

LIST OF THESIS ADVISORS FOR 2020 ENTRY

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MECHANICAL ENGINEERING

CAO, Wenjing (Assistant Professor)

Research field: Control Theory and Control Engineering

Main theme:

- Generation of automatic merging maneuver of automobile using optimal control method
- Optimal control of automobile powertrain operation mode with traffic condition considered

DZIEMINSKA, Edyta (Associate Professor)

<http://pweb.cc.sophia.ac.jp/edyta/>

Research field: Combustion and Detonation, Shock Waves

Main theme:

- Deflagration-to-Detonation Transition problem
- Numerical simulation of detonation
- Flame propagation and shock waves
- Amphibious aircraft design

HISAMORI, Noriyuki (Professor)

<http://www.me.sophia.ac.jp/~hisamori/>

Research field: Biomaterial Science, Material Science and Engineering

Main theme:

- Bio-functional materials for advanced medical technology
- Metallic biomaterials and Bioactive materials
- Strength and fracture of materials
- New surface modification processes

ICHIYANAGI, Mitsuhisa (Associate Professor)

Research field: Heat Transfer Engineering, Engine System Engineering

Main theme:

- Heat transfer analysis in engine systems
- Experimental analysis of micro-and nano-scale transport phenomena
- Evaluation of heat transfer characteristics in next-generation semiconductor devices
- Development of laser-based measurement technique

NAGASHIMA, Toshio (Professor)

<http://www.strmech.com/nagashima/>

Research field: Computational Mechanics, Structural Engineering

Main theme:

- Meshfree method
- Extended FEM
- Crack propagation simulation

SHEN, Tielong (Professor)

Research field: Control Theory and Applications

Main theme:

- Robust control of nonlinear systems
- Mechanical system control
- Modeling and control of automotive systems

SUZUKI, Takashi (Professor)

Research field: Internal Combustion Engine, Heat Transfer

Main theme:

- Heat flow of SI engine for control
- Energy flow analysis of hybrid engine system

TAKAI, Kenichi (Professor)

<http://www.me.sophia.ac.jp/~takai/>

Research field: Materials Science, Hydrogen Technology

Main theme:

- Hydrogen embrittlement mechanism of bcc, fcc and hcp metals
- Hydrogen trapping characteristic of metals measured by TDS
- Infrastructural material development for hydrogen energy society
- Interaction between hydrogen and lattice defects of metals

TAKEHARA, Shoichiro (Associate Professor)

Research field: Multibody Dynamics

Main theme:

- Motion analysis of Human body
- Motion and control of tethered system
- Design of Personal Mobility

TANAKA, Hidetake (Associate Professor)

Research field: Precision Engineering

Main theme:

- Development of novel machining technique for CFRP / Titanium
- Evaluation for surface texture and forming mechanism of burnishing
- Development of die-less forming technique for sheet metal and CFRTP on the basis of CAD
- Taguchi method for machining and plastic working

TERUMICHI, Yoshiaki (Professor)

Research field: Multibody Dynamics

Main theme:

- Motion analysis of high speed train
- Contact mechanics between rail and wheel
- Pattern formation phenomena due to machine vibration
- Motion and control of tethered system

WATANABE, Mariko (Associate Professor)

Research field: Fluid Engineering

Main theme:

- Multiphase Flow
- Reactive Flow

ZHANG, Yuelin (Assistant Professor)

Research field: Biomechanics

Main theme:

- Mechanism of traumatic brain injury
- Viscoelastic property measurement
- 3D deformation Visualization of biological body using MR/CT images

ELECTRICAL AND ELECTRONICS ENGINEERING

HAYASHI, Hitoshi (Professor)

http://rscdb.cc.sophia.ac.jp/Profiles/73/0007245/prof_e.html

Research field: IoT/AI Networks, Blockchain, Circuits and Electronics

Main theme:

- Fundamental study of RFID and sensor networks
- Design of miniaturized and low-power microwave circuits/wireless systems

KIKUCHI, Akihiko (Professor)

Research field: Semiconductor Engineering, Optoelectronics, Nanotechnology

Main theme:

- Fabrication and device application of III-nitride semiconductor nanostructures
- Growth and device application of organic semiconductor single crystals
- Development and application of electrospray deposition system
- Development of high-performance transparent electrodes based on metal/dielectric multilayer
- Development of novel semiconductor materials and devices

MIYATAKE, Masafumi (Professor)

<http://miyatake.main.jp/>

Research field: Transportation Electrification and Smartification

Main theme:

- Energy-efficient timetabling with less passenger disutility for railway systems
- Energy-efficient design of speed profiles based on optimal control for rail and road vehicles
- Applications of renewable energy and energy storage to transportation systems

NAKAMURA, Kazuya (Associate Professor)

Research field: Applied Superconductivity, Electric Power Application

Main theme:

- Fusion magnet technology
- Accelerator magnet technology
- Advanced cryogenic materials for magnets

NAKAOKA, Toshihiro (Professor)

<http://pweb.sophia.ac.jp/nakaoka/nakaoka.html>

Research field: Nano Electronics, Semiconductor Physics

Main theme:

- Quantum optoelectronic devices
- Single electron / photon devices
- Transport phenomena and optical spectroscopy in semiconductor nanostructures

NOMURA, Ichirou (Professor)

Research field: Semiconductor Engineering, Optoelectronics

Main theme:

- Molecular beam epitaxy of compound semiconductors
- II-VI compound semiconductors and devices
- Visible light emitting diodes and laser diodes

OGAWA, Masakatsu (Professor)

Research field: Smart IoT Systems, Wireless Communication Systems, Network Systems

Main theme:

- Application of wireless LAN and Bluetooth (Object detection, Human activity detection, Location detection)
- Smart IoT system development using various sensors such as acceleration, air pressure.
- Wireless LAN system (Access control, Packet scheduling, Power saving control)

SAKAMOTO, Orié (Associate Professor)

Research field: Power System Engineering

Main theme:

- Analysis and control of power systems
- Modeling of synchronous generators and induction motors
- Stabilizing control of power systems including renewable energy sources

SHIMOMURA, Kazuhiko (Professor)

Research field: Optoelectronics, Photonic Devices, Nano Structure, Semiconductor Crystal Growth

Main theme:

- Photonic Integrated Circuits: Integration of various functional photonic devices
- Optical devices for photonic systems, such as optical switch and modulator, arrayed waveguide grating
- Quantum-dots structure for laser, SOA, switch, and nonlinear photonic devices
- Optical interconnection technology
- Selective area growth using Metal-Organic Vapor Phase Epitaxy for the control of in-plane bandgap of epitaxial layers and integration of photonic devices

TAKAHASHI, Hiroshi (Professor)

<https://sites.google.com/site/sophiatakahashilab/>

http://rscdb.cc.sophia.ac.jp/Profiles/75/0007463/prof_e.html

Research field: High Speed Optical Fiber Communication, Integrated-optic Devices

Main theme:

- Optical signal transmission analysis
- Modulation and demodulation method for high speed transmission
- Planar lightwave circuit and optical waveguide devices
- Optical device based on photonic crystal
- Tera Hertz waveguide circuit

TAKAO, Tomoaki (Professor)

Research field: Electric Energy, Applied Superconductivity

Main theme:

- Superconducting application to renewable energy
- Superconducting magnet technology
- REBCO tapes
- Advanced cryogenic materials for magnets
- Superconducting generator for wind power generation
- Superconducting motor for ship propulsion
- Magnetic levitation system with superconducting bulk
- Some technologies related to superconductivity

TOGASHI, Rie (Assistant Professor)

Research field: Semiconductor Engineering, Crystal Growth

Main theme:

- Growth of III-nitride and oxide semiconductors
- Thermodynamic analysis for growth of semiconductor materials

YAGAI, Tsuyoshi (Professor)

Research field: Superconducting Power Application

Main theme:

- Design DC micro grid with renewable energy resources
- Development of DC power supply system for IT devices
- Development of new energy resource use
- Stability analysis of CIC conductor for large scale magnet

APPLIED CHEMISTRY

FUJITA, Masahiro (Professor)

<http://www.mls.sophia.ac.jp/~polymer/index.html>

Research field: Polymer Chemistry, Organic Chemistry

Main theme:

- Synthesis and characterization of ion conductive polymers
- Development of functional ionic liquids for rechargeable batteries
- Synthesis of organic ionic plastic crystals and their electrochemical properties
- Synthesis of cellulose derivatives by using ionic liquids

HORIKOSHI, Satoshi (Associate Professor)

<http://pweb.cc.sophia.ac.jp/horikosi/>

Research field: Green Chemistry, Energy & Fuel Chemistry

Main theme:

- Environmental protection with photocatalyst
- Organic synthesis in microwave green chemistry
- Hydrogen storage with novel microwave catalyst

RIKUKAWA, Masahiro (Professor)

<http://www.mls.sophia.ac.jp/~polymer/index.html>

Research field: Polymer Chemistry, Nano Science

Main theme:

- Proton conducting polymer electrolytes and fuel cell applications
- Synthesis and applications to medical materials of biodegradable polymers
- Synthesis and applications to solar cells and EL devices of conducting Polymers

SUZUKI, Noriyuki (Professor)

<http://www.mls.sophia.ac.jp/~orgsynth/>

Research field: Synthetic Organic Chemistry, Organometallic Chemistry

Main theme:

- Synthesis of five-membered metallacyclic alkynes and allenes, and study of their reactivity
- Development of environmentally-benign organic reaction processes using amphiphilic polymers

TAKAHASHI, Kazuo (Professor)

<http://sephiroth.mls.sophia.ac.jp/teacher/archives/000039.html>

Research field: Chemical Thermodynamics, Chemical Kinetics, Combustion Chemistry, Environmental Chemistry

Main theme:

- Studies on auto-ignitions of gasolines using high-pressure shock tube and RCM
- Construction of detailed reaction models for knock suppression in super-lean burn engines
- Predictive calculation on reaction paths and their kinetic data by TST and RRKM theories coupling first principle

TAKEOKA, Yuko (Professor)

<http://www.mls.sophia.ac.jp/~polymer/index.html>

Research field: Polymer Chemistry, Organic-inorganic Hybrids, Material Chemistry

Main theme:

- Development of organic-inorganic hybrids for optical devices such as photovoltaic cells
- Electrical and optical properties of polymer materials
- Synthesis and applications to medical materials of biodegradable polymers
- Bio-sensing application using π -conjugated polymers

TANAKA, Kunihiro (Associate Professor)

<http://www.mls.sophia.ac.jp/~tanaka/>

Research field: Applied Physical Chemistry, Plasma Chemistry

Main theme:

- Surface treatment and thin film deposition by atmospheric pressure glow plasma discharge

UCHIDA, Hiroshi (Professor)

<http://pweb.cc.sophia.ac.jp/h-uchida>

Research field: Material Science (Inorganic), Chemical Processing

Main theme:

- Thin film processing using metal-organic precursors
- Pb-free dielectric/ferroelectric materials with large polarization properties
- Material synthesis using supercritical fluid

CHEMISTRY

DANIELACHE, Sebastian Oscar (Associate Professor)

<http://www.seba-ken.com/>

Research field: Atmospheric Chemistry

Main theme:

- Atmospheric modeling of contemporary and Archean atmospheres
- Theoretical calculations of molecular spectral properties
- Spectral measurements of ultraviolet absorption properties
- Application of stable isotopes to atmospheric systems

HASHIMOTO, Takeshi (Associate Professor)

<http://www.mls.sophia.ac.jp/~analysis/>

Research field: Analytical Chemistry, Coordination Chemistry, Supramolecular Chemistry

Main theme:

- Ion and molecule recognition based on metal complexes and cyclodextrin chemistry
- Electrochemical studies for (β -diketonato) ruthenium complexes
- Design of supramolecular chemosensors for molecule, bacteria recognition in water

HAYASHITA, Takashi (Professor)

<http://www.mls.sophia.ac.jp/~analysis/>

Research field: Analytical Chemistry, Supramolecular Chemistry

Main theme:

- Development of novel sensing and separation systems for innovation in chemical analysis
- Design of supramolecular chemosensors for ion and molecule recognition in water
- Studies on synthesis, reaction and characterization of the photo-functional and electro-functional metal complexes for molecular recognition

KIKAWADA, Yoshikazu (Professor)

Research field: Chemical Volcanology, Geochemistry

Main theme:

- Geochemical monitoring of volcanic activity
- Risk assessment of volcanic activity from a geochemical point of view
- Mobility and distribution of trace elements in water-rock interaction

KUZE, Nobuhiko (Professor)

Research field: Physical Chemistry, Molecular Science

Main theme:

- Molecular spectroscopy (rotational and vibrational) in the gas-phase
- Structural determination by gas-electron diffraction
- Computational chemistry

MISAWA, Tomoyo (Assistant Professor)

Research field: Coordination Chemistry

Main theme:

- Syntheses of multi-nuclear transition metal complexes
- Molecular conversion on multi-nuclear complexes in homogeneous systems
- Electrochemical and spectroscopic studies on reactivity of complexes

NAGAO, Hirotaka (Professor)

Research field: Coordination Chemistry, Bioinorganic Chemistry

Main theme:

- Activation and conversion of nitrogen-containing compounds by transition metal complex
- Synthesis of novel transition metal complexes
- Regulation of geometry and reactivity around metal centers

NANBU, Shinkoh (Professor)

http://pweb.cc.sophia.ac.jp/nanbu_lab/index.html

Research field: Theoretical Chemistry

Main theme:

- Theory-Aided Molecular Design
- Quantum Reaction Dynamics

SUZUKI, Yumiko (Associate Professor)

http://www.mls.sophia.ac.jp/~yumiko_suzuki/

Research field: Synthetic Organic Chemistry, Medicinal Chemistry

Main theme:

- Design and Development of New Methodologies in Organocatalysis
- Synthesis of Functional Materials and Bioactive Compounds

USUKI, Toyonobu (Associate Professor)

<http://www.mls.sophia.ac.jp/~usuki/>

Research field: Natural Product Chemistry, Organic Chemistry

Main theme:

- Synthetic and bioorganic studies of plant natural products
- Ionic liquids-mediated extraction and isolation of natural products
- Chemical synthesis of elastin crosslinkers and elucidation of 3D structure of elastin

MATHEMATICS

GOMI, Yasushi (Associate Professor)

<http://pweb.sophia.ac.jp/y-gomi/en/>

Research field: Algebra

Main theme:

- Representation theory of algebraic groups and Hecke algebras

GOTO, Satoshi (Assistant Professor)

<http://pweb.sophia.ac.jp/s-goto/en-SGoto.html>

Research field: Operator Algebras

Main theme:

- Jones index theory of subfactors in the theory of operator algebras
- Algebraic/combinatorial aspects of subfactor theory (graphs, fusion algebras etc.) and its relation to other fields in mathematics and mathematical physics such as quantum groups, solvable lattice models, topological quantum field theory (3-dimensional topology) and rational conformal field theory

HIRATA, Hitoshi (Assistant Professor)

Research field: Analysis, Applied Analysis

Main theme:

- Nonlinear Schroedinger Equations
- Nonlinear Waves
- Biological Mathematics

KATO, Takeshi (Associate Professor)

<http://pweb.sophia.ac.jp/tkskato/en/>

Research field: Mathematical Statistics

Main theme:

- Time series analysis
- Application of wavelet analysis to mathematical statistics and probability theory
- Asymptotic theory in statistical inference

NAKASHIMA, Toshiki (Professor)

<http://pweb.cc.sophia.ac.jp/toshiki/>

Research field: Quantum Groups, Representation Theory

Main theme:

- Crystal Bases and Geometric Crystals
- Quantum groups at roots of unity
- q -boson Kashiwara algebras

NAKASUJI, Maki (Associate Professor)

<http://www.ics.sophia.ac.jp/nakasuji/>

Research field: Analytic Number Theory, Representation Theory

Main theme:

- Multiple Dirichlet series
- Automorphic forms and L-functions
- Selberg zeta functions and the spectral theory

OSHIRO, Kanako (Associate Professor)

<http://pweb.sophia.ac.jp/oshirok/>

Research field: Topology, Knot Theory

Main theme:

- Surface-knot theory
- Quandle algebra

TRIHAN, Fabien Benoit (Associate Professor)

Research field: Algebraic Geometry

Main theme:

- Geometric Iwasawa Theory

TSUJI, Hajime (Professor)

Research field: Algebraic Geometry, Several Complex Variables

Main theme:

- Abundance of canonical line bundles
- Study of pluricanonical systems
- Convexity and semipositivity of family of projective varieties

TSUNOGAI, Hiroshi (Professor)

<http://pweb.cc.sophia.ac.jp/tsunogai/index.html>

Research field: Mathematics, Number Theory

Main theme:

- Constructive Galois theory, Noether's Problem and its variants
- Galois representation attached to arithmetic fundamental groups
- Moduli spaces of projective lines with marked points

TSUZUKI, Masao (Professor)

Research field: Number Theory

Main Theme:

- Modular forms and related L-functions
- Selberg zeta functions and trace formulas

PHYSICS

ADACHI, Tadashi (Professor)

Research field: Superconductivity, New Functional Materials

Main theme:

- Muon-spin-relaxation study of the spin dynamics in Cu-based and Fe-based high- T_c superconductors
- Novel charge-spin order/fluctuation studied by transport, thermal and magnetic properties in high magnetic fields
- Synthesis of novel functional materials by the solid-state reaction, flux and floating-zone Methods

EMA, Kazuhiro (Professor)

<http://soliton.ph.sophia.ac.jp/>

Research field: Optical Physics, Optical Properties of Solids, Photonics

Main theme:

- Excitonic optical properties of semiconductors, organic materials, and inorganic-organic hybrid materials
- Ultrafast dynamics of excited states in solids
- Optical properties of semiconductor nanostructures
- Generation and control of coherent phonons in wide-gap semiconductors
- Ultrafast optical pulse control and its application for optical Communications

GOTO, Takayuki (Professor)

Research field: Low Temperature Condensed State Physics

This laboratory studies magnetic and superconducting properties of strongly-correlated electron systems at low temperatures by microscopic probes of nuclear magnetic resonance (NMR) and muon spin relaxation (μ SR)

Main theme:

- The ground state and various quantum phase transitions in quantum spin systems
- The effect of the incoherent local structure on the superconductivity in high- T_c superconductors
- Superconducting properties including the novel vortex state in organic complexes

HIRANO, Tetsufumi (Professor)

Research field: Hadron Physics (theory)

Main theme:

- Quark gluon plasma
- High energy nuclear collision
- Relativistic hydrodynamics

HOSHINO, Masamitsu (Professor)

<http://www.ph.sophia.ac.jp/~tana-ken/index.html>

Research field: Atomic and Molecular Physics

Main theme:

- Excitation of atoms / molecules by low energy electron / positron / ion impact
- Core excitation of molecules by synchrotron radiation
- Negative ion formation from dissociative electron attachment

KUNUGITA, Hideyuki (Associate Professor)

Research field: Optical Physics, Optical Properties of Solids

Main theme:

- Ultrafast spectroscopy
- Excitonic optical properties of solids
- Generation and control of coherent phonons in wide-gap semiconductors
- Carrier dynamics in photocatalytic materials

KUROE, Haruhiko (Associate Professor)

Research field: Solid-State Physics, Magnetism

Main theme:

- Raman scattering in magnetic materials under multi-extreme condition
- Magnetic and dielectric properties in multiferroic materials

KUWAHARA, Hideki (Professor)

Research field: Materials Science, Solid State Physics

Main theme:

- Exploration for novel spintronic (spin-based electronic) and multiferroic materials, e.g., giant magnetoresistive and gigantic magnetoelectric oxides
- External field control of electronic phases in strongly correlated materials:
Magnetic(Electric) field control of electric-polarization or resistivity (magnetization) for next-generation high-density memories
- Design and synthesis for A-site ordered perovskite-type oxides with high phase-transition temperatures for future electronic devices
- Transport (resistivity, Hall effect, thermopower, specific heat, etc.) and magnetic properties near the Mott insulator-metal phase boundary in band-width and/or band-filling controlled systems with strong electron correlation

ODAGIRI, Takeshi (Associate Professor)

<http://sephiroth.mls.sophia.ac.jp/teacher/archives/000086.html>

Research field: Atomic and molecular physics

Main theme:

- Spectroscopy and dynamics of short-lived molecular resonance states
- An entangled atom pair formation in photodissociation of molecular hydrogen

OHTSUKI, Tomi (Professor)

<http://www.ph.sophia.ac.jp/~tomi/english.html>

Research field: Solid State Physics (theory)

Main theme:

- Anderson localization
- Quantum Hall and quantum spin Hall effects
- Quantum network model
- Light propagation in non-uniform media

OKADA, Kunihiro (Professor)

Research field: Atomic and Molecular Physics, Quantum Electronics

Main theme:

- Gas-phase ion-molecule reactions at very low temperatures
- Production of ion Coulomb crystals and cold molecular ions
- Resonance-enhanced multiphoton ionization spectroscopy of molecules

SAKAMA, Hiroshi (Professor)

Research field: Applied Physics, Surface Science

Main theme:

- Thin films: Nucleation and growth mechanism. Epitaxy. Structure and chemical composition, Sputtering, Pulsed-laser deposition
- Transition metal oxide thin films: Growth, micro-fabrication and physical property measurement. Charge and spin order
- Surface: Structure and physical properties of solid surfaces, Phase transitions, Electron diffraction
- Photocatalyst: Reaction mechanism, Electronic structure of photocatalyst

TAKAYANAGI, Kazuo (Professor)

Research field: Quantum Many-Body Problems, Condensed Matter Physics, Nuclear Physics

Main theme:

- Effective interaction theory and its application to nuclei and electron systems.
- Inverse scattering theory and its application to effective interaction theory.

BIOLOGICAL SCIENCE

CHIBA, Atsuhiko (Professor)

Research field: Behavioral Neuroscience

Main theme:

- Studies on neuroendocrinological aspects of learning and memory processes
- Behavioral and neuroendocrinological studies of sexual odor preference in rodents

FUJIWARA, Makoto (Associate Professor)

http://rscdb.cc.sophia.ac.jp/Profiles/70/0006951/prof_e.html

Research field: Molecular Cell Biology, Plant Science

Main theme:

- Genetic control of chloroplast division
- Live imaging of plant cell organelles

HAYASHI, Kensuke (Professor)

Research field: Cell Biology, Developmental Neuroscience

Main theme:

- Development of the axon and dendrites in mammalian neurons
- Cell migration during the neuronal development

KANZAWA, Nobuyuki (Professor)

<http://www.mls.sophia.ac.jp/~kanzawa/home/en/>

Research field: Biochemistry, Plant Molecular Biology

Main theme:

- Regulatory mechanism of the seismonastic movement of Mimosa plant
- Biochemical characterization of a novel invertebrate enzyme
- Biochemical engineering of an advanced bioceramics

KAWAGUCHI, Mari (Associate Professor)

Research field: Molecular Evolutionary Biology

Main theme:

- Evolution of reproductive strategy of fishes
- Molecular evolution of brood pouch from seahorses and pipefishes
- Mechanism of sub-functionalization of duplicated genes during evolution

KONDO, Jiro (Associate Professor)

<http://pweb.cc.sophia.ac.jp/jkondo/index-e.html>

Research field: Biophysics, Structural Biology

Main theme:

- Motion picture crystallography of DNA/RNA molecular switches
- Structure based drug and material design

NIIKURA, Takako (Professor)

Research field: Neuroscience

Main theme:

- Neurodegeneration

SAITO, Tamao (Professor)

http://rscdb.cc.sophia.ac.jp/Profiles/69/0006815/prof_e.html

Research field: Environmental Molecular Biology, Biochemistry

Main theme:

- Analysis of small molecules (especially “polyketides”) for communication and ecology
- Functional analysis of novel polyketide synthases found in the cellular slime mould
- Pattern formation of the cellular slime mould as a model system

SUZUKI, Nobuhiro (Associate Professor)

Research field: Plant Molecular Biology, Plant Physiology

Main theme:

- Molecular mechanisms regulating different types of heat stress response in plants
- Response of plants to stress combinations

YASUMASU, Shigeki (Professor)

Research field: Developmental Biology

Main theme:

- Differentiation of fish hatching gland cells
- Molecular evolution of hatching enzyme gene
- Mechanism of egg envelope digestion by hatching enzyme

INFORMATION SCIENCE

ARAI, Takayuki (Professor)

<http://www.splab.net/>

Research field: Speech Communication

Main theme:

- Education in acoustics, acoustic phonetics, and speech analysis
- Speech science (incl. production), hearing science (incl. perception)
- Speech signal processing for people with communication disorders

BANDAI, Masaki (Professor)

<https://bandailab.jp>

Research field: Computer Networks

Main theme:

- Network computing
- Network protocol
- Application

GONSALVES, Tad (Professor)

<https://www.gonken.tokyo/>

Research fields: Evolutionary Computation, Bio-inspired Computation, Expert Systems, Machine Learning, AI applications

Main themes:

- Simulation Optimization Meta-heuristics
- Image recognition and self-driving cars
- PC games and puzzles
- Multi-GPU computation using Nvidia P100, Jetson TX2, etc.
- Knowledge Management & Design of Expert Systems

IROHARA, Takashi (Professor)

<http://pweb.cc.sophia.ac.jp/irohara/>

Research field: Industrial and Systems Engineering

Main theme:

- Facility logistics / Warehouse management / Material handling
- Supply chain optimization/ Inventory management/ Production scheduling
- Other industrial engineering topics related to manufacturing/logistics

KAWABATA, Ryo (Associate Professor)

<http://lise-sophia.net/sinfosys/>

Research field: Information Systems Engineering, Software Engineering

Main theme:

- Knowledge Base for Systems Analysis
- Reusing Diagrams for Systems Specification

MIYAMOTO, Yuichiro (Associate Professor)

<http://www.ics.sophia.ac.jp/miyamoto/>

Research field: Combinatorial Optimization, Mathematical Programming

Main theme:

- Approximation algorithms
- Graph coloring problem and perfect graphs
- Network design and network flows

SHIBUYA, Tomoharu (Professor)

<http://www.ts-lab.net>

Research field: Coding Theory, Information Security, Communication Theory, Information Theory

Main theme:

We study various coding techniques to realize reliable and secure digital communication.

This includes design of error correcting codes suitable for various channels, analysis of the performance of error correcting codes, development of secure multi-party protocols, study on secret sharing schemes and their applications, and so on.

SUMI, Chikayoshi (Associate Professor)

<http://www13.plala.or.jp/Sumi-lab/>

Research field: Biomedical Engineering, Medical Imaging, Remote Sensing, Measurement System Engineering, Visualization

Main theme:

- Techniques of diagnosis/therapy/culture for human diseases and various functional disorders (bioelectromagnetics, biomechanics, biothermodynamics, nanomedicine, ultrasound, photoacoustics, etc.)
- Techniques of nondestructive evaluations of structures/materials for environment
- Reconstructions using functional, stochastics, optimization (signal, image, function, etc.)

TAKAOKA, Eiko (Professor)

<http://pweb.cc.sophia.ac.jp/etl/>

Research Field: Database, Information System for Medical care, Education and Environment

Main theme:

- Development of cross-lingual health assistant system
- Understanding disorders from analysis of medical data in cooperation with community health-care
- Development of the weather visualization system and analysis of local weather data
- Computers and Education

TAMURA, Yasuhisa (Professor)

<http://tamuralabo.info/>

Research Field: Learning Technology

Main theme:

- CSCL support with use of Natural language processing
- Tablet PC / e-textbook utilization of e-Learning
- Material and learner information repository analysis and reuse

TANAKA, Shoji (Professor)

<https://sites.google.com/site/stlab10/Home>

Research Field: Brain Imaging, Brain Science

Main theme:

- Imaging of higher brain functions (cognition, memory, and self)
- Network architecture of cognitive systems of the human brain
- Dynamics and network principles for brain information processing
- Statistical analysis of brain imaging data

YAIRI, Ikuko (Associate Professor)

<http://www.yairilab.net/>

Research field: Informatics, Media and Communication Science and Technology

Main theme:

Applied research:

- Barrier-free ubiquitous mobility support system
- Geographic information system for disabled pedestrian navigation
- Universal-designed interactive map contents and interfaces, etc.

Basic research:

- Spatial and graphic information representation method with sound and touch without vision
- Interactive interface design for the aged, the disabled and children
- Community support for offering spatial information, etc.

YAMANAKA, Takao (Associate Professor)

<http://pweb.cc.sophia.ac.jp/takao-y/>

Research field: Sensory Information Processing, Computer Vision

Main theme:

- Automatic understanding of image contents
- Object recognition / Object detection
- Saliency detection
- Palmprint recognition for biometrics

YAMASHITA, Haruka (Assistant Professor)

Research Field: Applied Statistics, Machine Learning

Main theme:

- Business analytics
- Statistical quality control
- Big data analysis
- Sports data analysis