# List of Supervisors and Research Fields

As of November 1, 2020

## Department of Mathematics, Graduate School of Science — Doctoral Course

| Fields | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|
| Algebra | Professor | ASAKURA Masanori | Arithmetic geometry | |
| | Professor | SAITO Mutsumi | Algebraic analysis, rings of differential operators | |
| | Professor | MATSUMOTO Keiji | Special functions | |
| | Professor | YASUDA Seidai | Number theory, arithmetic geometry | |
| | Professor | YAMASHITA Hiroshi | Representation theory | |
| | Associate Professor | SHIBUKAWA Youichi | Yang-Baxter equations and quantum groups | |
| | Associate Professor | Simona Settepanella | Singularity theory, combinatorics | |
| | Associate Professor | TANABE Kenichiro | Vertex algebras, algebraic combinatorics | |
| | Associate Professor | MATSUSHITA Daisuke | Algebraic geometry | |
| Geometry | Professor | AKITA Toshiyuki | Algebraic topology, group cohomology, discrete groups | |
| | Professor | ISHIKAWA Goo | Real algebraic geometry, singularity theory | |
| | Professor | IWASAKI Katsunori | Complex geometry, dynamical systems, Painlevé systems | |
| | Professor | YOSHINAGA Masahiko | Algebraic geometry, combinatorics | |
| | Associate Professor | KOBAYASHI Shimpei | Differential geometry | |
| | Associate Professor | FURUHATA Hitoshi | Differential geometry | |
| Analysis | Professor | KUBO Hideo | Partial Differential Equations associated with Nonlinear Dynamics | |
| | Professor | HORA Akihito | Functional analysis, probability theory | |
| | Professor | HONDA Naofumi | Algebraic analysis | |
| | Professor | MASAMUNE Jun | Global Analysis | |
| | Associate Professor | KOBAYASHI Masaharu | Harmonic Analysis | |
| | Associate Professor | SUZUKI Yuhei | Operator algebras | |
| | Associate Professor | HASEBE Takahiro | Probability theory, complex analysis, functional analysis | |
| | Associate Professor | HAMAMUKI Nao | Nonlinear partial differential equations, Theory of viscosity solutions | |
| | Associate Professor | MIYAO Tadahiro | Mathematical physics, functional analysis, condensed matter physics | |
| Applied Mathmatics | Professor | EI Shin-Ichiro | Nonlinear analysis, nonlinear partial differential equations | |
| | Professor | SAKAI Akira | Probability theory, statistical mechanics, mathematical physics | |
| | Professor | JIMBO Shuichi | Applied analysis, Partial differential equations, Spectral theory | |
| | Professor | NAGAYAMA Masaharu | Reaction-diffusion systems, mathematical modeling, numerical simulation | |
| | Professor | NAMIKI Takao | Ergodic theory, dynamical systems, complex systems | |
| | Specially Appointed Professor | YURI Michiko | Ergodic theory, dynamical systems, complex systems | |
| | Associate Professor | KURODA Hirotoshi | Partial differential equations, variational analysis | |
| | Associate Professor | KOBAYASHI Yasuaki | Nonlinear dynamics | |
| | Associate Professor | SATO Yuzuru | Complex systems, chaotic dynamical systems | |
| | Associate Professor | TERAMOTO Hiroshi | Dynamical systems, singularity theory,chemical reaction dynamics | |
| | Associate Professor | MATSUMOTO Kenji | Biophysical complex systems, chaotic dynamical systems | |

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As of November 1, 2020

## Department of Condensed Matter Physics, Graduate School of Science — Doctoral Course

| Laboratories | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|
| Electronic Properties of Solids | Professor | ODA Migaku | High-temperature cuprate superconductors, Frustrated spin systems, Surface & nano-structure magnetism, Material research, Scanning tunneling microscopy/spectroscopy (STM/STS), Spin-polarized STM | |
| | Associate Professor | MATSUYAMA Hideo | | |
| | Associate Professor | YOSHIDA Hiroyuki | | |
| | Assistant Professor | KUROSAWA Tohru | | |
| J-Material: Physics of Strongly Correlated Systems | Professor | AMITSUKA Hiroshi | J-material, superconductivity, Magnetism, Heavy fermion, Quantum phase transition, Magnetoelectric effects, Very low temperatures, High magnetic fields, High pressure, Ultrasonic measurements, MuSR, Neutron scattering, RXS, Ferroelectrics, Multiferroics, Electronic ferroelectricity, Phase transition, Photoinduced cooperative phenomena | |
| | Associate Professor | TAKESADA Masaki | | |
| | Associate Professor | YANAGISAWA Tatsuya | | |
| | Assistant Professor | HIDAKA Hiroyuki | | |
| Electronic Properties of Low-demensional Material | Professor | KAWAMOTO Atsushi | NMR, Strongly-correlated electrom systems, Superconductivity, Magnetism Low-dimensional organic conductors, Scanning tunneling microscopy (STM), Scanning tunneling spectroscopy (STS), Nonlinear conductivity, Symmetry of Cooper pairs, Spin density waves (SDWs), Chiral superconductivity, Mesoscopic systems, Topological phenomena | |
| | Associate Professor | MATSUNAGA Noriaki | | |
| | Lecturer | IHARA Yoshihiko | | |
| | Assistant Professor | NOBUKANE Hiroyoshi | | |
| | Assistant Professor | FUKUOKA Syuhei | | |
| Condensed Matter Dynamics | Professor | NOZAKI Ryusuke | Microscopic dynamics of condensed matters, Dielectric and optical spectroscopy from 1microHz to 10 PHz, Raman scattering, Femtosecond pump-probe spectroscopy, Terahertz time-domain spectroscopy, Solids, Complex liquids, Hydrogen-bonding systems, Semiconductors, Nonlinear optical phenomena, Biological materials | |
| | Associate Professor | MISHINA Tomobumi | | |
| | Assistant Professor | YAMAMOTO Sekika | | |
| Statistical Physics | Professor | NEMOTO Koji | Statistical physics, Non-equilibrium, Non-linearity, Random systems, Complex networks, Phase transition, Self-organization, Critical phenomena, Scale-free structures, Numerical simulation, Superconductivity, Superfluidity, Bose-Einstein condensation, Condensed matter physics, Magnetism, Multiferroics, Heavy fermion | |
| | Professor | KITA Takafumi | | |
| | Assistant Professor | OKUDA Koji | | |
| Mathematical Physics | Professor | YAMAMOTO Shoji | Making full use of various—both analytical and numerical—quantum statistical methods, we explore novel quantum cooperative phenomena in low-dimensional electron systems. Understanding of phenomena must be our ultimate goal, but we often take furthermore interest in the mathematical and methodological ways we can accomplish this. We construct microscopic theories on a variety of physics such as spin liquid, nuclear magnetic resonance, inelastic neutron scattering, Raman scattering, optical conductivity, and photoinduced phase transition in geometric lattice magnets, transition metal complexes, and organic polymers. We sometimes enjoy theoretical formulation in itself and sometimes interpret observations in cooperation with experimentalists and chemist. | |
| | Lecturer | OHARA Jun | | |

| Laboratories | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|
| Nanostructure Physics (RIES) | Professor | ISHIBASHI Akira | Nano-structured devices, New photovoltaic devices, Next-generation solar cells, Clean unit system platforms | |
| | Associate Professor | KONDO Kenji | Qunatum field theory, Many-body perturbation theory, Spintronics devices, Magnetism, Electronic correlations, Dirac electron, Topological insulator | |
| Condensed Matter Theory Field of Advanced Functional Materials and Physics (NIMS). | Visiting Professor | YAMASE Hiroyuki | Quantum many-body theory, Superconductivity, Magnetism, Critical phenomena, Electronic nematic liquids | |
| Nano-system Photonics Field of Advanced Functional Materials and Physics (NIMS) | Visiting Professor | NAGAO Tadaaki | Surface physics, Nanophotonics, Energy conversion, Nanomaterials | |
| Solid State of Physics in High Magnetic Fields Field of Advanced Functional Materials and Physics (NIMS) | Visiting Professor | IMANAKA Yasutaka | Magneto-Spectroscopy, High magnetic field, Terahertz wave, Cyclotron resonance, Quantum Hall effect, Dirac Fermion, Topological insulator | |
| Surface Quantum Phase Materials Field of Advanced Functional Materials and Physics (NIMS) | Visiting Professor | UCHIHASHI Takashi | Surface and interface, Atomic layer, Two-dimensional, Quantum materials, Superconductivity, Topological state, Ultrahigh vacuum, Nanotechnology, Scanning tunneling microscopy, Electron transport | |
| Muon Spin Resonance Laboratory Field of Spin Resonance Material Science (RIKEN) | Visiting Professor | WATANABE Isao | μSR material science at the RIKEN-RAL Muon Facility in the UK. Experimental and theoretical studies on the magnestism, superconductivity, industiral applications, non-distructive element analysis, muon hyperfine interactions in metals, insuators and organic molecules. Muon site and magnetic spin structural analysis by the density functional theory. | |
| Electron Spin Resonance Laboratory Field of Spin Resonance Material Science (RIKEN) | Visiting Associate Professor | OSHIMA Yugo | Electron Spin Resonance (ESR) from X-band to millimeter and sub-millimeter waves, High magnetic field, Strongly-correlated materials, Molecular magnets, Molecular conductors, Spin-Liquid system, Nano-carbon materials. | |

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As of November 1, 2020

## Department of Cosmosciences, Graduate School of Science

**Doctoral Course**

| Laboratories | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|
| Observational Astronomy | Associate Professor | SORAI Kazuo | Observational astronomy, extragalacitc astronomy, interstellar matter, development of observational instruments and system for the Antarctic THz telescope | |
| Theoretical Particle Physics and Cosmology | Professor | SUZUKI Hisao | Particle physics, beyond the standard model, dark matter, dark energy, grand unified theory, superstrings, supersymmetry, early universe | |
| | Professor | KOBAYASHI Tatsuo | | |
| | Associate Professor | NAKAYAMA Ryuichi | | |
| | Specially Appointed Associate Professor | SETO Osamu | | Institute for the Advancement of Higher Education |
| | Lecturer | SUEHIRO Kazuhiko | | |
| Theoretical Nuclear Physics | Professor | KIMURA Masaaki | Quantum many-body problems, nuclear force, unstable nuclei, nucleosynthesis, hadronic matter | |
| | Lecturer | HORIUCHI Wataru | | |
| Theoretical Astrophysics | Visiting Associate Professor | Elizabeth Jane Tasker | Theoretical astronomy, numerical simulations, galaxy formation, galaxy clusters, supermassive black holes, interstellar matter, star formation, interstellar dust | Inter-field Cooperation with the Japan Aerospace Exploration Agency (JAXA) in the field of spacecraft observation. |
| | Lecturer | OKAMOTO Takashi | | |
| | Assistant Professor | Alexander Pettitt | | Institute for the Advancement of Higher Education |
| Planetary and Space Group | Professor | KURAMOTO Kiyoshi | Origin and evolution of planets and satellites, material evolution during planetary system formation, structure and dynamics of Earth and planetary atmospheres, comparative planetology, space exploration and ground-based observation, experimental studies, theory and hierarchical numerical simulation models, applications of information technology | |
| | Professor | TAKAHASHI Yukihiro | | |
| | Professor | ISHIWATARI Masaki | | |
| | Professor | SATO Mitsuteru | | |
| | Associate Professor | KAMATA Shunichi | | |
| | Specially Appointed Associate Professor | KUBOTA Hisayuki | | |
| | Specially Appointed Associate Professor | KURIHARA Junichi | | |
| | Specially Appointed Assistant Professor | ISHIDA Tetsuro | | |
| | Specially Appointed Assistant Professor | TAKAGI Seiko | | |

| Laboratories | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|
| Astrophysical Chemistry / Ice and Planetary Science | Professor | KOUCHI Akira | Interstellar molecules, ice dust, amorphous solid water, surface reactions | Retire in March 2022 |
| | Professor | WATANABE Naoki | | |
| | Associate Professor | KIMURA Yuki | | |
| | Assistant Professor | HIDAKA Hiroshi | | |
| | Assistant Professor | OBA Yasuhiro | | |
| | Specially Appointed Assistant Professor | TSUGE Masashi | | |
| Phase Transition Dynamics | Professor | SAZAKI Gen | Phase transition dynamics, crystal growth, ice, snow, interferometry, advanced optical microscopy, atomic force microscopy | |
| | Assistant Professor | NAGASHIMA Ken | | |
| | Assistant Professor | MURATA Ken-ichiro | | |
| Information Media Science | Professor | FUSE Izumi | Learning science, learning platforms, open education | |
| | Assistant Professor | YAMAMOTO Yuichi | | |
| Nuclear Reaction Data Science | Associate Professor | HIRABAYASHI Yoshiharu | Nuclear data, nuclear reactions, evaluation | Information Initiative Center |
| | Visiting Professor | FUKAHORI Tokio | | Inter-field Cooperation with the Japan Atomic Energy Agency (JAEA) in the field of nuclear data. |
| | Visiting Professor | IWAMOTO Nobuyuki | | |
| Spacecraft Observation Group | Visiting Professor | SATO Takehiko | Planetary exploration, infrared astronomy from space, radio astronomy from space | Inter-field Cooperation with Japan Aerospace Exploration Agency (JAXA) in the field of spacecraft observation. |
| | Visiting Associate Professor | MURATA Yasuhiro | | |
| | Visiting Associate Professor | YAMAMURA Issei | | |

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## Department of Natural History Sciences, Graduate School of Science — Doctoral Course

| Research Fields | Research Groups & Laboratories | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|---|
| Earth and Planetary Dynamics | Meteorology | Professor | INATSU Masaru | Meteorology, dynamics and forecast, cyclones and fronts, theory and numerical modelling, development of numerical model, meso-scale phenomena, cloud, rain, snow, aerosol, lightning, material transport, and their application. | |
| | | Specially Appointed Associate Professor | SATO Yousuke | | |
| | Physical Oceanography and Climate | Professor | MINOBE Shoshiro | Physical oceanography, meteorology, air-sea interactions, climate variability & change, oceans' role in climate, multidisciplinary challenges, numerical modelling, data analysis | |
| | | Associate Professor | SASAKI Yoshinori | | |
| | Space Geodesy | Professor | HEKI Kosuke | Space geodesy, GNSS, GPS, INSAR, GRACE, gravity, Earth rotation, atmospheric sensing, crustal deformation, glaciology, planetary geodesy, ionosphere | |
| | | Professor | FURUYA Masato | | |
| | | Associate Professor | TAKADA Youichiro | | |
| | Seismology | Professor | YOMOGIDA Kiyoshi | Seismic wave propagation, Earth structure, seismic tomography, broadband waveform analysis, lateral heterogeneity and anisotropy | |
| | | Associate Professor | YOSHIZAWA Kazunori | | |
| Earth and Planetary System Science | Petrology and Volcanology | Professor | NAKAGAWA Mitsuhiro | Processes of evolution and eruption in magma plumbing systems in volcanos, processes of magma generation and eruption in caldera volcanos, spatial and temporal variation in arc volcanism, long-term forecasting of volcanic activity, mitigation of volcanic disasters | |
| | | Associate Professor | KURITANI Takeshi | Petrological, geochemical, experimental, and theoretical studies for understanding generation, ascent, evolution, and eruption processes of magmas, differentiation processes of the lunar, and evolutionary processes of the Earth. | |
| | | Assistant Professor | YOSHIMURA Shumpei | Experimental and theoretical studies on igenous and volcanic processes | |

| Research Fields | Research Groups & Laboratories | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|---|
| Earth and Planetary System Science | Geochemistry | Professor | YURIMOTO Hisayoshi | Geochemistry, cosmochemistry, planetary chemistry, galaxies, stars, planetary systems, protoplanetary disks, planets, meteorites, Earth, core, mantle, crust, oceans, atmosphere, life, magma, geofluids, mass spectrometry, spectroscopy, microscopy, dust formation, crystal growth, high pressure, solar system evolution, planetary exploration | |
| | | Assistant Professor | BAJO Ken-ichi | | |
| | | Assistant Professor | KAWASAKI Noriyuki | | |
| | Earth Materials Science | Professor | NAGAI Takaya | Mineralogy, crystallography, crystal growth, physics and chemistry of minerals | |
| | | Associate Professor | KAWANO Jun | | |
| | | Assistant Professor | SHINOZAKI Ayako | | |
| | Earth Environmental History ・ Paleontology | Professor | KOBAYASHI Yoshitsugu | Vertebrate evolution, dinosaurs, reptiles, birds, phylogenetic relationships, functional morphology, comparative anatomy, embryology | Hokkaido University Museum |
| | | Associate Professor | IBA Yasuhiro | Evolution of Mesozoic marine biota, paleobiogeographic responses, global environmental change, origin of modern marine biota | |
| | Earth Bisophere Geoscience | Professor | SAWADA Ken | Paleoenvironmental reconstruction, Organic sedimentology, Molecular paleobiology, Macromolecular biogeochemistry, biomarker paleoclimatology | |
| | | Lecturer | WATANABE Tsuyoshi | High-resolution reconstruction of palaeoenvironments, biogeochemical cycles in reef ecosystems on the geological time scale | |
| | Geotectonics | Specially Appointed Professor | TAKESHITA Toru | Structural geology, tectonics, rheology, microstructures, metamorphic geology | |
| | | Associate Professor | KAMEDA Jun | Subduction zone seismogenesis, water-rock interactions, diagenesis, electron microscopy, clay mineralogy | |
| | | Assistant Professor | Marie Python | Petrography and chemistry of the crust and mantle in ophiolites and the Pacific Ocean, mantle melting, magmatic evolution of the oceanic crust, hydrothermal circulation, interactions within the oceanic crust and mantle | |

| Research Fields | Research Groups & Laboratories | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|---|
| Biodiversity | Biodiversity | Associate Professor | KAJIHARA Hiroshi | Biodiversity I:<br>Marine invertebrates, Nemertea, taxonomy, phylogeny, morphology | |
| | | Associate Professor | Helena Fortunato | Biodiversity I:<br>Mollusks, coralline algae, Bryozoa, calcification patterns, population genetics, ecology, ocean acidification, biogeography | |
| | | Lecturer | KAKUI Keiichi | Biodiversity I:<br>Marine invertebrates, Crustacea, Tanaidacea, taxonomy, phylogeny, morphology | |
| | | Professor | HORIGUCHI Takeo | Biodiversity II:<br>Microalgae, protists, dinoflagellates, phylogeny, endosymbiosis | |
| | | Assistant Professor | Kevin Wakeman | Biodiversity II:<br>Biodiversity, evolution, protists, Apicomplexa, dinoflagellates | Institute for the Advancement of Higher Education |
| | | Professor | MASUDA Ryuichi | Bidiversity IV (Laboratory of Genetic Diversity):<br>Molecular phylogenetics, population genetics, biogeography, mammals | |
| | | Professor | TAKAGI Masaoki | Biodiversity III:<br>Ecology,evolution,island,bird | |
| | | Professor | KOGAME Kazuhiro | Biodiversity II:<br>Taxonomy, phylogeny, evolution, seaweeds | |
| | | Associate Professor | ABE Tsuyoshi | Biodiversity II:<br>Seaweeds, taxonomy, phylogeny, chemotaxonomy | Hokkaido University Museum |
| | | Associate Professor | KATOH Toru | Biodiversity I:<br>Evolution, phylogeny, populations, insects | |

| Research Fields | Research Groups & Laboratories | Supervisors | | Keywords | Remarks |
|---|---|---|---|---|---|
| Science Communication | Communication of Science and Technology | Associate Professor | MIKAMI Naoyuki | Sociology, science and technology, public participation, governance and policy, technology assessment | Institute for the Advancement of Higher Education |
| | | Associate Professor | KAWAMOTO Shishin | | CoSTEP |
| | Philosophy of Science and Technology | Professor | MATSUOU Masahiro | Philosophy of science, ethics of science and technology, philosophy of risk, statistical inference of cause | |
| | Museum Education | Professor | YUASA Makiko | Museum communication, museum education, museum evaluation | The Hokkaido University Museum |
| | Science Education | Professor | HOSOKAWA Toshiyuki | Self-efficacy, cognitive bias, creativity, human-computer interactions, higher education, educational technology, open education | |
| | | Professor | IKEDA Fumihito | | |
| | | Specially Appointed Professor | SUZUKI Makoto | | Institute for the Advancement of Higher Education |
| | | Associate Professor | IWAMA Norikazu | | |
| | | Associate Professor | YAMADA Kunimasa | | |
| | | Associate Professor | SHIGETA Katsusuke | | Information Initiative Center, Hokkaido University |
| | | Assistant Professor | SUGIURA Mayumi | | Institute for the Advancement of Higher Education |
| Seismology and Volcanology | Seismological Observation | Professor | TAKAHASHI Hiroaki | Earthquake geophysical observation, seismographs, GNSS, gravity, subduction great earthquakes, inland earthquakes, statistical seismology, land and ocean bottom crustal deformation, regional tectonics in northeastern Asia, geothermal exploration, earthquake disaster mitigation | |
| | | Associate Professor | KATSUMATA Kei | | |
| | | Associate Professor | OHZONO Mako | | |
| | Ocean Bottom Seismology and Tsunami | Professor | TANIOKA Yuichiro | Subsurface structure at subduction zones,elastic wave propagation, tectonics of Northern Mid Atlantic Ridge,earthquake source processes, generation and propagation of tsunamis, pre-historical earthquakes and tsunamis, paleo-seismological analysis, international field science, disaster mitigation | |
| | | Associate Professor | MURAI Yoshio | | |
| | | Associate Professor | NISHIMURA Yuichi | | |
| | Volcano Physics | Professor | AOYAMA Hiroshi | Volcanology, volcanic seismology, eruption prediction, transport processes, volcano hydrology, crustal deformation, space geodesy, geo-electromagnetism, spectroscopy of volcanic plume, volcano monitoring system | |
| | | Assistant Professor | TANAKA Ryo | | |
| | Subsurface Structure | Professor | HASHIMOTO Takeshi | Research on subsurface structure by means of elemetromagnetic methods. | |

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