Emerging Researcher Profiles 2023-2024

Chemistry, Materials

Precisely designed transition metal catalysts for new molecular transformations
Jun Takaya School of Science

We aim to develop new transformation reactions of unreactive molecules and chemical bonds such as CO_2 and C-C sigma-bonds enabled by precisely designed new polymetallic transition metal catalysts and reactive species generated by cooperation between transition metals and light energy.

Development of electronic materials and devices
Junghwan Kim Institute of Innovative Research

I am conducting research related to electronic devices such as light emitting elements and transistors. Research on electronic devices spans an extremely wide range of fields; however, I am particularly interested in creating world-class devices by discovering new functional materials and making use of their unique physical properties.

Development of electrocatalysts toward energy conversion
Akira Yamaguchi School of Materials and Chemical Technology

We are working on the development of electrocatalysts based on earth abundant elements toward CO_2 reduction and water splitting. To achieve this goal, we take in original design and synthetic approach such as hydrothermal electrochemistry and machine-learning technique.

Search for solid electrolyte materials using machine learning
Kota Suzuki Institute of Innovative Research

The novel lithium ion conductors could enable the development of all-solidstate lithium batteries; however, the efficiency of material discovery is slow. In this study, we are developing an efficient new materials search method by combining classical materials search and machine learning techniques.

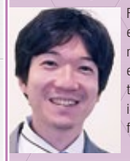
Signal-amplification sensing with smart chemosensors
Gaku Fukuhara School of Science

We have so far proposed a new amplification sensing methodology defined as "supramolecular allosteric signal-amplification sensing (SASS)", enabling to sense various analytes that are difficult to discriminate in a complex mixture.

Rotaxane-based supramolecular mechanophores
Yoshimitsu Sagara School of Materials and Chemical Technology

We are working on the development of supramolecular mechanophores utilizing rotaxanes, which have been well investigated in supramolecular chemistry. The mechanophores can visualize tiny mechanical forces.

Redox chemistry for molecular conversion technology
Shinsuke Inagi School of Materials and Chemical Technology



Focusing on the features of bipolar electrochemistry such as wireless nature, gradient potential and reduced electrolyte, novel molecular conversion technology based on redox chemistry is developed to produce useful and functional materials.

Seeking the riddle of origins of life
Ryuhei Nakamura Earth-Life Science Institute

At the bottom of the deep sea, chemical, thermal, and electrical energy conversion has been taking place over 3.8 billion years with an efficiency that far surpasses our modern technology. By unraveling the ancient earth technology, our laboratory will challenge the riddle of the origins of life.

Structure science of ceramic materials and exploration of novel materials
Kotaro Fujii School of Science

The diverse properties of ceramic material are closely related not only to the properties of the constituent elements, but also to the crystal structures. I am clarifying the relationship between the property and structure of ceramic material through detailed structural analysis, and exploring new materials by considering crystal structure.

Aromatic polymers and carbons for catalysis
Yuta Nabae School of Materials and Chemical Technology

I am working to develop a solid catalyst using organic materials based on keywords such as non-platinum catalysts, fuel cells, polyimides, hyperbranched polymers, organometallic complexes, and carbon materials. The goal is to realize a low-carbon society by developing a catalyst capable of efficiently promoting various reactions.

Degradable polymers via precision polymerization
Tomohiro Kubo School of Materials and Chemical Technology

The development of on-demand degradable plastics for a circular economy is imperative as environmental concerns loom large. I aim to construct a guiding principle for degradable polymeric materials through unveiling novel synthetic strategies toward environmentally benign polymers.

Development of functional materials for energy storage devices
Masaaki Hirayama School of Materials and Chemical Technology

We are exploring energy conversion and storage materials based on ionic conduction in solids. We focus mainly on all-solid-state batteries, which is a next-generation energy storage device, and contribute to clarify the ionic conduction mechanism at electrode/solid electrolyte interfaces for the development of all-solid-state batteries with high energy and power densities.

Development of metal oxide catalysts for selective chemical processes
Keigo Kamata School of Science

We investigate the rational design and synthesis of metal oxide catalysts with a wide variety of crystal structure based on both theoretical and experimental approaches. Through the development of novel nanostructure control methods, we create highly functionalized catalysts with much superior activity than previously reported catalysts for various types of catalytic reactions such as selective oxidation, acid-base reaction, and biomass conversion.

Anion-engineering for novel electronic functional materials exploration
Satoru Matsuishi Institute of Innovative Research

Focusing on mixed-anion compounds containing multiple types of anions and electrides in which electrons behave as anions, we are searching for functional materials such as superconductors, novel electronic conductors, and wavelength conversion materials.

Materials function-directed development of biopolymers
Toshiki Sawada School of Materials and Chemical Technology

Biopolymers observed in nature easily achieve excellent functional properties under aqueous-based mild conditions. We developed functional soft materials through function-directed modification/control of biopolymers based on bioengineering, polymer science, physical chemistry, and informatics.

Precision self-assembly of crystallizable polymers
Tomoya Fukui Institute of Innovative Research

I investigate the precision self-assembly of functional polymers. I have succeeded in controlling the self-assembly of π-conjugated polymers by kinetic control, thereby yielding the nanofibers with controlled lengths from nano to micrometer.

Development of new catalytic reactions by heterogeneous catalysts
Yusuke Kita Institute of Innovative Research

Promotion of the use of renewable resources is required to build a sustainable society. I am focusing on heterogeneous catalysts that synthesize high value-added compounds from non-edible biomass such as corn stalks that do not compete with food issues.

High mobility semiconducting polymers
Tsuyoshi Michinobu School of Materials and Chemical Technology

Crystalline organic semiconducting polymer thin films are capable of carrying electricity by properly controlling the intermolecular interactions and carrier generation. I aim to create a new organic semiconducting polymer by using precise molecular design and an efficient synthesis method, and to realize high-performance solar cells and transistors.

Boron vacant orbital engineering for the development of functional materials
Yoshiaki Shoji Institute of Innovative Research

We have developed functional organoboron compounds and new organic transformations based on the design concept of boron vacant orbital engineering, that is, the design of the chemical bonds attached to boron, the space provided by substituents around boron, and the assembly mode of boron vacant orbitals.

Life Science and Technology

Development of new nucleic acid drugs for gene therapy
Akihiro Ohkubo School of Life Science and Technology

We have synthesized functional oligonucleotides useful for medical and diagnostic purposes by introduction of the chemical modification into nucleic acids. In our recent research, we develop new bioactive molecules including nucleic acids drugs for accurate regulation of biochemical reactions (transcription, splicing, translation) based on organic chemistry.

Drug delivery systems for photodynamic therapy and neutron capture therapy
Takahiro Nomoto Institute of Innovative Research

Photodynamic therapy and neutron capture therapy have attracted recent attention as promising techniques for treating intractable diseases including multiple and diffuse cancers. We develop light/neutron-responsive drug delivery systems to extend their application.

Development and application of original photo-functional chemical probes
Mako Kamiya School of Life Science and Technology

The goal of my research is to unravel the physiopathological phenomena by developing new photofunctional molecules (fluorescent probes, Raman probes, photosensitizers, etc.) based on original molecular design strategy for observing and manipulating living organisms.

Nexus of nano, bio and electronics
Toshinori Fujie School of Life Science and Technology

Minimally invasive medicine is expected for human healthcare and biomedicine. Our group envisions the smart biodevice with integrated nano, bio, electronics.

Genome editing and environmental responses of plants
Satoshi Kidokoro School of Life Science and Technology

Plants regulate physiological responses and adapt to changes in the surrounding environment through the expression and function of various genes. I will develop novel genome editing technology in plants, and then use this technology to analyze and modify the functions of their genes involved in environmental responses.

How energy organizes chemistry into life
Shawn McGlynn Earth-Life Science Institute

In biology, material (molecules) are organized by energy flow. My lab works on multiple systems – from molecules in the lab to hot springs in the field- with the goal of understanding how organization is governed by energy transfer reactions.

Fluorinated artificial channel
Kohei Sato School of Life Science and Technology

Inspired by natural membrane proteins that transport molecules and ions across cellular membranes, we have synthesized fluorinated artificial channels and found that they can transport molecules even faster than channel proteins in nature.

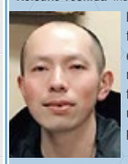
Elucidation of intestinal environment dynamics
Takuji Yamada School of Life Science and Technology

We have been engaged in elucidating the relationship between gut microbiome and diseases based on community structure analysis of the bacteria that live in the human intestines. In addition, we also focus on the research for the dynamics of the microbial community structure during the food fermentation process, data visualization of the metabolic pathway database, and a new analysis method.

Mechanosensation involved in tissue functions
Keiko Nonomura School of Life Science and Technology

We are studying physiological roles of mechanosensation mediated by PIEZO mechanically activated channel, awarded Nobel Prize 2021, in tissues/cells including sensory neurons and brain tissue.

Redox-based regulatory network for controlling plant functions
Keisuke Yoshida Institute of Innovative Research



Plants must control their own physiological functions in response to changes in environmental conditions. I focus on redox regulation as a key to control plant functions. I am trying to comprehensively understand its molecular basis and physiological significance.

Emerging Researcher Profiles 2023-2024

Mechanical Engineering, Civil Engineering, Architecture

Smart agriculture and forestry systems based on engineering wisdom

Hideharu Takahashi School of Engineering

For the construction of a machine system that can work autonomously to support smart agriculture and forestry, we are researching on the technologies such as remote sensing, robot, environmental recovery, utilization of unused resources, in-situ power supply with solar tracking power generation system, and social implementation of these technologies.

Intelligent soft materials and soft robots

Shingo Maeda School of Engineering

We create autonomous and intelligent soft robots and machines by actively utilizing nonlinear phenomena and nonequilibrium systems of soft materials. We also challenge to understand the mechanisms of such complex soft robots and machines.

Design method of high-rise building against huge earthquakes and typhoons

Daiki Sato Institute of Innovative Research

Our laboratory aims to develop a design method that considers both seismic and wind loads for buildings with applied advanced vibration technologies such as passive control and base isolation systems by using observation data, experiments, and simulations. It also develops method for estimating performance of different dampers used in passive control and base-isolation systems.

Trajectory optimization for high-speed and high-precision machining systems

Shingo Tajima Institute of Innovative Research

Demand for advanced machining processes at the manufacturing facility, I research on the trajectory optimization of industrial robots and multi-axis machine tools for high-speed and high-accuracy motion. Specifically, considering the kinematical and vibrational characteristics of the mechanical system, the optimization of posture selection and trajectory control is accomplished by utilizing the kinematic redundancy.

Systems and control theory for future energy management

Takayuki Ishizaki School of Engineering

Based on the foundation of systems and control theory, we challenge ourselves to advanced research topics for future smart energy management. In particular, we focus on developing modular design theory for large-scale decentralized control systems.

Seismic performance of new and repaired RC structures

Aleksey Vadimovich Shegay Institute of Innovative Research

Reinforced concrete structures must not only be safe but also reusable and re-occupiable following damaging earthquakes. Our research is focused on finding effective design and repair methodologies to enable such rapid recovery to be achieved following earthquakes.

Establishing groundbreaking robotics through cutting–edge actuators

Hiroyuki Nabae School of Engineering

It can be difficult for general robot systems that use electromagnetic actuators to work properly in extreme environments such as confined spaces and where there is high load disturbance. We are working to create new robotics that can resolve such issues based on research into new actuators.

Visualization of environmental impact in automotive transportation system

Susumu Sato School of Engineering

Although the total amount of air pollutants emitted from automobiles has been reduced, local roadside air pollution caused by exhaust gas is still pressing issue. We are investigating "where" and "how much" air pollutants were emitted using with measurement and numerical analysis.

Advanced digital technology and artificial intelligence induced creative seismic design

Yuki Terazawa School of Environment and Society

In order to utilize innovative damping modification system into more creative building designs, I am tackling developing algorithmic and interactive seismic design methods with advanced digital technology and AI, applying these methods to real projects, and implementing these methods in society through web applications, etc. Furthermore, I am also developing and evaluating a novel damping modification system.

Development of biomedical mechatronics and bio-tissue utilization technology

Wataru Hijikata School of Engineering

Based on mechanical engineering and engineering electrodynamics, I am working on medical-mechatronics systems such as ventricular assist devices, artificial skin and implantable wireless power transfer system.In addition, I am also trying to use biological tissue as an engineering application such as implantable power generators and bio-hybrid actuators. These studies are conducted in collaboration with the Faculty of Medicine.

Coordinated control of human, robots, and systems

Takeshi Hatanaka School of Engineering

I am working on novel distributed cooperative environmental monitoring technology and human-robot collaboration technology to address the social issue of a shrinking working-age population. In particular, I am conducting interdisciplinary researches in the fields of smart agriculture, smart ocean, and energy management.

Transportation research with data science

Toru Seo School of Environment and Society

I study transportation and information systems to realize a better society by utilizing theory and data. I am particularly interested in emerging technologies such as automated driving, ridesharing, and connected vehicles.

Surrounding environment recognition by acoustic signal

Kotaro Hoshiba School of Engineering

I am researching about surrounding environment recognition for robots using active acoustic measurement (measurement "using" sound) and passive acoustic measurement (measurement "of" sound). It will be applied to search and rescue tasks in disaster-stricken areas or sensing of living environments.

Challenge to wind and snow related issues for urban environment

Tsubasa Okaze School of Environment and Society

We are investigating the mechanisms of wind gust at pedestrian space, pollutant dispersion, snow drifting, and other problems caused by wind and its related diffusion phenomena within built-up environments, and proposing countermeasures with CFD (computational fluid dynamics), which can predict the flow fields with computer simulation.

Developing novel technologies for water quality analysis and water treatment

Manabu Fujii School of Environment and Society

We are developing novel water quality measurement technologies to comprehensively detect various chemicals, naturally occurring substances and so forth in environmental waters, drinking water and wastewaters. We are also conducting research from the perspective of developing sustainable water and wastewater treatment technologies with low energy and environmental impact.

Electrical and Electronic Engineering, Computer Science

Periodic nanostructures opening a new field of photonics

Tomohiro Amemiya Institute of Innovative Research

We are exploring the potential of "metamaterials" and "topological photonics" for opening a new field of photonics.

Terahertz electronics and applications

Safumi Suzuki School of Engineering

The terahertz frequency band is expected to be used for various purposes such as next-generation wireless communication. In our laboratory, we will open up the future of terahertz technology by researching extreme semiconductor devices capable of terahertz operation, giving them various functionality, and applying them to the various terahertz applications and actually showing the operations.

AI-driven integrated intelligent communication network

Takayuki Nishio School of Engineering

Toward energy- and communication-efficient IoT system with AI, we are working in the interdisciplinary area of sensing, networking, and computing and developing novel technologies such as vision-assisted wireless networks and distributed machine learning in networks.

Diamond quantum technologies

Takayuki Iwasaki School of Engineering

Spin defects formed in diamond function as quantum sensors, and they are also expected to be used as solid-state quantum light sources for quantum network. I am proceeding with research on high-sensitivity magnetic and electric field sensors using NV centers, and studying new quantum light sources using Group IV elements.

Multinary inorganic compound materials and energy conversion devices

Takahito Nishimura School of Engineering

I am researching high-performance technology for compound thin-film solar cells that focus on crystal growth and interfaces for different materials. I am also conducting research on functional development technology for lightweight and flexible solar cells with a view to developing applications such as ZEB/ZEH and in-vehicle usage. In addition, I am promoting research on thermoelectric conversion materials that achieve high-efficiency conversion of low-temperature waste heat and have a low environmental impact.

Embedded systems for next generation IoT

Yuko Hara School of Engineering

Design requirements of embedded systems are being diversified in terms of processing speed, power/energy consumption, security, etc. in the Internet of Things (IoT) era. Our group aims at developing new design methods for both hardware and software in embedded systems toward the next-generation IoT.

Fundamental technologies toward semiconductor quantum computers

Tetsuo Kodera School of Engineering

I am conducting research and development of fundamental technology for the realization of semiconductor quantum computers. I am promoting joint research and development with universities, corporations, and research institutions in Japan and overseas by linking a wide range of technology layers such as materials, devices, circuits, control, and systems.

Ultralow power spintronic devices

Nam Hai Pham School of Engineering

We develop novel materials such as topological insulators, topological half metals, and ferromagnetic semiconductors to realize ultralow power spintronic devices, including magnetoresistive random access memory, racetrack memory, and spin transistor.

Augmented reality using high speed vision and projection

Yoshihiro Watanabe School of Engineering

We explore the possibilities to invoke a new sense of reality based on the advanced technology centering on visual sensing and projection. The key is speed transcending the human capabilities. We believe the next reality is driven by the technological control of the unseen moment.

Novel functional photonic devices with magnetic materials

Yuya Shoji Institute of Innovative Research

Utilizing unique feature of magnetic material as non-reciprocity or non-volatility, we develop novel functional photonic devices. In addition, we are exploring innovative applications as photonic computing and photonic neuron by using such devices.

High-efficiency solar cells and optical power converter for optical power transmission

Shinsuke Miyajima School of Engineering

A production process of silicon solar cells without explosive and toxic gases are investigated for low-cost silicon solar cells. Hybrid tandem solar cell using silicon and a perovskite material and blue-light optical power converter for optical power transmission system are also our important topics.

Artificial intelligence for understanding and generating human language

Naoaki Okazaki School of Computing

Language is more than a communication tool. It is also a source for intellectual activities including thinking and logic. Incorporating linguistics, statistics, machine learning, and recent deep learning, I am working to achieve intelligent computers that can speak languages to communicate with others, as we human beings do.

Integrated circuits for wireless communication to be deployed in space

Atsushi Shirane Institute of Innovative Research

We conduct research and development on "Integrated Circuits for Wireless Communications and Wireless Power Transfer". We aim to realize integrated circuits for wireless communication to extend the coverage area further than the current level and to expand it to space, and wireless transceivers that do not require a power source using wireless power transfer technology to open up the carbon-neutral era.

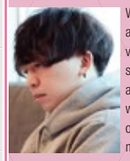
Custom computing machine for deep learning applications

Hiroki Nakahara School of Engineering

I am researching the development of high-speed hardware exclusively for machine learning and AI processing including deep learning along with its applications.

Leverage math for sensing data processing and analysis

Shunsuke Ono School of Computing



We are developing signal processing algorithms for extracting and analyzing valuable information from noisy and degraded sensing data by leveraging sparse modeling and mathematical optimization. In addition, we are actively engaged in the application of these algorithms to remote sensing and material imaging.

Emerging Researcher Profiles 2023-2024

Mathematics, Physics, Earth and Planetary Sciences

Data-driven Intelligent Robotics
Asako Kanezaki School of Computing

We develop a robotic system that recognizes the real world and learns behavior. Robots collect data using various sensors and predict the optimal behavior through the knowledge they gather and interactions with humans. We are researching recognition technologies and machine learning methods for this purpose.

Mathematical analysis of nonlinear partial differential equations
Hideyuki Miura School of Computing

We study partial differential equations by applying tools from functional analysis and Fourier analysis. More precisely, we are working on asymptotics and regularity of solutions for nonlinear partial differential equations in fluid mechanics.

Science of control of quantum physical properties utilizing non-equilibrium processes
Fumitaka Kagawa School of Science

I am utilizing a non-thermal equilibrium process (a method that goes beyond the thermodynamic approach) in an effort to create a novel non-equilibrium steady state, operate a non-equilibrium phase change different from the equilibrium phase transition, and achieve high-order functionality based on domain engineering consisting of competing phases with different symmetries.

Biophysics and informatics for intelligent matter like living systems
Masahiro Takinoue School of Computing

Living systems are non-equilibrium, dynamic material systems that exhibit intelligent behaviors such as information processing, response, replication, and evolution. We are exploring physics to elucidate their design principles, as well as applied science to realize intelligent molecular systems such as molecular computers and artificial cells.

Mathematical optimization: theory and applications
Makoto Yamashita School of Computing

Mathematical optimization provides solutions using mathematical approaches for the optimal selection under many constraints, for example, numerical methods for train route searches and shift scheduling. We study theoretical aspects of mathematical optimization and apply numerical methods to various practical problems

Search for quantum spin magnets showing novel quantum phenomena
Nobuyuki Kurita School of Science

Magnetic insulators with small spin quantum number show quantum ground state and excited state owing to remarkable quantum effects, which cannot be understood within the framework of a classical spin model. For the purpose of finding the novel quantum phenomena, we develop new quantum spin magnets and investigate their magnetic properties.

Large scale distributed deep learning on TSUBAME
Rio Yokota Global Scientific Information and Computing Center

Due to the rapid increase in size of deep neural networks, it is now becoming impossible to train them without using supercomputers. Our research aims to train the largest models by using the first GPU supercomputer in the world TSUBAME at Tokyo Institute of Technology and making use of over ten years of experience on such systems.

Algebraic approaches to low dimensional topology
Takefumi Nosaka School of Science

My research is topology, and focuses on objects of dimension 2,3,4. My approaches contain nilpotent methods and quandle theory to topology, where quandle is a certain algebraic system. I aim to make a development of topological procedures to demonstrate 3-dimensional topology and cohomology of algebras.

Gravitational wave cosmology
Teruaki Suyama School of Science

By using gravitational waves which have extremely high penetrability and come from the abyss of the universe, I am conducting theoretical research to clarify the fundamental mysteries of the universe; for example, the origin of the universe and the identity of dark matter and dark energy.

Developing and using statistical methods for recent real data
Takayuki Kawashima School of Computing

Based on theories such as mathematical statistics and mathematical optimization, I am developing methods for analyzing a wide variety of real data. In particular, one of my recent initiatives is conducting data analysis that applies methods actually developed for epidemiological and medical data.

Macroscopic quantum physics with single nanoparticles in vacuum
Kiyotaka Aikawa School of Science

By using ultracold single nanoparticles laser-trapped in a vacuum, we investigate whether macroscopic objects follow quantum mechanics, which has been successful with microscopic particles such as electrons and atoms. We also aim at developing applications of our system in sensing.

Exploring quantum properties of ultrathin nano materials
Toru Hirahara School of Science

We are performing precise thin-film synthesis, in which atoms are stacked one layer at a time, to search for quantum properties that do not appear in thick bulk materials. In particular, we use quasiparticles that appear in materials to demonstrate concepts predicted in high-energy physics, and conduct basic research for real-world applications.

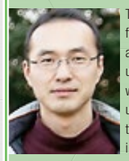
Theory and applications for large-scale signal processing
Satoshi Takabe School of Computing

Due to technology such as post-5G wireless communication, signal processing has recently been required to be large-scale, high-performance, and high-speed. By combining the approaches of statistical mechanics, information theory, and deep learning, I aim to develop next-generation signal processing algorithms and further deepen related theories.

Novel quantum phases realized by epitaxy
Masaki Uchida School of Science

Our group pursues physics of novel quantum transport emerging in extremely high-quality epitaxial thin films and artificial heterostructures, by adopting molecular beam epitaxy techniques, which have led the way in the semiconductor research, to exotic materials including topological and correlated materials.

Ultraviolet time-domain astronomy with small satellites
Yoichi Yatsu School of Science



Time-domain Astronomy is a new category which focuses on transient celestial phenomena. We are surveying those transient events by making use of AI and unique small satellites. Currently we are developing a micro-satellite for the ultra-wide field UV transient explore mission to be launched in 2023 by joint effort between industry and academia. We also are applying the observation technology to practical technologies such as navigation and remote-sensing which are the base of the new-space industry.

Transdisciplinary Science and Engineering, Humanities and Social Science

Building planet formation theory based on theory and astronomical observations
Satoshi Okuzumi School of Science

We now know that Earth-sized exoplanets are common in the galaxy. Are they similar to our own Earth? We seek to answer this question by combining computer simulations and the latest observational data.

Solving various nuclear issues through the innovation of element separation
Masahiko Nakase Institute of Innovative Research

Based on the innovative elemental separation technology and understanding of Actinide elements, difficult issuses such as reprocessing of spent nuclear fuels and their final disposal and stabilization of various kinds of waste generated in the Fukushima Daiichi Nuclear Power Station will be solved and aim to contribute to the revival and revitalization of Fukushima.

Analyzing visual culture of celebrity constructed by media
Kyohhei Kitamura Institute of Innovative Research, Institute for Liberal Arts

In the 20th century, the appearance of celebrities such as movie stars and idols completely changed due to movies and television, and in the 21st century, new celebrities including YouTubers and VTubers appear over the internet. I am studying "celebrity" that is created through media and its visual culture.

Mechanism of historical human capital formation
Kota Ogasawara School of Engineering

Ogasawara laboratory focuses on the mechanisms of human capital formation during industrialization. Utilizing unique long-term historical socioeconomic statistics with properly designed cliometrics, the lab studies how people accumulated human capital in the economic development process, especially from the economics viewpoint.

Global urban climatology
Alvin Christopher Varquez School of Environment and Society

Cities have dynamic interactions with their atmospheric environment. With distinct geopolitical and socioeconomic identities, urbanization influences global climate change, and vice-versa. Through state-of-the-art numerical models, geospatial analyses, and machine learning, our lab aims to investigate the science behind these spatiotemporal interactions to contribute to the creation of sustainable environments.

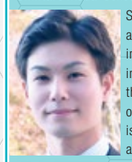
Research on educational practice, policy, and school reform
Yuta Suzuki Institute for Liberal Arts

I am engaged in educational research with the emphasis on learning from school sites and listening to school sites. In particular, I am interested in the learning of teachers, who are the change agent in reform of teaching and schooling. A recent publication is "Formation and Development of Teachers' Professional Community: A Genealogy of Research on School Reform in the United States" (Keisoshobo, Tokyo, 2018).

Mathematical optimization for decision making
Ken Kobayashi School of Engineering

Mathematical optimization is a method for finding an optimal solution with regard to some criterion. I aim to support complex decision-making in the real world by developing optimization methods to solve broader optimization problems efficiently.

Social infrastructure innovation with cutting-edge technology
Shintaro Ikeda School of Environment and Society



Sophisticated advanced technologies such as artificial intelligence are also being introduced into the social infrastructure industry, which is traditionally known as the legacy industry. However, advanced organizational and strategic management is necessary in order to effectively use advanced technology. I am working to clarify related measures.

Chrono-nutrition, precision nutrition
Masaki Takahashi
Institute of Innovative Research,Institute for Liberal Arts

Chrono-nutrition is an established research field that examines the relationship between the timing of nutrition/diet and the circadian clock system. Moreover, we are working to develop a system for "Precision Nutrition" which takes into consideration aspects of individual background such as lifestyle and genetic differences.

Assessment, prediction and control of the urban atmospheric environment
Atsushi Inagaki School of Environment and Society

We aim to make an assessment, a prediction and control the urban atmospheric environment by means of the numerical simulation of urban atmospheric turbulence and dispersion, wind monitoring at pedestrian level, and flux tower observation.

Aesthetics on physical experiences of people with disabilities
Asa Ito Institute of Innovative Research, Institute for Liberal Arts

I am conducting qualitative research on what it is like to live with various disabilities and illnesses such as visual impairment, stuttering, and dementia. My research is based on interviews of people with disabilities and illnesses. Every body in this world is different from all others. While respecting the universality of science, I would like to highlight the unique individuality of the human body.

The relation of new technology and social and political issues
Ryosuke Nishida Institute for Liberal Arts

I handle the multifaceted relationship between new information technologies/services and politics (elections), institutions, and society through policy analysis, historical research, and quantitative analysis, etc. Recent research is on policy processes and the social impact of COVID-19 measures. A recent publication is "Sociology of the Corona Crisis" (2020, Asahi Shimbun Publications Inc.).

Waste recycles promoted by additional value creation and psychological approaches
Fumitake Takahashi School of Environment and Society

My team studies waste management and recycles from generation to final landfill disposal. They include psychological analysis of waste sorting, design analysis for waste separation, value-added technology development for waste recycles, and geochemical conversion of landfilled wastes to soil.

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