

# Degree Programs in Systems and Information Engineering

## Graduate School of Science and Technology

### Faculty member list (Master's programs)

#### Master's Program in Policy and Planning Sciences

Field of Research	Faculty	Detailed Description of Research Field
	AKIYAMA, Eizo	Evolutionary game theory, Dynamical systems theory, Agent-based simulation.
	ARITA, Tomokazu	Industrial location, Agglomeration economies, Urban and regional policies, City planning systems.
	SATO-ILIC, Mika	Multi-dimensional data analysis, statistics: latent structure models, fuzzy clustering, and multi-way data theory.
	OHSAWA, Yoshiaki	City Planning through MaaS, Infrastructure asset management, Spatial voting equilibrium, Quantitative analysis on landscape, Spatial competition and harmonization in Europe, Location Theory
	OKAMOTO, Naohisa	Tourism Science, Transportation planning, Transport Policy, Travel Behavior Analysis and Demand Forecasting, Evaluation on Infrastructure Development
	KAWASHIMA, Hiroichi	Local gov. management, Open data, Co-creative planning, local information policy.
	SHIGENO, Maiko	Mathematical programming, combinatorial optimization, Network flow theory, Algorithm engineering.
	SUZUKI, Tsutomu	Urban Analysis, Facility Planning, Location Analysis, Environmental Modeling, Geographical Information Science.
	TANIGUCHI, Ayako	Attitude and behavioral modification concerning Urban transport planning, Risk communication, Mobility management, Social acceptance of Autonomous Vehicles.
	TANIGUCHI, Mamoru	Compact city, Sustainable urban and regional planning, Management of urban layout, National land-use plan, Social capital.
	ZHANG, Yongbing	Resource allocation and management in parallel/distributed systems, mobile and pervasive computing, wavelength routing in optical networks.
	TSUTSUMI, Morito	Spatial Statistics, Spatial Econometrics, Geospatial Information Sciences, Economic analysis of infrastructure investment, Industrial location, Urban modeling, Local government/Public facilities management

Field of Research	Faculty	Detailed Description of Research Field
	FUJIKAWA, Masaki	History of Urban Built Environment in Japan and Other Asian Countries, Conservation of Traditional Buildings in Urban and Rural Area
	MIAO, Ying	Combinatorics for Coding Theory and Information Security
	★ MURAKAMI, Akinobu	Urban and rural planning, theories and practices of urban landscape planning.
	YOSHISE, Akiko	Mathematical optimization and its applications, Algorithms for solving conic optimization problems
	WATANABE, Shun	Architectural and urban planning toward the highly-networked information society, Development of intelligent information systems for their planning and design.
	AMEMIYA, Mamoru	Environmental design and community planning for crime prevention, Planning and management of residential environment in depopulating society
	ANDO, Hiroyasu	Mathematical modeling of bio-inspired complex networks and its application to social systems
	UEICHI, Hideo	Individual differences and decision-making, risk perception, cognitive psychology, emotion.
	UMEMOTO, Michitaka	Countermeasures against infrequent risk in urban and regional area: Evacuation planning, Disaster information, Regionals' countermeasures against nuclear disaster, Perception of disaster risk.
	OKUBO, Masakatsu	Empirical study on intertemporal consumption decisions, Application of time series econometrics.
	OTA, Mitsuru	Selforganization of spatial economic system and structural change.
	OKADA, Yukihiro	Management accounting in service organizations. Service target costing.
	OKUSHIMA, Shinichiro	Environmental economics, Energy economics, Policy analysis, Environmental ethics, Poverty analysis, Inequality analysis, Welfare analysis.
	★ KAIDA, Naoko	Pro-environmental awareness and behavior, economic valuation of environmental and natural resources, environmental decision-making, environmental psychology
	SAKUDO, Mari	Applied Econometrics
	SAWA, Ryoji	Evolutionary game theory, Cooperative games, Behavioral game theory.
	TAKANO, Yuichi	Mathematical optimization, Financial engineering, Machine learning
	TURNBULL, Stephen John	Economics of the Internet and social networks, Economics of open source, Mathematical structure of games, Environmental economics
	HACHIMORI, Masahiro	Discrete Mathematics, Combinatorics, Analysis of discrete structures

Field of Research	Faculty	Detailed Description of Research Field
	HARADA, Nobuyuki	Theoretical and empirical analysis of SME dynamics and policies, Econometric analysis of Japanese economy and Industry.
	FUJII, Sayaka	Urban Planning, Urban and Community Planning of Neighborhoods, Living Environment in Aging Housing Estates, Community Business Utilizing Local Resources.
	PHUNG-DUC, Tuan	Applied Probability, Stochastic Models, Performance Evaluation, Queueing Theory, Operations Research
	MATSUBARA, Kosuke	Urban planning, planning history, Urban planning in Asia and Africa.
	★ YAMAMOTO, Sachiko	Management and utilization method of building stock (vacant house / closed school, etc.), Maintenance and regeneration system in rural area, Regional management by local residents
	WADA, Kentaro	Traffic management and control, Transportation network, Traffic flow, Intelligent transportation systems
	【ARIMA, Sumika】	Supply chain management, Logistics.
	【ANNO, Hidekazu】	Matching market design, Game theory, Microeconomics
	【IGARASHI, Gaku】	Nonparametric density estimation
	【USHIJIMA, Koichi】	Empirical analysis of investment in child human capital, residential choice, health investment, educational investment.
	【OHYAMA, Tomoya】	Crime Prediction, Spatial Information Science, Behaviormetrics
	【ORIYARA, Masanori】	Empirical analysis of corporate finance
	【KANAZAWA, Kiyoshi】	Financial data analysis, market microstructure, stochastic processes, econophysics
	【KUROSE, Yuta】	Bayesian statistics, State space models
	【SANO, Yukie】	Physics of socio-economic systems, Social media, Computational social science, Web science
	【TRAN, Lam Anh Duong】	International Economics, Economic Growth, Income Distribution
Professor of Cooperative Graduate School	KOBAYASHI, Hiroshi (National Institute for Land and Infrastructure Management)	Road Design, Traffic Safety Analysis and Measures, Bicycle Traffic, Community Road
	KONDO, Yoshinori (National Institute for Environmental Studies)	Vehicle evaluation in real world conditions, Proposal of environmental conscious traffic and life style, Development of personal mobility based on inclusive way of thinking.
	HASEGAWA, Hiroshi (National Institute for Land and Infrastructure Management)	Housing policy, Housing safety net policy, Housing market trend analysis, Housing planning for the elderly and child-care household, Management of housing estates, Housing refurbishment.

Field of Research	Faculty	Detailed Description of Research Field
Professor of Cooperative Graduate School	MATSUHASHI, Keisuke (National Institute for Environmental Studies)	Integrated planning of sustainable region and transport, Public involvement.
	MENO, Fumitake (Building Research Institute)	Housing policy in collaboration with welfare, Housing supply and support by NPOs, Disaster reconstruction of houses and areas, Urban and community planning by residents.
	YAMANO, Hiroya (National Institute for Environmental Studies)	Spatio-temporal dynamics of environment and ecosystems based on fieldwork and remote sensing, Biodiversity and ecosystem conservation
	ISHII, Norimitsu (National Institute for Land and Infrastructure Management)	Evaluation and visualization of urban spatial structure, Urban and Regional management, Mathematical model of urban disaster mitigation.
	ONISHI, Masaki (National Institute of Advanced Industrial Science and Technology)	Computer Vision, Pattern Recognition, Human Behavior Recognition, Big data analysis, Visualization

(Note)

The faculty member marked "★" will conduct research guidance with the support of the faculty member without the "★" mark.

Applicants cannot choose faculty members written in square brackets as a prospective supervisor directly, but, can choose them with the cooperation of faculty members who are not written in square brackets.

Applicants have to contact a prospective supervisor (a faculty member from whom you wish to receive academic instruction) and obtain his/her consent to your application in advance.

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Web: <http://www.sk.tsukuba.ac.jp/PPS/en/>

### Master's Program in Service Engineering

Field of Research	Faculty	Detailed Description of Research Field
	AKIYAMA, Eizo	Evolutionary game theory, Dynamical systems theory, Agent-based simulation.
	ARITA, Tomokazu	Industrial location, Agglomeration economies, Urban and regional policies, City planning systems.
	OHSAWA, Yoshiaki	Management for local government, Infrastructure maintenance, Regional Revitalization
	OKAMOTO, Naohisa	Transportation planning, Transport Policy, Tourism Science, Travel Behavior Analysis and Demand Forecasting, Analysis of Transportation Big Data
	KAWASHIMA, Hiroichi	Open data, Public-sector innovation, Local government information strategy
	SHIGENO, Maiko	Mathematical programming, combinatorial optimization, Network flow theory, Algorithm engineering.
	SUZUKI, Tsutomu	Urban Analysis, Facility Planning, Location Analysis, Environmental Modeling, Geographical Information Science.
	TANIGUCHI, Mamoru	Sustainable urban and regional planning, Management of urban layout, National land-use plan, Social capital.
	ZHANG, Yongbing	Resource allocation and management in parallel/distributed systems, mobile and pervasive computing, wavelength routing in optical networks.
	TSUTSUMI, Morito	Property valuation, Local government accounting, Public Facilities Management, Analysis on business transaction
	FUJIKAWA, Masaki	History of Urban Built Environment in Japan and Other Asian Countries, Conservation of Traditional Buildings in Urban and Rural Area
	MIAO, Ying	Combinatorics for Coding Theory and Information Security
	YOSHISE, Akiko	Mathematical optimization and its applications, Algorithms for solving conic optimization problems
	WATANABE, Shun	Architectural and urban planning toward the highly-networked information society, Development of intelligent information systems for their planning and design.
	AMEMIYA, Mamoru	Environmental design and community planning for crime prevention, Planning and management of residential environment in depopulating society
	ANDO, Hiroyasu	Mathematical modeling of bio-inspired complex networks and its application to social systems
	UEICHI, Hiedo	Individual differences and situations on decision-making, Effect of emotion on decision-making.
	OKUBO, Masakatsu	Empirical study on intertemporal consumption decisions, Application of time series econometrics.

Field of Research	Faculty	Detailed Description of Research Field
	OTA, Mitsuru	Selforganization of spatial economic system and structural change.
	OKADA, Yukihiro	Management accounting in service organizations. Service target costing.
	OKUSHIMA, Shinichiro	Environmental economics, Energy economics, Policy analysis, Environmental ethics, Poverty analysis, Inequality analysis, Welfare analysis.
	SAKUDO, Mari	Applied Econometrics
	SAWA, Ryoji	Evolutionary game theory, Cooperative games, Behavioral game theory.
	TAKANO, Yuichi	Mathematical optimization, Financial engineering, Machine learning
	TURNBULL, Stephen John	Internet economy (equipment and system organization; electronic commerce business), Economic environment of open source software.
	HACHIMORI, Masahiro	Discrete Mathematics, Combinatorics, Analysis of discrete structures
	HARADA, Nobuyuki	Theoretical and empirical analysis of SME dynamics and policies, Econometric analysis of Japanese economy and industry.
	FUJII, Sayaka	Community Business Utilizing Local Resources and Vitalizing Neighborhoods, Public Private Partnership in Urban Developments, Revitalization of Housing Estates.
	PHUNG-DUC, Tuan	Applied Probability, Stochastic Models, Performance Evaluation, Queueing Theory, Operations Research
	MATSUBARA, Kosuke	Urban planning, planning history, Urban planning in Asia and Africa.
	WADA, Kentaro	Traffic management and control, Transportation network, Traffic flow, Intelligent transportation systems
	【ARIMA, Sumika】	Supply chain management, Logistics.
	【ANNO, Hidekazu】	Matching market design, Game theory, Microeconomics
	【IGARASHI, Gaku】	Nonparametric density estimation
	【USHIJIMA, Koichi】	Empirical analysis of investment in child human capital, residential choice, health investment, educational investment.
	【ORIHARA, Masanori】	Empirical analysis of corporate finance
	【KANAZAWA, Kiyoshi】	Financial data analysis, market microstructure, stochastic processes, econophysics
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	【TRAN, Lam Anh Duong】	International Economics, Economic Growth, Income Distribution

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## Master's Program in Risk and Resilience Engineering

Field of Research	Faculty	Detailed Description of Research Field
Foundations of Risk Analysis and Resilience Assessment	ITOH Makoto	Systems safety: mutual trust and cooperation in human-machine systems, cognition, inference, and decision making under uncertainty or gray zone, perception and acceptance of risk.
	SATO-ILIC Mika	Multi-dimensional data analysis, statistics: latent structure models, fuzzy clustering, and multi-way data theory.
	ENDO Yasunori	Fundamentals and applications of soft computing techniques underlying artificial intelligence: machine learning including clustering and deep learning, and fuzzy inference and fuzzy control
	FURUKAWA Hiroshi	Cognitive interface design: human interface to extend cognitive capability, navigation support, learning support, mental models.
	【SAITO Yuichi】	Human-machine systems, cognitive systems science, systems safety and control, human-machine interface and interaction, and risk prediction and avoidance based on data analysis.
	【TAKAYASU Akitoshi】	Verification methods for nonlinear mathematical models including mathematical models for environmental problems, Numerical analysis, Verified numerical computation.
	【MISAKI Hiroumi】	Statistics, econometrics and quantitative finance: high-frequency data analysis, volatility and cointegration of asset prices, financial risk management, state space models, and particle filters.
	※UCHIDA Nobuyuki (Japan Automobile Research Institute)	Human error analysis and traffic accident prevention, Safety evaluation for automated driving systems
	※ABE Genya (Japan Automobile Research Institute)	Vehicle safety: interactions between human and advanced driver assistance systems, trust in automated driving systems, recognition, decision and implementation while driving
	※SATO Toshihisa (National Institute of Advanced Industrial Science and Technology)	Science of driving pleasure, Cognitive and behavior characteristics of elderly drivers, and Ergonomic experiments of drivers with automated and advanced driver assistance systems
	※OKABE Kohei (National Institute of Occupational Safety and Health, Japan)	Risk Management: labor accident, safety design, collaborate robot, nursing care equipment



Field of Research	Faculty	Detailed Description of Research Field
Foundations of Risk Analysis and Resilience Assessment	※SANAMI Shou (Dai Nippon Printing Co., Ltd.)	Machine Learning: Understanding and dealing with risks in application to actual problems.
Information Systems and Security	OMOTE Kazumasa	Information security: risk assessment for cyber attacks, security for blockchain and cryptocurrency, malware countermeasure, cloud security, IoT security, privacy-preserving data analysis.
	KATAGISHI Kazuki	Wisdom information communication systems: Hyperfunctions-based “Fluency Information Theory”, New Generation Network, Network security technologies.
	NISHIDE Takashi	Information security: design of public key encryption, cryptographic protocol, privacy-enhancing technology, method for securing information systems.
	※SHIMAOKA Masaki (SECOM)	Information Security and Trust: PKI application(e-signature, authentication), Trust model of PKI, Social Trust of Information Infrastructure, ethics for security research
Urban Resilience and Disaster Management	SUZUKI Tsutomu	Urban Analysis, Facility Planning, Location Analysis, Environmental Modeling, Geographical Information Science.
	TANIGUCHI Ayako	Attitude and behavioral modification concerning Urban transport planning, Risk communication, Mobility management, Social acceptance of Autonomous Vehicles.
	UMEMOTO Michitaka	Countermeasures against infrequent risk in urban and regional area: Evacuation planning, Disaster information, Regionals' countermeasures against nuclear disaster, Perception of disaster risk.
	【KINOSHITA Yohei】	Meteorological application of space geodetic tools (e.g. SAR and GNSS), Satellite remote sensing, MaaS application
	※FUJIWARA Hiroyuki (National Research Institute for Earth Science and Disaster Resilience)	Seismic hazard and risk assessment, Numerical simulation, Strong motion prediction, Subsurface structure Modeling, Real-time earthquake damage estimation system
	※SAKAI Naoki (National Research Institute for Earth Science and Disaster Resilience)	Geotechnical engineering, Landslides, Heavy rainfall-induced disaster, Model tests, IoT/AI, Satellite and remote sensing data, Disaster risk, TDA(Trans-disciplinary approach)

Field of Research	Faculty	Detailed Description of Research Field
Urban Resilience and Disaster Management	※USUDA Yuichiro (National Research Institute for Earth Science and Disaster Resilience)	Disaster Informatics, Disaster Dynamics, Cyber-Physical System for Disaster Resilience, Risk Communication, Decision Support
Environmental and Energy Systems	OKAJIMA Keiichi	New energy systems: LCA evaluation and reliability analysis of energy systems with new energy devices such as photovoltaic cell and fuel cell systems.
	HATANO Yuko	Fate and transport of pollutants in the natural environment. Remediation; adsorption; molecular dynamics simulations.
	SHOJI Gaku	Structural safety and system reliability assessment for lifeline infrastructures such as transportation networks, utilities, and communication networks in view of seismic and tsunami hazards, and mathematical modeling of public cognition for functional losses of critical infrastructures during an event.
	【AKIMOTO Yutaro】	Non-invasive measurement and evaluation methods of fuel cell, Resilience power system, Energy analysis of new generation societies and vehicles
	【SUZUKI Kengo】	Multi-agent simulation, gaming, risk communication, and political scenario analysis related with energy and environmental systems
	※YAMAMOTO Hiromi (Central Research Institute of Electric Power Industry)	Low carbon energy systems analysis, Evaluation of renewables and hydrogen technologies in energy systems
	※KATO Kazuhiko (National Institute of Advanced Industrial Science and Technology)	Safety Management Measures and Evaluation Methods for Photovoltaic Power Plants
	※TAHARA Kiyotaka (National Institute of Advanced Industrial Science and Technology)	Development of sustainability assessment based on life cycle thinking, inventory database, technology assessment

※: Professor (Collaborative Graduate School Program)

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## Master's Program in Computer Science

Field of Research	Faculty	Detailed Description of Research Field
Information Mathematics and Modeling	KAWABE Tohru	Control design: Theory and applied research in Biologically Inspired Technology, Computational Intelligence based Control, Robust Control, etc.
	KUNO Takahito	Mathematical optimization: Numerical algorithms for globally solving nonconvex optimization problems.
	SAKURAI Tetsuya	Computational Mathematics, Numerical Mathematics for Computers, Parallel Computing Algorithms for Supercomputers, Algorithms for Large-scale Data Analysis, Computational Science, Mathematical Software.
	TOKUNAGA Ryuji	Chaos, fractals and bifurcation theory. Computer amusement oriented elementary technologies.
	AIHARA Ikkyu	Mathematical modeling of animal behavior and its applications: Nonlinear dynamics, Field recordings of animal calls, Sensor networks.
	IMAKURA Akira	Numerical analysis: Numerical algorithms for solving linear Systems , eigenvalue problems and matrix computation-based machine learning.
	CAI Dong Sheng	Multimedia using artificial life theory. High performance computing and parallel computing for space simulation. Imaging using chaos and fractals.
	SANO Yoshio	Discrete Mathematics, Graph Theory, Combinatorics
	HIRATA Yoshito	Nonlinear time series analysis: theory and its applications.
	【TOKUDA Keita】	Dynamical systems, Neural networks, Chaos, Machine learning, Learning and memory, Hippocampus, Biomarker, Central nervous system disease.
	【FUTAMURA Yasunori】	Numerical analysis, High performance parallel algorithm, Parallel solver for large-scale linear systems and eigenvalue problems, Parallel numerical software.
	【MORIKUNI Keiichi】	Numerical linear algebra, large sparse matrix computations, preconditioning algorithms for Krylov subspace methods, least squares problems, singular linear systems.
	【BAKKU Ranjith Kumar】	Bioinformatics approaches for Omics data and Mass-Spectrometry, Biological networks, Biochemical regulatory mechanisms and Computational Functional genomics
Intelligent Software	OHYA Akihisa	Intelligent robots and sensing: Mobile robots working in humans' daily life environment, real world sensory information processing, networked robotics, cooperative multiple mobile robots.
	KAMEYAMA Yuki Yoshi	Programming languages and symbolic logic: type system, metaprogramming, programming logic, program verification.

Field of Research	Faculty	Detailed Description of Research Field
Intelligent Software	SHIZUKI Buntarou	Human-computer interaction: Visual programming and interaction techniques for end users.
	MISUE Kazuo	Information visualization: visual interface, visual analytics, network visualization, graph drawing.
	UNNO Hiroshi	Program verification : model checking, type systems, program analysis, automated theorem proving.
	TAKAHASHI Shin	User interface software, Ubiquitous computing, Computer-supported cooperative work (CSCW).
	【MIZUTANI Tetsuya】	Program theory and musical informatics: Logical foundation of verification and analysis of realtime intellectual program systems and musical information.
	【VASILACHE Simona】	Software engineering, software development process, human computer interaction; intercultural communication, global software engineering
	【KAWAGUCHI Ikkaku】	Human Computer Interaction, Remote Communication Support, Communication Robot.
	【YOROZU Ayanori】	Intelligent robot for human-harmonious collaboration, Task and motion planning, Human and environmental sensing, Field robotics.
Software System	AMAGASA Toshiyuki	Database system, data engineering: XML/RDF Database, social media, and scientific database.
	KATO Kazuhiko	System software: Distributed system, cloud computing, operating system, cyber-physical system, software security
	ABE Hirotake	System Software, Distributed Systems, Computer Security, Computer Network.
	OYAMA Yoshihiro	Computer security, system software, operating systems, virtualization.
	OKA Mizuki	Social Media, Web Science, Artificial Life.
	SHINJO Yasushi	Operating systems, distributed systems, virtualization, privacy protection, decentralized social networking services.
	SHIOKAWA Hiroaki	Database systems and data engineering
	HASEBE Koji	Multi-agent systems: Game theory, Mathematical logic, Formal methods, Autonomous distributed systems.
	MAEDA Atusi	Implementation of programming languages, garbage collection, runtime system, resource management.
	MACHIDA Fumio	System dependability, dependability evaluation, stochastic models, system design optimization.
	【CHEN Hanxiong】	Database system, knowledge-base system, e-education, information retrieval, knowledge discovery and data mining.
	【TSUGAWA Sho】	Network mining, Social network analysis, Computational social science

Field of Research	Faculty	Detailed Description of Research Field
Software System	【HAYASE Yasuhiro】	Software Engineering : Program comprehension, software repository mining, software maintenance.
	【HORIE Kazumasa】	Machine Learning, Neural Network, Pattern Recognition, Biological Signal Processing.
Computer Architecture	TAKAHASHI Daisuke	High-performance computing: High-performance numerical algorithms on parallel computers and performance evaluation.
	TATEBE Osamu	Parallel and distributed system software, data-intensive computing, and high performance computing.
	NUKADA Akira	High Performance Computing, Performance Optimization, GPU Computing
	BOKU Taisuke	Massively parallel and high performance computing systems: Massively parallel computer architecture, cluster computing and its system software, high performance computing system including GPU/FPGA accelerators.
	YASUNAGA Moritoshi	VLSI engineering: VLSI design and implementation of parallel and distributed systems and evolutionary systems.
	KIMURA Shigetomo	Information communication engineering: Process algebra, network protocols and performance evaluation of communication systems.
	SATO Akira	Design and operation technology for academic network systems, information systems and computing systems.
	SHOUNO Kazuhiro	Analog integrated circuit and circuit theory: Highly linearized CMOS transconductors and complex filters.
	YAMAGIWA Shinichi	Algorithms, Software/Hardware and Applications of Embedded System, Data Compression, Distributed System, Computer Architecture and Sports Engineering
	YAMAGUCHI Yoshiki	Reconfigurable architecture, computing, and highly efficient systems with high performance and low-power consumption applied to AI, encryption, IoT, and scientific applications.
	【TOMIYASU Hiroshi】	Making better use of significantly progressing microprocessors for parallel computer architecture after Age of vector supercomputers and massively parallel computers.
	【KANAZAWA Kenji】	VLSI Engineering, Reconfigurable computing, Accelerator for hard computation problems using reconfigurable LSI.
	【KOBAYASHI Ryohei】	FPGA applications, Reconfigurable Computing System, High-speed RTL Simulation.

Field of Research	Faculty	Detailed Description of Research Field
Computer Architecture	【SANNOMIYA Shuji】	Autonomous, parallel, and distributed processor architecture: Research on data-driven chip-multi-processor based on self-timed elastic pipeline.
	【TADANO Hiroto】	Numerical analysis: Numerical algorithms for large scale linear systems. Parallel computing for eigenvalue problems.
	【FUJITA Norihisa】	High Performance Computing, Accelerator, GPU Computing, Reconfigurable Computing, High Performance Interconnection
Media Engineering	KAMEYAMA Keisuke	Learning, adaptive information processing, signal / image encoding, and applications to retrieval and restoration.
	KUDO Hiroyuki	Image processing and medical imaging : Image and video processing, imaging science, medical imaging (CT,PET,MRI) and computer-aided diagnosis, machine learning and artificial intelligence,intelligent image sensing, music and sound processing, mathematics of inverse problems.
	○MAKINO Shoji	Acoustic signal processing, Music signal processing, Computational auditory scene analysis: Blind source separation, Acoustic echo cancellation, Segregation, processing, synthesis, 3D reproduction, and retrieval of music, Technical realization of the cocktail party effect.
	MITANI Jun	CG and CAD : Geometric modeling, Human computer interface, Computational origami.
	KANAMORI Yoshihiro	Computer graphics (CG), rendering, deep learning, image editing techniques, CG applications for industry
	SUZUKI Taizo	Multi-perception media processing: Signal processing, image/video processing, compression, perceptual encryption, information hiding, sparse representation, filter banks/wavelets.
	TAKIZAWA Hotaka	Intelligent image processing: medical image recognition, computer-aided diagnosis, computer vision, 3-D object recognition.
	YAMADA Takeshi	Speech and acoustic information processing: speech recognition, sound scene understanding, multi-channel signal processing, media quality assessment, and e-learning.
	【AOTO Takahito】	Computational Photography, Computer Vision
	【ENDO Yuki】	Computer graphics, image synthesis and editing techniques, image recognition, data mining, machine learning, deep learning
Intelligent System	KUNIIHIRO Noboru	Cryptography, Information Security, Quantum Computation, Cryptanalysis, Cryptographic Protocol.

Field of Research	Faculty	Detailed Description of Research Field
Intelligent System	SAKAI Ko	Computational vision: representation of shape, perception of 3D structure, figure-ground segregation, cortical representation, cognitive neuroscience, and psychophysics.
	SAKUMA Jun	Security and Privacy for Artificial Intelligence: Machine Learning, Artificial Intelligence, Data Privacy, Applied Cryptography.
	FUKUI Kazuhiro	Pattern recognition and computer vision: Face recognition, 3D object recognition, human sensing, robot vision.
	YAMAMOTO Mikio	Natural Language Processing on the Web using statistical methods: Statistical machine translation and Web documents processing such as sentiment analysis.
	AKIMOTO Yohei	Black Box Optimization and its Applications: probabilistic model based optimization, evolutionary computation, hyper-parameter optimization in machine learning, reinforcement learning, application of information geometry to algorithm design.
	IGARASHI Yasuhiko	Machine learning, Multivariate analysis, Sparse modeling, Data-driven science, Measurement informatics, Materials informatics
	INUI Takashi	Natural Language Processing: Information extraction and knowledge acquisition from natural language data, opinion mining, and sentiment analysis.
	BABA Yukino	Human computation, Crowdsourcing, Collective intelligence, Machine learning, Data mining.
	【ARANHA Claus】	Research on Evolutionary Computation: Optimization, Program Generation, Procedural Generation, Intelligent Agents and Artificial Life.
	【IIZUKA Satoshi】	Computer graphics, image processing, image editing, computer vision, machine learning
Professors of Cooperative Graduate School	【FUKUCHI Kazuto】	Mathematical statistics and machine learning: statistical inference, statistical learning, fairness and privacy in machine learning, data mining
	【YE Xiucui】	Feature selection for high dimensional data, Clustering, Machine learning, Data analysis, Classification, Network computing.
	INO Shuichi (National Institute of Advanced Industrial Science and Technology)	Human machine interface, soft actuator technology, information accessibility, haptic interface design, healthcare and quality of life technology, rehabilitation engineering.



Field of Research	Faculty	Detailed Description of Research Field
Professors of Cooperative Graduate School	SATO Mitsuhsa (Institute of Physical and Chemical Research (RIKEN))	High-performance parallel computing systems : Cluster computing, parallel programming systems such as OpenMP and HPF, benchmarking and performance evaluation of parallel computing systems, parallel and distributed computing on Grid
	SATOH Yutaka (National Institute of Advanced Industrial Science and Technology)	Ubiquitous vision, Robot vision, Stereo omnidirectional system (SOS).
	NAKADA Hidemoto (National Institute of Advanced Industrial Science and Technology)	Parallel computing, distributed computing, grid, cloud, machine learning.
	TANIMURA Yusuke (National Institute of Advanced Industrial Science and Technology)	Parallel and distributed storage. Large-scale data processing. Cloud computing. Grid computing. E-science applications.
	NAKATA Ayako (National Institute for Materials Science)	Application of Computational Mathematics and Machine Learning to Materials Science (Quantum chemistry, First-principles simulation).

○: Appointed until 31 March 2022

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## Master's Program in Intelligent and Mechanical Interaction Systems

Field of Research	Faculty	Detailed Description of Research Field
System Design	MARUYAMA Tsutomu	Reconfigurable Computer Systems, Adaptive Complex System.
	MORITA Masahiko	Brain-like Computing, Neural Networks, Modeling Brain Functions.
	KAWASAKI Masahiro	Neuroscience, Cognitive Science, Psychology, Communication, Signal Processing.
	NOBUHARA Hajime	Computational Intelligence, Multimedia Processing, Advanced Sensing by UAV.
	HASEGAWA Manabu	System Modeling.
	NIIZATO Takayuki	Emergence, Learning and Collective Behavior.
	【KAWAI Shin】	Control Theory, Discretization, Descriptor System
	【SHIBUYA Takeshi】	Machine Learning, Reinforcement Learning, Multi-Agent System including Hardware Components.
Man-Machine System and Robotics	AIYAMA Yasumichi	Human-like Dexterous Robot Manipulation, Advanced Industrial Robot.
	IWATA Hiroo	Virtual Reality.
	KURODA Yoshihiro	Interactive Biological Media, Medical Artificial Intelligence, Medical System.
	SANKAI Yoshiyuki	Cybernetics: New Academic Frontier fusing Humans, Robots and Information Systems, Innovative Cybernetic Systems in Brain-nerve/Physical/Physiological/Life field, Human Big-data & AI (artificial intelligence) processing, Biomedical Technology.
	SUZUKI Kenji	Artificial Intelligence, Autonomous Humanoid Robot, Human Assistive Technology, Music & Sound Media Technology, Kansei Research.
	TSUBOUCHI Takashi	Self-Contained Autonomous Mobile Robots, Outdoor Autonomous Mobile Vehicles.
	NAKAUCHI Yasushi	Human-Robot Interaction, Intelligent Environments, Sensor Network.
	HOSHINO Kiyoshi	Biomedical Measurement and Analysis, Mathematical Models for Biological System, Brain Science.
	MOCHIYAMA Hiromi	Soft Robotics, Haptics Technology.
	YANO Hiroaki	Virtual Reality, Haptic Interface, Locomotion Interface, Assistive Technology.
	IZAWA Jun	Computational Neuroscience, Motor Control and Learning, Neural Decoding, VR Rehabilitation Robot, Stroke Simulator, Decision Making.

Field of Research	Faculty	Detailed Description of Research Field
Man-Machine System and Robotics	KAWAMOTO Hiroaki	Integration of Human and Robot, Biological Control Systems, Biological Motion & Physiology Analysis, Robot Therapy, Robot Safety.
	TANAKA Fumihide	Social Robotics, Feel Safe AI, Feel Safe Technologies, Human-Robot Interaction, Education Support, Development and Learning, Active Seniors.
	【IIO Takamasa】	Social cognitive engineering, Social robotics, Human robot interaction.
	【OSAWA Hirotaka】	Human-Agent Interaction, Artificial Intelligence, Human Interface, Communication Game, Engineering Ethics, Technology in Science Fiction.
	【PUENTES Sandra】	Cybernetics, Clinical Gait Analysis, Motor Disturbances, Wearable Robot.
	【ZEMPO Keiichi】	Augmentation of Human Perception, Sense Substitution, Disability Support, Human Augmentation Engineering, Big Data Utilization and Integration on Sensor Signals.
	【HASHIMOTO Yuki】	Tactile Interface, Tactile Perception, Interactive Technique, Virtual Reality, Telexistence.
	【Hachisu Taku】	Haptics, Touch, Wearable device
	【HIROKAWA Masakazu】	Artificial Intelligence, Human-Machine Cooperation, Robotics for Developmental Support, Sports Engineering.
Instrumentation and Control Engineering	YABUNO Hiroshi	Nonlinear Mechanical Systems, Nonlinear Control of Nano-Micro Machines, Bifurcation Control and its Applications.
	SAKAINO Sho	Mechatronics, Haptics, Manipulation
	DATE Hisashi	Model Predictive Control for Nonlinear Systems, Autonomous Mobile Robot, Self-Driving System, Snake-Like Robot and Mechanical System Design.
	WAKATSUKI Naoto	Simulation based Visualization, Vibration Sensors and Actuators, Acoustical Engineering, Musical Acoustics, Inverse Problems.
	【MAEDA Yuka】	Non-invasive Measurement by Photoplethysmography, Developing Wearable Devices for Home Healthcare System.
	【YAMAGUCHI Tomoyuki】	Instrumentation Engineering, Robotics, Robot's Eye, Human Interface, Image Processing.
	【Nguyen Van Triet】	Digital control, electrical power system, smart power router

Field of Research	Faculty	Detailed Description of Research Field
Communication System	UTSURO Takehito	Natural Language Processing, Web Mining, Information Retrieval, Human-Machine Communication by Speech and Language, Understanding and Creating Entertainment and Educational Contents, Language Processing by Deep Learning, Artificial Intelligence.
	KAMEDA Yoshinari	Massive Sensing, Intelligent Image Understanding / Processing, Multimedia Understanding, Model based Vision, Mixed Reality.
	KITAHARA Itaru	Real World Imaging, Free-Viewpoint Video, Mixed-Reality, Augmented Reality.
	KOGA Hiroki	Information Theory, Information Security.
	EBIHARA Tadashi	Communication and Information Engineering, Oceanic Engineering, Network Engineering.
	KAKEYA Hideki	3D Imaging, Information Display, Geometric Optics, Computer Aided Surgery, Media Technology, Natural Language Processing.
	HOSHINO Junichi	Entertainment Computing, Game Technologies, Storytelling Technologies.
	【SHISHIDO Hidehiko】	Computer Vision, Image Media Processing, Sports Science
Professor of Cooperative Graduate School	KANEHIRO Fumio (National Institute of Advanced Industrial Science and Technology)	Mechanism, Motion Planning, Motion Control, Environment/Object measurement and recognition, simulation of Humanoid robots.
	KURATA Takeshi (National Institute of Advanced Industrial Science and Technology)	IoH (Internet of Humans), Indoor Positioning, Computer Supported Smart Work, Applied Service Engineering.
	GOTO Masataka (National Institute of Advanced Industrial Science and Technology)	Music Information Processing, Singing Information Processing, Media Interaction.

Field of Research	Faculty	Detailed Description of Research Field
Professor of Cooperative Graduate School	SAKANASHI Hidenori (National Institute of Advanced Industrial Science and Technology)	Medical Image Processing, Computer-Aided Diagnosis (CAD), Clinical Decision Support, Pattern Recognition, Machine Learning.
	MURAKAWA Masahiro (National Institute of Advanced Industrial Science and Technology)	Machine Learning, Adaptive Algorithm, Vibration and Acoustic Analysis, and the Applications to Structural Health Monitoring.
	YODA Ikushi (National Institute of Advanced Industrial Science and Technology)	Intelligent Human Sensing by Computer Vision and Pattern Recognition, Gesture Interface, Video Surveillance, Media Art.
	KAMIMURA Akiya (National Institute of Advanced Industrial Science and Technology)	Modular Robot System, Decentralized Ad Hoc Wireless Network, Self-Organization System, and Infrastructure and Disaster Investigation Robot System, AI Applications.
	KONDOH Shinsuke (National Institute of Advanced Industrial Science and Technology)	Development of Design Tools and Methodologies for Sustainable Design, Life Cycle Design, and Environmentally Conscious Design.
	SAGAWA Ryusuke (National Institute of Advanced Industrial Science and Technology)	Computer Vision, Computational Imaging, 3D Reconstruction, Motion Analysis, Human Behavior Analysis.
	HAMASAKI Masahiro (National Institute of Advanced Industrial Science and Technology)	Online Community System, Social Media Analysis, Web Mining, Semantic Web.
	MATSUMOTO Yoshio (National Institute of Advanced Industrial Science and Technology)	Service Robotics (Assistive Robotics and Rehabilitation Robotics), Evaluation, Real-Time Vision, Human-Robot Interaction, Android.
Visiting Associate Professor	KUMANO Shiro	Affective Computing.

(Note)

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Applicants have to contact a prospective supervisor (a faculty member from whom you wish to receive academic instruction) and obtain his/her consent to your application in advance.

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## Master's Program in Engineering Mechanics and Energy

Field of Research	Faculty	Detailed Description of Research Field
Solid and Structural Mechanics	ISOBE Daigoro	Numerical and experimental studies on impact and collapse problems of structures, Development of computer simulation techniques aiming disaster prevention and mitigation, Application of computational mechanics and structural engineering essence to robotics.
	KANAKUBO Toshiyuki	Studies on structural performance of seismic, isolated or controlled structures. Development of high performance structural materials and new techniques for buildings and infrastructures.
	OKAWAI Masamichi	Modeling and experiments for deformation and strength of fiberreinforced composite materials in aerospace structures and for inelastic and damage behavior of refractory metals in hightemperature components.
	SHOJI Gaku	Earthquake engineering and structural dynamics. Clarification on nonlinear seismic response of infrastructure subjected to extreme ground motions, development of seismic retrofit technologies, structural reliability assessment
	MATSUSHIMA Takashi	Mechanics of granular materials. Mechanics of liquefaction and debris flow. Mechanics of long-term geological formation. Mechanics of planetary surface processes.
	ENAMI Kazuhiro	Studies on three-dimensional shape measurement of various objects
	KAMEDA Toshihiro	Innovative engineering with computational mechanics handling high-power laser. Smart society realization using LPWA and data platform.
	NISHIO Mayuko	Structural engineering, Applied mechanics. Structural health monitoring, inverse analysis, data assimilation, model V&V for the maintenance and operation, and the disaster reduction of infrastructures

Field of Research	Faculty	Detailed Description of Research Field
Solid and Structural Mechanics	MATSUDA Akihiro	Study on development of design tool for sportswear and sports equipment using computational mechanics. Aging estimation of rubberlike material for electric power industry.
	MATSUDA Tetsuya	Study of multi-scale simulation techniques. Property evaluation of solid materials that exhibit microscopic internal structures using homogenization theory / finite element method based computational mechanics.
	YASOJIMA Akira	Studies on performance evaluation and seismic evaluation technology of reinforced concrete buildings with focuses on maintenance and life extension
	ASAI Takehiko	Smart structural vibration control and self-powered control systems with energy harvesting technologies.
	【SHINTAKU Yuichi】	Numerical and experimental study on fracture mechanism of materials, development of crack propagation analysis using enhanced finite element method (FEM) such as finite cover method and s-version FEM, and strength evaluation on engineering product by its application.
	【MITSUME Naoto】	Development of coupled analysis systems and methods for complicated/complex phenomena, Applications to real-world problems such as tsunami-resilient design of structures
	【MORITA Naoki】	Development of analysis systems and parallel computing libraries for numerical simulation. A study on the strength evaluation of structures using multi-scale simulation.
	【YAMAMOTO Kyosuke】	Studies on “Partial Safety Factor Method” , “Efficiency of Updraft Tower Power Generator” and “Structure Health Monitoring based on Vibration Analysis” for civil structures.
Fluid and Environmental Engineering	KYOTOH Harumichi	Micro-bubble generating devise; Curtain coating; Pulsation suppression of diaphragm pump



Field of Research	Faculty	Detailed Description of Research Field
Fluid and Environmental Engineering	TAKEWAKA Satoshi	Field survey, numerical computations and remote sensing on coastal environments.
	SHIRAKAWA Naoki	River basin management with engineering and socioeconomic approaches. Environmental flow, environmental economics, decision making process.
	DAIRAKU Koji	Regional climate and water cycle modeling, Environmental disaster resilience (Hydrometeorological hazard and risk information)
	【KANAGAWA Tetsuya】	Physico-mathematical analyses on basic fluid physics: Bubble dynamics and Nonlinear thermo-acoustics.
Energy and Electrical Engineering	ISHIDA Masayoshi	Development of high voltage insulation technique at high temperatures and high output generation systems using fuel cells are being studied to improve efficiency on energy conversion and transmission, and also ultra long HVDC.
	NISHIOKA Makihito	Based on reactive gasdynamics and aerothermochemistry, stabilities of fundamental laminar flames, formation mechanisms and reduction methods of pollutants such as NOx in flames are studied.
	MONJI Hideaki	Basic study and its application on dispersed two-phase flow; Drag force acting on a car in a line arrangement, Bubbly flow.
	AKI Hirohisa	Power and energy systems engineering: studies on demand-side oriented energy systems.
	KANEKO Akiko	Research on flow phenomena of various multiphase flows with a view to energy and environmental issues.
	FUJINO Takayasu	Research on plasma and magnetohydrodynamic technologies for power engineering and aerospace engineering.
	YOKOTA Shigeru	Advanced space propulsion systems, such as electric propulsion or laser propulsion.
	【SHEN Biao】	Study of effects of surface wettability on boiling heat transfer phenomena
	【SHIMAMURA Kohei】	Aerospace and aeronautical engineering in terms of advanced energy technology: 1.Space propulsion (Laser propulsion) 2.Wireless power transmission for a flight object via magnetic coupling resonance.
	【TAKAHASHI Toru】	Research and development on predictive design techniques for power conversion circuits.

Field of Research	Faculty	Detailed Description of Research Field
Professors of Cooperative Graduate School	ZHOU Haoshen (National Institute of Advanced Industrial Science and Technology)	Research on electrode active materials and electrolytes for energy storage technology.
	SUGITA Hiroyuki (Japan Aerospace Exploration Agency)	Research on active thermal control devices and efficient space cryocoolers for innovative spacecrafts.
	HARADA Yoshihisa (National Institute of Advanced Industrial Science and Technology)	Research and development of materials reliability performance based on damage evaluation for structural and processing components such as transportation, industrial machinery, and etc.
	MATSUMOTO Satoshi (Japan Aerospace Exploration Agency)	Study on thermo-fluid phenomena utilizing the International Space Station, Non-linear dynamics of levitating drop.
	YOSHIDA Hiroyuki (Japan Atomic Energy Agency)	Research on evaluation of multi-phase flow behavior for improvement of nuclear reactor safety
	SAKAKITA Hajime (National Institute of Advanced Industrial Science and Technology)	Research on medical, aerospace, energy and environmental applications using plasma technologies.
	SATO Hiroyuki (Japan Atomic Energy Agency)	Researches on High Temperature Gas-cooled Reactor hydrogen electricity cogeneration systems
	DENDA Masatoshi (The Public Works Research Institute)	Field survey, remote sensing analyses and numerical simulations on problems of river environments.
	MIZUTANI Tadahito (Japan Aerospace Exploration Agency)	Research on smart structures and structural health monitoring both for spacecraft and space transportation vehicles utilizing precise measurement technologies (e.g. fiber optic sensors).

○: Appointed until 31 March 2022

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