory

Keywords Related to Research
Iwasawa Theory, Selmer group, L-function



Specialty on Big Data / Crowdsourcing


Toshiyuki Amagasa
Professor / Center for Computational Sciences



Area of Expertise
Database, Data Engineering

Keywords Related to Research
Big data, Data mining, Semi-structured data


Hiroaki Shiokawa
Associate Professor / Center for Computational Sciences



Area of Expertise
Data Engineering, Database System

Keywords Related to Research
Big data processing, Data mining, Graph data management


Bou Savong
Assistant Professor / Center for Computational Sciences



Area of Expertise
Data Engineering, Database System

Keywords Related to Research
Big data processing, Data mining, Data stream processing • analytics


Atsuyuki Morishima
Professor /
Faculty of Library, Information and Media Science



Area of Expertise
Database Systems

Keywords Related to Research
Crowdsourcing systems, Crowdsourcing applications, Human computation, Query processing


Kazumasa Horie
Assistant Professor / Center for Computational Sciences



Area of Expertise
Machine Learning, Biological Signal Processing

Keywords Related to Research
Neural networks, Deep Learning, Electroencephalogram, Electromyogram

Hiroyoshi Ito
Assistant Professor /
Faculty of Library, Information and Media Science




Area of Expertise
Data mining, Machine learning

Keywords Related to Research
Time-series data analysis, Social network mining, Human-AI collaboration

Specialty on Security / Privacy


Jun Sakuma
Professor /
Faculty of Engineering, Information and Systems



Area of Expertise
AI Security and Privacy

Keywords Related to Research
Machine learning, Secure multiparty computation, Differential privacy


Youhei Akimoto
Associate Professor /
Faculty of Engineering, Information and Systems



Area of Expertise
Black-Box Optimization

Keywords Related to Research
Evolutionary Computation, Machine Learning, Markov Chain Analysis


Kazumasa Omote
Professor /
Faculty of Engineering, Information, and Systems



Area of Expertise
Information Security

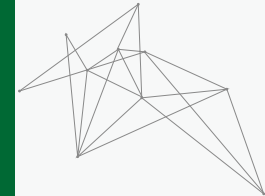
Keywords Related to Research
Malware countermeasure, Cloud security, Risk assessment for cyber attacks

Kazuto Fukuchi
Assistant Professor /
Faculty of Engineering, Systems and Information



Area of Expertise
Mathematical statistics and machine learning

Keywords Related to Research
Statistical inference, Machine learning, Fairness, Privacy



Specialty on Service Engineering

Yukihiko Okada

Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Japan's Service Development Theory

Keywords Related to Research
Service target costing, Data-driven service engineering,
Applied statistics

Hiroyasu Ando

Visiting Professor / Tohoku University

Area of Expertise
Complex Networked Systems

Keywords Related to Research
Mathematical modeling, Dynamics analysis, Data science

Yuichi Takano

Associate Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Operations Research

Keywords Related to Research
Mathematical Optimization, Financial Engineering, Machine Learning

Specialty on Human Technology

Kenji Suzuki

Director, Professor / Faculty of Engineering,
Information and Systems, Center for Cybernics Research

Area of Expertise
Artificial Intelligence and Robotics

Keywords Related to Research
Cybernics, Medicine and healthcare, Assistive technologies

Hajime Nobuhara

Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Computational Intelligence

Keywords Related to Research
Computational intelligence, Multi-media processing,
Web intelligence, Drone

Akiko Yoshise

Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Mathematical Optimization, Operations Research

Keywords Related to Research
Conic optimization, Algorithms, Optimization models

Tuan Phung-Duc

Associate Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Applied Stochastic Process

Keywords Related to Research
Modelling and performance analysis of services and information
systems, Stochastic models, Queueing theory

Kyosuke Yamamoto

Assistant Professor /
Faculty of Engineering, Systems and Information

Area of Expertise
Civil Engineering

Keywords Related to Research
Bridge Maintenance, Structure Design

Yasushi Nakauchi

Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Intelligent Environments

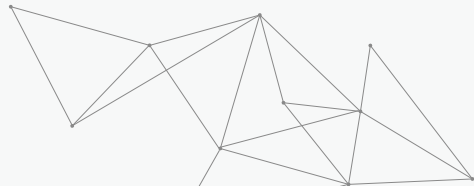
Keywords Related to Research
IoT, Sensor network, Big data analysis

Takamasa Iio

Visiting Associate Professor /
Doshisha University

Area of Expertise
Social Robotics

Keywords Related to Research
Human robot interaction, Multi-robot conversation, Social cognition



Masakazu Hirokawa

Assistant Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Human-Machine Interaction

Keywords Related to Research
Artificial Intelligence, Robotics, Sports science

Naoto Ienaga

Assistant Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Machine learning, Computer vision

Keywords Related to Research
Deep learning, Fisheries, Occupational therapy

Division of Applied Research

Specialty on Healthcare and Sports

Shinya Kuno

Professor / Faculty of Health and Sport Sciences

Area of Expertise
Sport Medicine, Health promotion, Health policy

Keywords Related to Research
Health promotion for the middle-aged and elderly, Health policy in community and workplace,
Prevention of lifestyle-related diseases and nursing care,
Prevention of sarcopenia and sarcopenic obesity

Tsuyoshi Matsumoto

Associate Professor /
Faculty of Health and Sport Sciences

Area of Expertise
Sport Coaching

Keywords Related to Research
Sport, Coaching, Tactics, Strategy

Etsuko T. Harada

Professor / Faculty of Human Sciences

Area of Expertise
Cognitive Psychology, Cognitive Science, Cognitive Engineering

Keywords Related to Research
Human-artifact interaction, Cognitive aging

Nanako Tamiya

Director, Professor /
R&D Center for Health Services, Faculty of Medicine

Area of Expertise
Medicine, Medical and Health Services Research

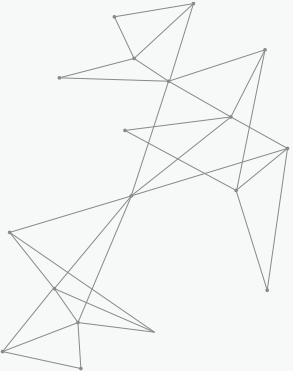
Keywords Related to Research
Health services research, Research based on medical & long-term care claim data, Outcome
research, Public health, Long-term care insurance system, The integrated community-care
system, Evaluation of quality of medical treatment, Nursing and social welfare services

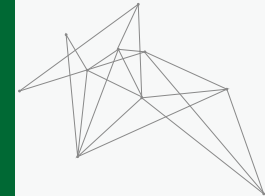
Bogdanova Anna

Assistant Professor /
Faculty of Engineering, Information and Systems

Area of Expertise
Machine Learning

Keywords Related to Research
Distributed Data Analysis, Federated Learning, Explainability, Natural
Language Processing






Specialty on Medical and Material Sciences

Taka-Aki Sato
Director, Professor / R&D Center for Precision Medicine

Area of Expertise
Molecular Oncology

Keywords Related to Research
Oncogene, Tumor suppressor gene, Liquid biopsy, Metabolome analysis



Masashi Yanagisawa
Director, Professor / International Institute for Integrative Sleep Medicine (WPI-IIS)

Area of Expertise
Sleep Biomedicine, Neuroscience, Pharmacology

Keywords Related to Research
Sleep / Wake, Electroencephalography, Polysomnography



Naoya Fukuda
Professor / Faculty of Life and Environmental Sciences, Tsukuba-Plant Innovation Research Center

Area of Expertise
Protected Horticulture


Keywords Related to Research
Greenhouse management, Plant physiology, ICT for agriculture



Hiroshi Itsumura
Professor / Faculty of Library, Information and Media Science

Area of Expertise
Academic Information

Keywords Related to Research
Academic information, Academic libraries, Open access, Open science



Yoshiyuki Sankai
Executive Research Director and Professor / Center for Cybernics Research, Faculty of Engineering, Information and Systems

Area of Expertise
Cybernics, HOJO-brain, Artificial Intelligence; AI, Artificial brain, Cybernic kernel


Keywords Related to Research
Cybernics, Robotic treatment device, Bio robotics, Neuro-machine interface



Masahide Itoh
Director, Professor / R&D Center for Innovative Material Characterization, Faculty of Pure and Applied Sciences

Area of Expertise
Applied optics


Keywords Related to Research
Optical information processing, High-precision interferometric measurement, Optical wavefront measurement



Toshiaki Uchiyama
Associate Professor / Faculty of Art and Design

Area of Expertise
Design Science


Keywords Related to Research
Design Science



Yoichi Ochiai
Associate Professor / Faculty of Library, Information and Media Science

Area of Expertise
CGH, HCI, VR, Visual Auditory Tactile Display, Digital Fabrication


Keywords Related to Research
CGH, HCI, VR



Kazuya Morikawa
Professor / Faculty of Medicine

Area of Expertise
Bacteriology

Keywords Related to Research
Gram-positive pathogens, Staphylococcus



Haruka Ozaki
Associate Professor / Faculty of Medicine

Area of Expertise
Bioinformatics, Computational Biology


Keywords Related to Research
Single-cell omics data analyses, Multi-omics data analyses, HTS, Epigenomics, Biological sequence analysis



Hiroko Terasawa
Associate Professor / Faculty of Library, Information and Media Science

Area of Expertise
Acoustics, Computer Music, and Sound Design


Keywords Related to Research
Sound synthesis, Data sonification, Sonic interaction, Musical emotion, and Timbre perception

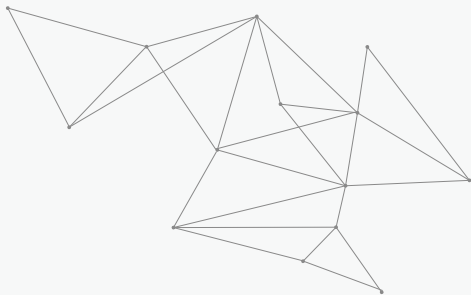


Takaho Tsuchiya
Assistant Professor / Faculty of Medicine

Area of Expertise
Systems Biology, Bioinformatics, Computational Biology

Keywords Related to Research
Single cell omics data analysis, Sparse modeling, System identification






Specialty on Mobility

Makoto Itoh
Professor / Faculty of Engineering, Information and Systems

Area of Expertise
Human Factors


Keywords Related to Research
Human-Machine Systems, Automation, Automated Driving



Yoshinari Kameda
Professor / Center for Computational Sciences

Area of Expertise
Computational Media

Keywords Related to Research
Computer vision, Mixed reality, Virtual reality, Augmented reality



Specialty on Society and Arts

Isamu Takahara
Director and Specially Appointed Professor / R&D Center for Strategic Frontiers in Social Planning

Area of Expertise
Vehicle Design Engineering and Development


Keywords Related to Research
Automated driving, Fuel Cell Vehicle, MaaS, IoT Vehicle Data



Hiroshi Ezura
Professor / Faculty of Life and Environmental Sciences

Area of Expertise
Horticulture, Plant Molecular Breeding

Keywords Related to Research
Tomato, Melon, Genetics and breeding, Plant biotechnology, Genetic transformation, Genome editing



Yuichi Saito
Assistant Professor / Faculty of Engineering, Information and Systems

Area of Expertise
Human-machine systems, Cognitive engineering, Human interaction

Keywords Related to Research
Automated driving, Driver assistance, Shared control, Analysis of drive recorder data

