The Institute of Statistical Mathematics

ACTIVITY REPORT

2017.4 — 2019.3

Tokyo, Japan

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October 2019
Center for Engineering and Technical Support
The Institute of Statistical Mathematics
Research Organization of Information and Systems
Inter-University Research Institute Corporation

Contents

Foreword

The Institute of Statistical Mathematics (ISM) was established in June 1944 as a research institute under the direct control of the Ministry of Education, Science, and Culture. Subsequently, it was reorganized as the National Inter-University Research Institute in 1985 and then as the Inter-University Research Institute in 1989. Then, it became part of the Inter-University Research Institute Corporation, Research Organization of Information and Systems (ROIS) in 2004. On June 5, 2019, ISM celebrated its 75th anniversary. On behalf of ISM, I sincerely appreciate your understanding and long-standing support to the research and educational activities of ISM.

Activities involving "big data," "artificial intelligence," "Internet of Things," and "Industry 4.0" have become the source of the industrial competitiveness. Consequently, nowadays, not only researchers but the general public is increasingly interested in methods of effective data utilization in order to survive under a major social change called "Society 5.0," and "Data Science," which is the all-inclusive word to express various fields of mathematical sciences, including statistics, machine learning, and optimization, has also become well known.

The Institute of Statistical Mathematics has three crucial objectives: "strengthening of the cooperative research function," "expansion of the project of fostering and promoting statistical thinking," and "globalization of the research field of statistical mathematics."

In fact, to realize these objectives, since 2010, we have been promoting our projects, such as the Network of Excellence (NOE) project, and implementing effective reorganizations. The NOE project aims to connect and cooperate with other organizations from industry, government, and academia. It could also contribute comprehensively and effectively to helping a lot of people who need our research outcome, and developments can be implemented through the project. We aim to make the systematic value creation design possible, which will be a guideline for "Society 5.0."

Furthermore, we set the School of Statistical Thinking to establish a base for developing professionals who would be leaders in the data-driven era in our

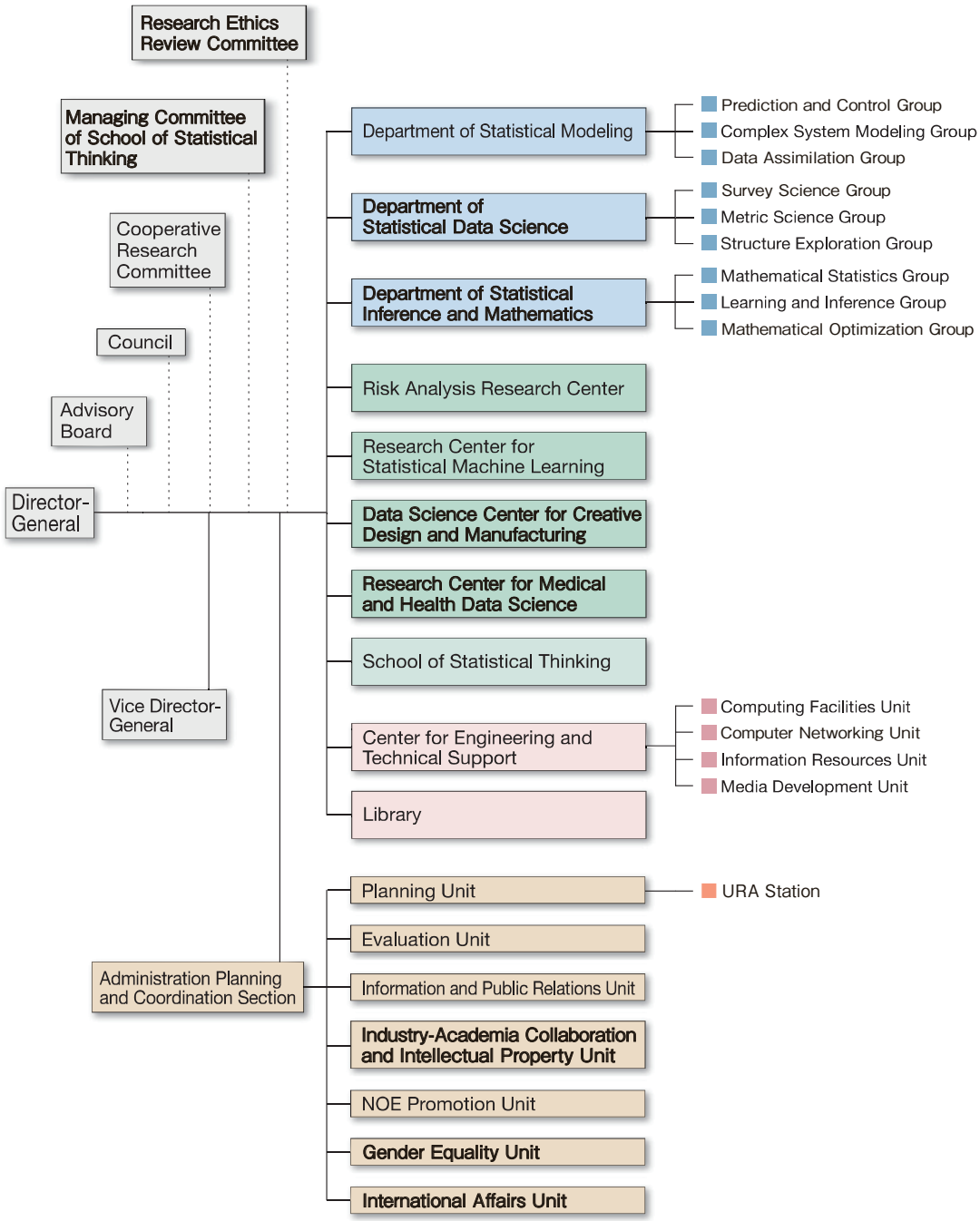
"project of fostering and promoting statistical thinking." We have designed multiple programs for professional development and have realized many achievements. However, ISM as a research institute holding a large number of statistical mathematics researchers in Japan is also expected to become a core center to educate whole universities and industries in advanced data science. We plan to form a network of data science with higher educational institutes and to establish a management cycle of data science education through the outcome of our project of fostering and promoting statistical thinking.

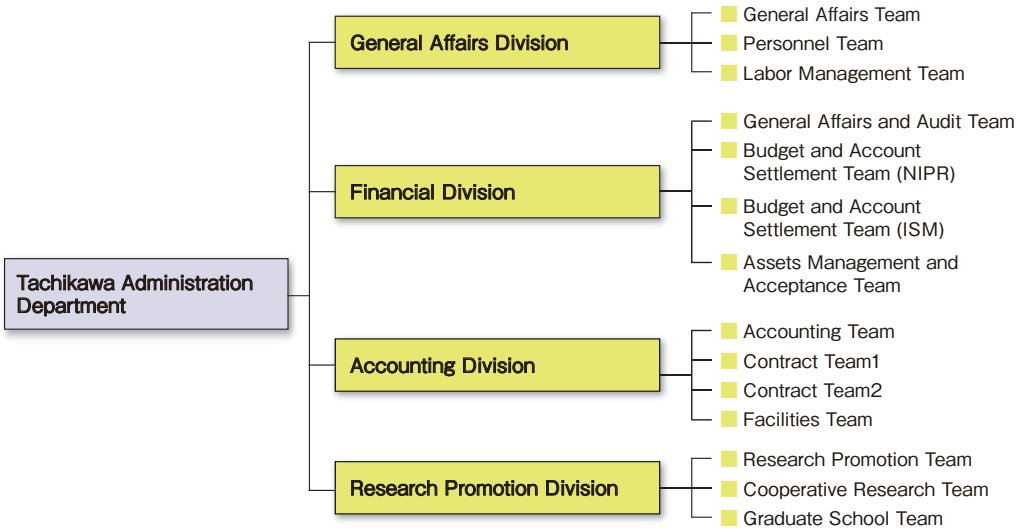
We shall continue to promote our research and educational activities with a strong orientation toward research grounded in reality, which has been handed down through generations of ISM researchers as a hands-on approach to research for 75 years.

Hiroe Tsubaki
Director-General

October 2019

Organization Diagram (As of April 1, 2019)




Tachikawa Administration Department
General Affairs Division
General Affairs Team
Personnel Team
Labor Management Team
Financial Division
General Affairs and Audit Team
Budget and Account Settlement Team (NIPR)
Budget and Account Settlement Team (ISM)
Assets Management and Acceptance Team
Accounting Division
Accounting Team
Contract Team1
Contract Team2
Facilities Team
Research Promotion Division
Research Promotion Team
Cooperative Research Team
Graduate School Team

1 Organization

Since its foundation as the one and only national institute for statistical science in Japan, the Institute of Statistical Mathematics (ISM) has continued to exert a prominent influence on the study and research of statistical science. The ever-increasing needs for statistical methods and ideas in various fields of science and technology led ISM to reorganize itself in 1985 as an inter-university research institute that puts a major emphasis on research collaboration with all science disciplines.

In April 2004, ISM began a new chapter as a member of the Research Organization of Information and Systems (ROIS), Inter-University Research Institute Corporation, which includes three other institutes: the National Institute of Polar Research (NIPR), National Institute of Informatics (NII), and National Institute of Genetics (NIG). In October 2009, ISM moved to Tachikawa and started its activities. It shares the new building with NIPR and the National Institute of Japanese Literature (NIJL).

At present, ISM consists of three departments, four research centers, a school, a support center, a planning section, a council, and committees. The NIPR/ISM joint administration office was reorganized as the Tachikawa Administration Department of ROIS. All ISM activities are guided by the leadership of the director-general and three vice-director-generals. The Council of ISM implements any necessary recommendations. The Cooperative Research Committee organizes and facilitates collaborative research projects developed between staff at ISM and collaborators in other academic agencies. The Managing Committee of the School of Statistical Thinking, established in 2016, makes suggestions regarding projects of fostering statistical thinking.

Three research departments, the Department of Statistical Modeling, the Department of Statistical Data Science, and the Department of Statistical Inference and Mathematics, form the active core of ISM with its 43 academic

staff and carry out research on either statistical theory or its application to other fields of science and industry. The Department of Statistical Modeling and its three groups study statistical modeling aspects in various fields. In the three groups of the Department of Statistical Data Science, efforts are concentrated on data collection and handling. The three groups of the Department of Statistical Inference and Mathematics are specifically concerned with the fundamental aspects of statistics.

The four strategic research centers—Risk Analysis Research Center, Research Center for Statistical Machine Learning, Data Science Center for Creative Design and Manufacturing, and Research Center for Medical and Health Data Science—were established in 2005, 2012, 2017, and 2018, respectively, as main bodies for establishing the Network of Excellence (NOE) and performing project research on specific topics. The Risk Analysis Research Center studies many risk-related topics, such as food, drug, clinical trials, suicide, environment, resource management, finance, insurance, earthquake, and genome information. The Research Center for Statistical Machine Learning aims to support the research community of the field as an activity of the NOE projects and produce influential research works by carrying out various research projects with domestic and international collaborations. The Data Science Center for Creative Design and Manufacturing aims to motivate advanced technologies in the field of data science and foster scientific methodologies for creative design and manufacturing. The Research Center for Medical and Health Data Science aims to facilitate statistical data science research that covers medical studies, drug developments, health care, and public health. More detailed descriptions of the objectives of each department and center are presented in the next chapter. The information covers research subjects and staff interests, considering the physical sciences, life sciences, social sciences, and cultural sciences.

The School of Statistical Thinking, established in 2012, performs the project of fostering and promoting statistical thinking. As data produced in various fields of the real world become very large and complex, people who can discover im-

portant knowledge buried in such data are strongly required. The Institute of Statistical Mathematics has provided several tutorial courses and supports to disseminate statistical thinking for a long time. The school integrates and expands such activities and provides a place to learn statistical thinking.

The Center for Engineering and Technical Support was established in 2006 to help the activities of the Japanese statistical science community by providing adequate computational and informational resources. The center has 11 technical staff that works on special jobs, including computer systems maintenance, journal editing, and bibliographical services. The Institute of Statistical Mathematics has a supercomputer system and a library of books and journals, not only in pure statistics but also in fields of specific interest to researchers (e.g., physics, genetics, and social sciences).

The institute also devotes itself to educating young statisticians. As a constituent of the Graduate University for Advanced Studies, SOKENDAI, ISM offers graduate programs leading to a Ph.D. degree in the Department of Statistical Science, School of Multidisciplinary Sciences (See Supplement on page 103).
(The number of staff mentioned above refers to the full strength on April 1, 2019.)

2 Departments, Centers and Research Staff

Department of Statistical Modeling

The Department of Statistical Modeling works on the modeling of phenomenal structures related to numerous factors, and it conducts research on model-based statistical inference methodologies. The department aims to contribute to the development of cross-field modeling intelligence via investigation of the modeling methods for prediction&control, complex structures, and data assimilation.

■ Spatial and Time Series Modeling Group (-2018.3.31)
The Spatial and Time Series Modeling Group works on the development and evaluation of statistical models, which function effectively in terms of predicting phenomena or scientific discoveries, through data analysis and modeling related to space-time-varying phenomena.

— *Staff* —

Tomoyuki HIGUCHI, Prof. (Director-General)
Shinya NAKANO, Assoc. Prof.
Genta UENO, Assoc. Prof.
Jiancang ZHUANG, Assoc. Prof.
Daisuke MURAKAMI, Assist. Prof. (2017.8.1-)

— *Subjects* —

- Methods for prediction and knowledge discovery based on Bayesian model
- Modeling and application of point location and/or spatial structure
- Bayesian multi-dimensional data analysis
- Point process modeling of market data and its application
- Statistical seismology
- Model integration by particle filter
- Statistical analysis and modeling of stochastic point process

- Point process model and its applications to biosciences
- Development of data assimilation system in Earth science
- Environmental data analysis

■ Prediction and Control Group (2018.4.1-)

The Prediction and Control Group works on the development and evaluation of statistical models, which function effectively in terms of predicting and controling phenomena, decision making, and scientific discoveries. These efforts involve data analysis and modeling related to phenomena that vary across time and stpace.

— *Staff* —

Yoshinori KAWASAKI, Prof.
Yoshihiko MIYASATO, Prof.
Atsushi YOSHIMOTO, Prof.
Fumikazu MIWAKEICHI, Assoc. Prof.
Yumi TAKIZAWA, Assoc. Prof.
Jiancang ZHUANG, Assoc. Prof.

— *Subjects* —

- Time series modeling with smoothed prior distribution
- Research on control of multi-agent system
- Discrete optimization model development for ecosystem service evaluation
- Statistical seismology
- Network structure estimation by causal analysis
- Information extraction and prediction from high frequency observation time series
- Study of nonlinear H_∞ control based on inverse optimization
- Development of an eco-adaptive decision support system for resource management
- Biosignal spatiotemporal analysis

■ Complex System Modeling Group

The Complex System Modeling Group conducts studies in order to discover the structures of complex systems, such as nonlinear systems and hierarchical networks, through statistical modeling. For these purpose, the group also considers Monte Carlo simulations, discrete mathematics, and computer science.

— *Staff* —

Yukito IBA, Prof.
Junji NAKANO, Director, Prof. (-2018.3.31)
Hiroshi MARUYAMA, Visiting Prof. (-2018.3.31)
Hideitsu HINO, Assoc. Prof. (2018.4.1-)
Shinsuke KOYAMA, Assoc. Prof.
Kazuhiro MINAMI, Assoc. Prof. (2018.4.1-)
Fumikazu MIWAKEICHI, Assoc. Prof. (-2018.3.31)
Yumi TAKIZAWA, Assoc. Prof. (-2018.3.31)
Shigeru SAITOU, Visiting Assoc. Prof. (-2018.3.31)
Tarou TAKAGUCHI, Visiting Assoc. Prof. (-2018.3.31)
Momoko HAYAMIZU, Assist. Prof.
Ayaka SAKATA, Assist. Prof. (-2018.3.31)

— *Subjects* —

- Bayesian modeling and MCMC data analysis
- Privacy protection for big data
- Modeling and statistical analysis of complex systems using stochastic processes and random fields
- Development of active learning and statistical anomaly detection methods and its application to natural science and industry
- Statistical security analysis of anonymous data
- Development of applications with MCMC and sequential Monte Carlo methods
- Geometric analysis of machine learning and statistical algorithms
- Structural modeling of biological phenomena using graphs
- Research on discrete geometry and its application to extract graph structure from distance data
- Urban intelligence
- Statistical analysis of speech and image data

■ Latent Structure Modeling Group (-2018.3.31)

The Latent Structure Modeling Group works on the modeling of variable factors as latent structures existing behind various dynamic phenomena in the real world, and it conducts research on methodologies for inference computation associated with structures on the basis of data related to phenomena.

— *Staff* —

Yoshinori KAWASAKI, Prof.
Tomoko MATSUI, Prof.
Kazuhiro MINAMI, Assoc. Prof.
Ryo YOSHIDA, Assoc. Prof.
Stephen WU, Assist. Prof.

— *Subjects* —

- Hidden variable modeling with smoothing prior
- Estimation and application of regularized non-linear models
- Data structure learning using kernel methods
- Modeling and simulation for biological control system
- Multi-dimensional modeling for social behavior
- Inverse problem solution using hierarchical Bayesian inference
- Requirement definition in modeling for life cycle
- Model evaluation by information criteria
- Estimation of latent structure for speech, musical and image data based on machine learning

■ Data Assimilation Group (2018.4.1-)

The Data Assimilation Group works on the development of data assimilation techniques, which are procedures aimed at combining information derived from large amounts of observations and a numerical simulation model. By developing computational algorithms and high-performance parallel computing systems, the group aims to build a next-generation simulation model that can predict the future in real time.

— *Staff* —

Tomoyuki HIGUCHI, Prof. (Director-General)
Junji NAKANO, Director, Prof.
Genta UENO, Prof.
Shinya NAKANO, Assoc. Prof.
Yuji MIZUKAMI, Visiting Assoc. Prof.
Shunichi NOMURA, Assist. Prof.

— *Subjects* —

- Model integration by particle filtering
- Development of data assimilation system in geosciences

- Development and application of data assimilation based on high-dimensional system models
- Data analysis based on state-space models
- Inverse estimation of crustal deformation based on seismic activity
- State-space modeling of insurance data
- Theory and prediction of point-process models

Department of Statistical Data Science

The Department of Statistical Data Science conducts research on data design methods aimed at managing uncertainty and incompleteness of information, quantitative methods for evidence-based practice, and related data analysis methods. Moreover, the department investigates methods for inferring the latent structures in target phenomena from observation data.

■ Survey Science Group

The Survey Science Group promotes research on the design of statistical surveys, development of statistical analysis methods on survey data, and applications. By exploring complex phenomena in various fields, the group also aims to contribute to practical applications in academia and policymaking through social surveys.

— *Staff* —

Ryozo YOSHINO, Prof.
Takatoshi IMADA, Visiting Prof.
Toru KIKKAWA, Visiting Prof.
Yoshimichi SATO, Visiting Prof.
Wataru MATSUMOTO, Visiting Prof.
Masato YONEDA, Visiting Prof. (-2018.3.31)
Shintaro SONO, Visinting Prof. (-2018.3.31)
Kazufumi MANABE, Visiting Prof. (-2018.3.31)
Fumi HAYASHI, Visitng Prof. (-2018.3.31)
Masahiro MIZUTA, Visiting Prof.
Saeko KIKUZAWA, Visiting Prof.
Tadahiko MAEDA, Assoc. Prof.
Yoo Sung PARK, Assist. Prof. (-2018.3.31), Assoc. Prof. (2018.4.1-)
Takahito ABE, Visiting Assoc. Prof. (-2018.3.31)

Koken OZAKI, Visiting Assoc. Prof.
Tadayoshi FUSHIKI, Visiting Assoc. Prof.
Hiroko TSUNODA, Visiting Assoc. Prof. (-2018.3.31)
Taisuke FUJITA, Visiting Assoc. Prof.
Masayo HIROSE, Assist. Prof.
Yusuke INAGAKI, Project Assist. Prof.
Kiyohisa SHIBAI, Project Assist. Prof.

— *Subjects* —

- Social research methods and data analysis
- Data science for Behaviormetric study of civilizations
- Theory and applications of latent variable models
- Research on nonsampling errors in surveys
- Analysis of longitudinal and repeated cross-sectional surveys
- Statistical research on the Japanese national character
- Sampling theory and its applications
- Methodology of cross-national comparative survey
- Theory and applications of multilevel modeling
- Organizational behavior based on multilevel analysis
- Theory of small area estimation and its applications

■ Metric Science Group

The Metric Science Group conducts research aimed at identifying and evaluating statistical evidence through the quantification of phenomena that have not been measured thus far as well as through the efficient extraction of information from large databases. The group investigates related methods and develops methods for analyzing the collected data. By working on applied research in various fields of real science, the group aims to advance practical, applied, and statistical mathematical research based on evidence.

— *Staff* —

Yoshiyasu TAMURA, Director (-2018.3.31), Prof. (-2018.3.31)
Satoshi YAMASHITA, Prof. (Vice Director-General)
Koji KANEFUJI, Prof. (2018.4.1-) (Vice Director-General)
Yoichi ITO, Prof. (2018.4.1-)
Michiko WATANABE, Visiting Prof. (-2018.3.31)
Kenichi MIURA, Visiting Prof. (-2018.3.31)
Hiroko NAKANISHI, Visiting Prof. (-2018.3.31)

Makoto SHIMIZU, Visiting Prof. (-2018.3.31)
Shizue IZUMI, Visiting Prof. (2018.4.1-)
Kenichiro SHIMATANI, Assoc. Prof. (-2018.3.31)
Masayuki HENMI, Assoc. Prof. (-2018.3.31)
Ikuko FUNATOGAWA, Assoc. Prof.
Hisashi NOMA, Assoc. Prof.
Fumitake SAKAORI, Visiting Assoc. Prof. (-2018.3.31)
Michihiro OTA, Visiting Assoc. Prof. (-2018.3.31)
Kazuhiro HIDE, Visiting Assoc. Prof. (-2018.3.31)
Nobuo SHIMIZU, Assist. Prof.

— *Subjects* —

- Evaluation methodology for financial statistic models
- Valuation of market risk and credit risk
- Statistical analysis in clinical trials of pharmaceutical drugs
- Design and analysis of clinical studies for personalized medicine
- Methodology of clinical researches for developing predictive medicine
- Methodology of study designs and statistical methods for epidemiologic researches
- Theory of semiparametric inference and its application
- Foundation of meta-analysis and its application
- Design for long-term ecological study
- Missing data analysis
- Symbolic data analysis
- Longitudinal data analysis

■ Structure Exploration Group

The Structure Exploration Group conducts research on statistical science aimed at inferring the latent "structure" behind various target phenomena in biology, physics, and social science based on observational data. The group focuses on machine learning, Bayesian reasoning, experimental design methods, and spatial–temporal analysis methods to investigate micro/meso/macroscopic and spatial–temporal dynamic structures in target phenomena.

— *Staff* —

Koji KANEFUJI, Prof. (-2018.3.31) (Vice Director-General)
Tomoko MATSUI, Director (2018.4.1-), Prof. (2018.4.1-)
Ryo YOSHIDA, Prof. (2018.4.1-)

Naomasa MARUYAMA, Assoc. Prof. (-2018.3.31)
Jun ADACHI, Assoc. Prof.
Kenichiro SHIMATANI, Assoc. Prof. (2018.4.1-)
Shunichi NOMURA, Assist. Prof. (2017.5.1-)
Stephen WU, Assist. Prof. (2018.4.1-)
Daisuke MURAKAMI, Assist. Prof. (2018.4.1-)

— *Subjects* —

- Statistical methods to establish environment standards
- Reliability theory based on life-span models
- Environmental statistics
- Causal data analysis for advanced business modeling
- Statistical causal inference
- Graphical modeling
- Modeling of molecular evolution
- Maximum likelihood inference of molecular phylogeny
- Comparative analysis of genome structure
- Theoretical biology and bioinformatics
- Analysis of educational and psychological assessment data
- Latent variable models for social sciences
- Decoding of algebraic geometric codes
- Methodology for collecting and publishing information relating to statistical science

Department of Statistical Inference and Mathematics

The Department of Statistical Inference and Mathematics carries out research into general statistical theory, statistical learning theory, optimization, and algorithms for statistical inference.

■ Mathematical Statistics Group

The Mathematical Statistics Group is concerned with aspects of statistical inference theory, modeling of uncertain phenomena, stochastic processes and their application to inference, probability and distribution theory, and the related mathematics.

— *Staff* —

Satoshi KURIKI, Director, Prof.
Yoshiyuki NINOMIYA, Prof. (2018.4.1-)
Akimichi TAKEMURA, Visiting Prof.
Shogo KATO, Assoc. Prof.
Shuhei MANO, Assoc. Prof.
Takaaki SHIMURA, Assist. Prof. (-2018.3.31), Assoc. Prof. (2018.4.1-)
Teppei OGIHARA, Assist. Prof.

— *Subjects* —

- Additive processes
- Algebraic statistics
- Analysis of multivariate data and contingency tables
- Change-point analysis
- Directional statistics
- Extreme value theory
- Heavy-tailed distributions
- Integral-geometric approach to random field theory
- Statistical inference and statistical decisions
- Multiple comparisons
- Statistical inference based on graphical models
- Stochastic modeling of data with combinatorial structures

■ Learning and Inference Group

The Learning and Inference Group develops statistical methodologies to describe the stochastic structure of data mathematically and clarify the potential and the limitations of the data theoretically.

— *Staff* —

Shinto EGUCHI, Prof.
Kenji FUKUMIZU, Prof.
Hironori FUJISAWA, Prof.
Shiro IKEDA, Prof. (-2018.3.31)
Daichi MOCHIHASHI, Assoc. Prof.
Masayuki HENMI, Assoc. Prof.
Ayaka SAKATA, Assist. Prof.

— *Subjects* —

- Approximate Bayesian method
- Approximation theory on graph
- Bioinformatics
- Genome statistics
- Information geometry
- Nonparametric Bayesian method
- Robust statistics
- Semiparametric inference
- Sparse modeling
- Statistical inference based on positive semidefinite kernel
- Statistical inference for observational studies
- Statistical learning theory
- Statistical methods of topological data analysis
- Statistical natural language processing
- Statistical singular model
- Stochastic inference

■ Computational Inference Group (-2018.3.31)

The Computational Inference Group studies mathematical methodologies in the research fields of numerical analysis, optimization, discrete mathematics, control and systems theory for computation-based statistical inference as well as their applications.

— *Staff* —

Satoshi ITO, Prof. (Vice-Director General)
Yoshihiko MIYASATO, Prof.
Akiko TAKEDA, Prof. (-2018.3.31)
Atsushi YOSHIMOTO, Prof.
Eitarou AIYOSHI, Visiting Prof.
Mirai TANAKA, Assist. Prof.

— *Subjects* —

- Adaptive gain-scheduled control
- Algorithms for computational inference
- Analysis of social system
- Computational algorithms for state-space modeling
- Control of multi-agent system

- Iterative learning control
- Mathematics and computational complexity analysis of convex programming
- Nonlinear H_∞ control based on inverse optimality
- Optimization in natural resource controling problem
- Optimization modeling in computational inference
- Systems design under uncertainty
- Theory and computational methods of optimization

■ Mathematical Optimization Group (2018.4.1-)

The Mathematical Optimization Group focuses on mathematical theory and practical applications of optimization and computational algorithms together with underlying numerical or functional analysis and discrete mathematics.

— *Staff* —

Satoshi ITO, Prof. (Vice-Director General)
Shiro IKEDA, Prof.
Eitarou AIYOSHI, Visiting Prof.
Mirai TANAKA, Assist. Prof.

— *Subjects* —

- Algorithms for nonconvex optimization
- Applications of mathematical optimization
- Convex optimization in measure spaces
- Mathematics and computational complexity analysis of convex optimization
- Mathematics of clinch and elimination
- Systems design under uncertainty

Risk Analysis Research Center

Risk Analysis Research Center is pursuing a scientific approach to the uncertainty and risks in society which have increased with the growing globalization of society and the economy, and also the center is constructing a network for risk analysis with the goal of contributing to create a reliable and safe society.

■ Data Infrastructure for Risk Analysis

To generate data-centric risk sciences this group will construct data bases for risk analysis by collecting relevant data and their linkage. The project will further investigate quality management of risk data and supply secured and efficient data editing environment to researchers where they can safely analyze anonymized information on individuals.

— *Staff* —

Kazuhiro MINAMI, Assoc. Prof. (2017.6.1-)
Satoshi YAMASHITA, Director, Prof. (Vice-Director General)
Sadaaki MIYAMOTO, Visiting Prof.
Shigeyuki MATSUI, Visiting Prof. (2018.6.1-)
Shinsuke ITO, Visiting Prof. (2018.4.1-)
Takahiro HOSHINO, Visiting Prof. (2018.6.1-)
Hitoshi MOTOYAMA, Visiting Assoc. Prof. (-2018.3.31, 2018.6.1-)
Takafumi KUBOTA, Visiting Assoc. Prof.
Motoi OKAMOTO, Project Assoc. Prof. (2018.4.1-)
Junchao ZHANG, Project Assist. Prof. (2017.7.1-)

■ Mathematical Analysis of Risk

To quantify the risk factors such as natural disasters, severe diseases and accidents, we need to formalize their stochastic behaviors, and make statistical inferences based on their tail distributions. As such, we study the extreme value theory, copula model and multiple comparisons from the mathematical and computational viewpoints. To promote the activity of this research community, we organize the annual cooperative research symposiums “Extreme value theory and applications” (since 1994) and “Infinitely divisible processes and related topics” (since 1992), and other occasional international symposiums.

— *Staff* —

Satoshi KURIKI, Prof.
Yoshiyuki NINOMIYA, Prof. (2018.5.1-)
Rinya TAKAHASHI, Visiting Prof.
Yo SHIINA, Visiting Prof.
Toshinao YOSHIBA, Visiting Prof.
Masayuki HENMI, Assoc. Prof. (2018.4.1-)
Shogo KATO, Vice Director, Assoc. Prof.

Takaaki SHIMURA, Assist. Prof. (-2018.3.31), Assoc. Prof. (2018.4.1-)
Hisayuki HARA, Visiting Assoc. Prof.
Toshikazu KITANO, Visiting Assoc. Prof. (2018.4.1-)
Masao UEKI, Visiting Assoc. Prof. (2017.10.1-)
Teppei OGIHARA, Assist. Prof.
Yuma UEHARA, Project Assist. Prof. (2019.3.1-)

■ Medical Care and Health Science Project

This project consists of the following three subprojects. In the first one, we aim to develop the statistical framework and methodology of quantitative risk evaluation for substances ingested by the human body. In the second one, we construct theoretical schemes for clinical trial designs toward predictive medicine and develop effective statistical methods for developing and validating predictive biomarkers for treatment efficacy and adverse reactions and for evaluating risk and benefit of treatment based on predictive biomarkers in premarketing and postmarketing clinical trials. In the third one, we clarify effective suicide prevention and mental health care through discussion with experts of mental health and application of spatio-temporal data analysis and causal modeling of various data which may affect mental health.

— *Staff* —

Masayuki HENMI, Assoc. Prof.
Shinto EGUCHI, Prof. (-2018.4.31)
Manabu IWASAKI, Visiting Prof. (-2018.3.31)
Tosiya SATO, Visiting Prof. (-2018.3.31)
Shigeyuki MATSUI, Visiting Prof. (-2018.3.31, 2018.6.1-)
Satoshi TERAMUKAI, Visiting Prof. (-2018.3.31)
Tatsuhiko TSUNODA, Visiting Prof. (-2018.3.31)
Shusaku TSUMOTO, Visiting Prof. (-2018.3.31)
Fumikazu MIWAKEICHI, Assoc. Prof. (-2018.4.31)
Ikuko FUNATOGAWA, Assoc. Prof. (-2018.4.31)
Hisashi NOMA, Assoc. Prof. (-2018.4.31)
Masakazu FURUKAWA, Visiting Assoc. Prof. (-2018.3.31)
Kazushi MARUO, Visiting Assoc. Prof. (-2018.3.31)
Ryota NAKAMURA, Visiting Assoc. Prof. (-2018.3.31)
Toshihiko KAWAMURA, Visiting Assoc. Prof. (-2018.3.31)
Hisateru TACHIMORI, Visiting Assoc. Prof. (-2018.3.31)
Makoto TOMITA, Visiting Assoc. Prof. (-2018.3.31)

Masataka TAGURI, Visiting Assoc. Prof. (-2018.3.31)
Atsushi GOTO, Visiting Assoc. Prof. (-2018.3.31)
Takahiro OTANI, Project Assist. Prof. (-2018.3.31)
Mayumi OKA, Project Assist. Prof. (2017.11.1-2018.3.31)

■ Environmental Statistics Project

The impact of human activity on the global environment is increasing. Thus, quantitative methods to accurately take stock of the environmental situation are becoming increasingly important to implement effective measures for the next generation. In this project, we conduct research on statistical analysis methods which form the basis of environmental risk assessments for water, air, and soil, environmental monitoring, setting of environmental standards, and many other activities.

— *Staff* —

Koji KANEFUJI, Prof. (Vice-Director General)
Mihoko MINAMI, Visiting Prof.
Satoshi TAKIZAWA, Visiting Prof.
Toshihiro HORIGUCHI, Visiting Prof.
Naoki SAKAI, Visiting Prof.
Shunji HASHIMOTO, Visiting Prof.
Kenichiro SHIMATANI, Assoc. Prof.
Shuhei MANO, Assoc. Prof.
Takashi KAMEYA, Visiting Assoc. Prof.
Kunio SHIMIZU, Adjunct Prof.
Nobuhisa KASHIWAGI, Adjunct Prof.

■ Risk analysis for resource management Project

Our research focuses on mathematical modeling for prediction and control of natural and socio-economic resource change within deterministic and stochastic frameworks. Through field survey, we conduct research on sustainable renewable resource management as a socio-economic system. One of our current projects concerns risk evaluation and economic analysis of sustainable forest and ecosystem management.

— *Staff* —

Atsushi YOSHIMOTO, Prof.
Yasuhiro KUBOTA, Visiting Prof.

Yumi TAKIZAWA, Assoc. Prof.
Kenichi KAMO, Visiting Assoc. Prof.
Masashi KONOSHIMA, Visiting Assoc. Prof.
Tetsuji TONDA, Visiting Assoc. Prof.
Shizu ITAKA, Project Assist. Prof. (-2018.11.30)

■ The risk evaluation, control and management of finance and insurance

The aims of this project are to develop the methodology of risk evaluation, risk control and risk management, focusing to financial market, credit risk and macro-economic data.

— *Staff* —

Satoshi YAMASHITA, Director, Prof. (Vice-Director General)
Yoshinori KAWASAKI, Prof.
Naoto KUNITOMO, Visiting Prof.
Hiroshi TSUDA, Visiting Prof.
Toshio HONDA, Visiting Prof.
Michiko MIYAMOTO, Visiting Prof.
Nakahiro YOSHIDA, Visiting Prof.
Tadashi ONO, Visiting Prof.
Hideatsu TSUKAHARA, Visiting Prof.
Satoshi FUJII, Visiting Prof.
Takaaki YOSHINO, Visiting Prof.
Yoichi NISHIYAMA, Visiting Prof. (-2018.3.31)
Masakazu ANDO, Visiting Prof.
Yasutaka SHIMIZU, Visiting Assoc. Prof. (-2017.7.31), Visiting Prof. (2017.8.1-)
Masaaki FUKASAWA, Visiting Prof.
Seisho SATO, Visiting Assoc. Prof. (2017.5.1-)
Yukihiko OKADA, Visiting Assoc. Prof.
Junichi TAKAHASH, Visiting Assoc. Prof. (2017.12.1-)
Yuta KOIKE, Visiting Assoc. Prof. (2018.1.1-)
Teppei OGIHARA, Assist. Prof.
Syunichi NOMURA, Assist. Prof. (2017.6.1-)
Hayafumi WATANABE, Project Assist. Prof. (-2018.11.30)
Yuta TANOUE, Project Assist. Prof. (-2018.8.31)

■ Statistical Seismological Research Project

The statistical seismological research group develops statistical models for

quantitative analysis of earthquake occurrence and the relation between seismicity and other phenomena from geophysical or geochemical observations, techniques of probabilistic earthquake forecasting, and methods for evaluating forecasting performance, with applications in earthquake early warning and earthquake insurance. More general types of random events in time and/or space, such as fires, crimes, etc., are also studied, especially, the construction of forecasting models based on our understanding of the mechanisms of these phenomena, as well as their statistical inferences.

— *Staff* —

Jiancang ZHUANG, Assoc. Prof.
Bogdan Dumitru ENESCU, Visiting Assoc. Prof.
Takaki IWATA, Visiting Assoc. Prof.
Kazuyoshi NANJO, Visiting Assoc. Prof. (2018.4.1-)
David S. HARTE, Visiting Assoc. Prof. (2018.9.15-2018.11.16)
Shunichi NOMURA, Assist. Prof. (2017.6.1-)
Stephen WU, Assist. Prof. (2018.5.1-)
Takao KUMAZAWA, Project Assist. Prof. (2017.6.1-2018.5.31)
Yicun GUO, Project Assist. Prof. (2018.4.1-)

Research and Development Center for Data Assimilation

Data assimilation is a fundamental technique that constructs precise and predictable models by combining numerical simulations and observational/experimental data. Research and Development Center for Data Assimilation studies foundations of data assimilation based on Bayesian statistics, implements numerical algorithms on high-performance computer systems in order to deal with large-scale problems, and promotes data assimilation to various fields of sciences.

— *Staff* —

Genta UENO, Director, Assoc. Prof. (-2018.3.31), Prof. (2018.4.1-)
Tomoyuki HIGUCHI, Prof. (Director-General)
Yoshiyasu TAMURA, Prof. (-2018.3.31)
Junji NAKANO, Prof.
Yukito IBA, Prof.
Ryo YOSHIDA, Assoc. Prof. (-2018.3.31), Prof. (2018.4.1-)

Takashi WASHIO, Visiting Prof. (-2018.3.31)
Shinichi OHTANI, Visiting Prof.
Yoichi MOTOMURA, Visiting Prof.
Nobuhiko TERUI, Visiting Prof.
Tadahiko SATO, Visiting Prof.
Kazuyuki NAKAMURA, Visiting Assoc. Prof. (-2018.3.31), Visiting Prof. (2018.4.1-)
Masako KAMIYAMA, Visiting Prof. (2018.4.1-)
Shinya NAKANO, Vice Director, Assoc. Prof.
Masaya SAITO, Project Assoc. Prof.
Hiroshi FUJISAKI, Visiting Assoc. Prof. (-2018.3.31)
Hiromichi NAGAO, Visiting Assoc. Prof.
Hiroshi KATO, Visiting Assoc. Prof.
Eiji MOTOHASHI, Visiting Assoc. Prof.
Tsukasa ISHIGAKI, Visiting Assoc. Prof.
Hiroshi YAMASHITA, Visiting Assoc. Prof. (-2018.3.31)
Yosuke FUJII, Visiting Assoc. Prof.
Stephen WU, Assist. Prof. (2017.5.1-)
Shunichi NOMURA, Assist. Prof. (2017.6.1-)
Daisuke MURAKAMI, Assist. Prof. (2017.10.1-)
Guillaume LAMBARD, Project Assist. Prof. (-2017.7.31)
Yuya ARIYOSHI, Project Assist. Prof. (-2018.3.31)

— *Subjects* —

- Research of sequential Monte Carlo methods, nonlinear filtering and visualization of ultrahigh dimensional data
- Development of new algorithms that generates random numbers with ultrahigh speed and quality by combining pseudo and hardware random numbers
- Application of data assimilation to practical probrems in various fields of sciences such as space, earth and life sciences
- Development of next-generation industrial science geared towards highly-accurate simulations and highly-sensitive sensors
- Development of advanced Monte Carlo algorithm and its applications
- Implementation of statistical analysis systems in high performance computing and cloud computing environments
- Establishment of a cooperative network that consists of institutes and universities associated with numerical simulations

Research Center for Statistical Machine Learning

The Research Center for Statistical Machine Learning started in January 2012, aiming at taking charge of advancing the "Statistical Machine Learning NOE", one of the Network of Excellence Establishing Projects, and at being a central research organization in the field of statistical machine learning. The center is carrying out various research projects in the machine learning, as well as contributing the research community through organizing and supporting workshops and seminars for the developing this research field.

— *Staff* —

Kenji FUKUMIZU, Director, Prof.
Tomoko MATSUI, Vice Director, Prof.
Shinto EGUCHI, Prof.
Yoshihiko MIYASATO, Prof.
Satoshi ITO, Prof. (Vice-Director General)
Shiro IKEDA, Prof.
Satoshi KURIKI, Prof.
Akiko TAKEDA, Prof. (-2018.3.31), Visiting Prof. (2018.4.1-)
Hironori FUJISAWA, Prof.
Katsuki FUJISAWA, Visiting Prof.
Takashi TSUCHIYA, Visiting Prof.
Masataka GOTO, Visiting Prof.
Yoshiki YAMAGATA, Visiting Prof.
Hiroshi KURATA, Visiting Prof. (-2018.3.31)
Yuji SHINANO, Visiting Assoc. Prof. (-2018.3.31), Visiting Prof. (2018.4.1-)
Arthur GRETTON, Visiting Assoc. Prof. (-2017.11.30), Visiting Prof. (2017.12.1-)
Yoichi MOTOMURA, Visiting Prof.
Nobuhiko TERUI, Visiting Prof.
Daichi MOCHIHASHI, Assoc. Prof.
Shinsuke KOYAMA, Assoc. Prof.
Kazuhiro MINAMI, Assoc. Prof.
Hideitsu HINO, Assoc. Prof. (2018.5.1-)
Hiroshi SOMEYA, Visiting Assoc. Prof. (-2018.3.31)
Makoto YAMADA, Visiting Assoc. Prof. (2017.5.1-)
Tsutomu TAKEUCHI, Visiting Assoc. Prof. (2018.4.1-)
João Pedro PEDROSO, Visiting Assoc. Prof. (2018.2.26-)
Eiji MOTOHASHI, Visiting Assoc. Prof.

Tsukasa ISHIGAKI, Visiting Assoc. Prof.
Mirai TANAKA, Assist. Prof. (2017.5.1-)
Daisuke MURAKAMI, Assist. Prof. (2017.12.1-)
Ayaka SAKATA, Assist. Prof. (2018.6.1-)
Masaaki IMAIZUMI, Assist. Prof. (2018.7.1-)
Mikio MORII, Project Assist. Prof.
Motonobu KANAGAWA, Project Assist. Prof. (2017.6.1-2017.8.31)
Song LIU, Project Assist. Prof. (-2017.9.15)
Matthew Christopher AMES, Project Assist. Prof. (2017.8.1-2018.9.30)

Data Science Center for Creative Design and Manufacturing (2017.7.1-)

The Data Science Center for Creative Design and Manufacturing was established in July 2017, aiming at facilitating strategic applications of data science technologies and the creation of ground-breaking methods for manufacturing. The center has put together diverse technologies of data science, including machine learning, Bayesian modeling and inference, and materials informatics. We will demonstrate the next generation of manufacturing technologies through industry-academia collaboration.

— *Staff* —
Ryo YOSHIDA, Director, Assoc. Prof. (-2018.3.31), Prof. (2018.4.1-)
Hironori FUJISAWA, Vice Director, Prof.
Kenji FUKUMIZU, Prof.
Akiko TAKEDA, Prof. (-2018.3.31)
Shinya NAKANO, Assoc. Prof.
Daichi MOCHIHASHI, Assoc. Prof.
Terumasa TOKUNAGA, Visiting Assoc. Prof. (2018.4.1-)
Stephen WU, Assist. Prof.
Guillaume LAMBARD, Project Assist. Prof. (2017.8.1-2018.3.31)

Research Center for Medical and Health Data Science (2018.4.1-)

Research Center for Medical and Health Data Science promotes statistical mathematics and data science research for medical, drug discovery, health care, and public health in industry, academia, and government. From the basic

mathematics and computer science, which support the scientific foundation of medical research to various research areas in basic medicine, clinical medicine, and social medicine, as well as the latest medical science fields, such as advanced artificial intelligence, machine learning, and data analysis. The goal is to create a foundation for new data science to meet the diverse needs of research. We will also promote nationwide network construction and highly specialized statistical education to strengthen the medical research environment.

— *Staff* —

Yoichi M. ITO, Director, Prof.
Satoshi YAMASHITA, Prof. (Vice Director-General)
Shinto EGUCHI, Prof.
Yasuo OHASHI, Visiting Prof.
Senichiro KIKUCHI, Visiting Prof.
Ken KIYONO, Visiting Prof.
Toshiya SATO, Visiting Prof.
Satoshi HATTORI, Visiting Prof.
Tatsuhiko TSUNODA, Visiting Prof.
Satoshi TERAMUKAI, Visiting Prof.
Hisateru TACHIMORI, Visiting Prof.
Manabu IWASAKI, Visiting Prof.
Shusaku TSUMOTO, Visiting Prof.
Michiko WATANABE, Visiting Prof.
Shigeyuki MATSUI, Visiting Prof. (2018.6.1-)
Hisashi NOMA, Vice Director, Assoc. Prof.
Masayuki HENMI, Assoc. Prof.
Ikuko FUNATOGAWA, Assoc. Prof.
Fumikazu MIWAKEICHI, Assoc. Prof.
Kengo NAGASHIMA, Project Assoc. Prof.
Noriko TANAKA, Visiting Assoc. Prof.
Ryoichi KIMURA, Visiting Assoc. Prof.
Kunihiko TAKAHASHI, Visiting Assoc. Prof.
Kazushi MARUO, Visiting Assoc. Prof.
Atsushi GOTO, Visiting Assoc. Prof.
Masataka TAGURI, Visiting Assoc. Prof.
Ryota NAKAMURA, Visiting Assoc. Prof.
Mayumi OKA, Project Assist. Prof.

Naohiro KATO, Project Assist. Prof. (2018.8.1-)
Naomi TAMURA, Project Assist. Prof. (2018.9.1-)

URA (University Research Administrator)

ISM assigned URA in the Administration Planning and Coordination Section for promoting and strengthening joint research in mathematical statistics.

— *Roles of URA* —

- Promotion for research collaborations and interchanges with universities and research institutions
- Support for design and planning of ISM research strategy
- Promotion for utilizations of ISM supercomputer systems
- Pre-awards and post-awards
- Public-relations and outreach

School of Statistical Thinking

The School of Statistical Thinking was established as a center for the planning and implementation of various programs for professional development and education and training in statistical thinking. In the setting of a joint research facility, the school is working to develop professionals (specialists with broad knowledge and skills, modelers, research coordinators, etc.) equipped with the statistical thinking ability to meet the demands of the "big data era", in which large-scale data sets are utilized for modeling, research coordination, and other applications.

— *Staff* —

Yoshinori KAWASAKI, Director
Genta UENO, Vice Director
Yukito IBA, Vice Director (2018.4.1-), Prof.
Satoshi ITO, Prof. (Vice Director-General)
Kenji FUKUMIZU, Prof.
Yoshiyuki NINOMIYA, Prof. (2018.6.1-)
Yoshiyasu TAMURA, Project Prof. (2018.4.1-)

Kunio SHIMIZU, Adjunct Prof.
Nobuhisa KASHIWAGI, Adjunct Prof.
Toshifumi IKEMORI, Adjunct Prof. (2018.7.5-)
Naomasa MARUYAMA, Assoc. Prof. (-2018.3.31)
Kenichiro SHIMATANI, Assoc. Prof.
Hideitsu HINO, Assoc. Prof. (2018.6.1-)
Naoki KAMIYA, Project Assoc. Prof.
Osamu KOMORI, Visiting Assoc. Prof. (-2018.3.31, 2018.6.1-)
Kei TAKAHASHI, Visiting Assoc. Prof. (-2018.3.31, 2018.6.1-)
Yukino BABA, Visiting Assoc. Prof. (2018.11.16-)
Masaaki IMAIZUMI, Assist. Prof. (2018.4.1-)
Shunichi NOMURA, Assist. Prof. (2018.11.1-)
Mitsuru TOYODA, Project Assist. Prof. (2018.4.1-)
Shogo MIZUTAKA, Project Assist. Prof. (-2018.3.31)

— *Activities* —

- Open lecture for public: Free and introductory lecture concerning statistical science, once a year in November
- Tutorial courses: Pay courses for various topics in statistical science, about 13 times a year
- Graduate school linkage program: Courses and/or guidances at collaborative graduate schools
- Special collaboration with research students: Guidance given in ISM to graduate students belonging to other universities
- Summer graduate Seminar: Free open lecture for graduate students, once a year in summer
- Open-type professional development program: Support for research meetings and workshops for promoting statistical thinking
- Statistical mathematics seminar: Seminars on new research results by researchers in ISM, once a week on Wednesday afternoon
- Research collaboration start-up: Advises and supports given by researchers in ISM for problems of various fields concerning statistical mathematics
- Researcher exchange promotion program: Support to university researchers who use sabbatical system and study at ISM
- Statistical training for school teachers: Training for school teachers to increase their leadership of statistical thinking

Center for Engineering and Technical Support

The Center for Engineering and Technical Support assists the development of statistical science by managing computer systems used for statistical computing, facilitating public outreach, and supporting the research activities of both staff and collaborators.

— *Staff* —

Yoshinori KAWASAKI, Director, Prof.
Jun ADACHI, Vice Director, Assoc. Prof.

■ Computing Facility Unit
The Computing Facility Unit is in charge of the management of computer facilities and software used for research.

■ Computer Networking Unit
The Computer Networking Unit is in charge of the management of networking infrastructure and is responsible for network security.

■ Information Resources Unit
The Information Resources Unit is in charge of the management of the system for disseminating research results and an extensive library and is responsible for planning statistical education courses.

■ Media Development Unit
The Media Development Unit is in charge of the publication and editing of research results and is responsible for public relations.

Project Researchers

Project researchers is the all-inclusive term for post-doctoral researchers participating in specific projects. To name a few, ISM NOE (Network Of Excellence) projects, ROIS-DS (Joint Support-Center for Data Science Research) projects, government-commissioned projects, and the projects funded by independent agencies like JST.

Ames, Matthew Christopher	Kumazawa, Takao	Sugasawa, Shonosuke
Ariyoshi, Yuya	Lambard, Guillaume	Tamura, Naomi
Guo, Yicun	Le, Duc Anh	Tamura, Yoshiyasu
Hamada, Hiroka	Liu, Chang	Tanoue, Yuta
Hirakawa, Shinya	Liu, Song	Tomita, Hiroaki
Inagaki, Yusuke	Mizutaka, Shogo	Toyoda, Mitsuru
Ishibashi, Hideaki	Morii, Mikio	Uehara, Yuma
Itaka, Shizu	Nagahata, Hideaki	Watanabe, Hayafumi
Kamiya, Naoki	Nagashima, Kengo	Yamada, Hironao
Kanagawa, Motonobu	Oka, Mayumi	Yamamoto, Takashi
Kato, Naohiro	Otani, Takahiro	Zhang, Junchao
Kato-Nitta, Naoko	Saito, Masaya	Zhou, Jin
Kawamori, Ai	Shibai, Kiyohisa	

Visiting Professors

To push forward the frontiers of interaction between statistics and other fields of science, the Institute provides positions for visiting professors.

Each of the Institute's three departments and five centers have invited foreign and Japanese professors from universities and institutes as shown in the list below.

— *Foreign Visiting Professors* —

Myrvoll, Tor Andre	(Norway)	2017. 6. 5 – 2017. 6.30
Ibid.	(Norway)	2018. 6.11 – 2018. 7. 6
Septier, François Jean Michel	(France)	2017. 6.14 – 2017. 7.10
Ibid.	(France)	2018. 7. 6 – 2018. 8. 1
Doucet, Arnaud	(U.K.)	2017. 7.21 – 2017. 8.23
Ibid.	(U.K.)	2018. 7.26 – 2018. 8.20
Hung, Ying -Chao	(China)	2017. 7.26 – 2017. 8.24
Shi, Ningzhong	(China)	2017. 9.11 – 2017.12. 1
Shevchenko, Pavel	(Australia)	2017.10. 2 – 2017.10.30
Ibid.	(Australia)	2019. 2.12 – 2019. 3.15
Peters, Gareth William	(U.K.)	2018. 2.19 – 2018. 3.16
Ibid.	(U.K.)	2018. 7.23 – 2018. 8.30
Richards, Donald ST. P.	(U.S.A.)	2018. 5.11 – 2018. 7. 4
Phoa, Frederick Kin Hing	(Taiwan)	2018. 9.20 – 2018.10.16

Pedroso, João Pedro (Portugal) 2019. 2.26 – 2019. 3.31

— *Japanese Visiting Professors* —

Abe, Takahito	2017. 4. 1 - 2018. 3.31	Kunitomo, Naoto	2017. 4. 1 - 2019. 3.31
Aiyoshi, Eitarou	2017. 4. 1 - 2019. 3.31	Kurata, Hiroshi	2017. 4. 1 - 2018. 3.31
Ando, Masakazu	2017. 4. 1 - 2019. 3.31	Manabe, Kazufumi	2017. 4. 1 - 2018. 3.31
Enescu, Bogdan Dumitru	2017. 4. 1 - 2019. 3.31	Maruo, Kazushi	2017. 4. 1 - 2019. 3.31
Fujii, Satoshi	2017. 4. 1 - 2019. 3.31	Maruyama, Hiroshi	2017. 4. 1 - 2018. 3.31
Fujii, Yosuke	2017. 4. 1 - 2019. 3.31	Matsui, Shigeyuki	2017. 4. 1 - 2018. 3.31
Fujisaki, Hiroshi	2017. 4. 1 - 2018. 3.31	Ibid.	2018. 6. 1 - 2019. 3.31
Fujisawa, Katsuki	2017. 4. 1 - 2019. 3.31	Matsumoto, Wataru	2017. 4. 1 - 2019. 3.31
Fujita, Taisuke	2017. 4. 1 - 2019. 3.31	Minami, Mihoko	2017. 4. 1 - 2019. 3.31
Fukasawa, Masaaki	2017. 4. 1 - 2019. 3.31	Miura, Kenichi	2017. 4. 1 - 2018. 3.31
Furukawa, Masakazu	2017. 4. 1 - 2018. 3.31	Miyamoto, Michiko	2017. 4. 1 - 2019. 3.31
Fushiki, Tadayoshi	2017. 4. 1 - 2019. 3.31	Miyamoto, Sadaaki	2017. 4. 1 - 2019. 3.31
Goto, Atsushi	2017. 4. 1 - 2019. 3.31	Mizukami, Yuji	2017. 4. 1 - 2019. 3.31
Goto, Masataka	2017. 4. 1 - 2019. 3.31	Mizuta, Masahiro	2017. 4. 1 - 2019. 3.31
Gretton, Arthur	2017. 4. 1 - 2019. 3.31	Motohashi, Eiji	2017. 4. 1 - 2019. 3.31
Hara, Hisayuki	2017. 4. 1 - 2019. 3.31	Motomura, Yoichi	2017. 4. 1 - 2019. 3.31
Hashimoto, Shunji	2017. 4. 1 - 2019. 3.31	Motoyama, Hitoshi	2017. 4. 1 - 2018. 3.31
Hayashi, Fumi	2017. 4. 1 - 2018. 3.31	Ibid.	2018. 6. 1 - 2019. 3.31
Hide, Kazuhiro	2017. 4. 1 - 2018. 3.31	Nagao, Hiromichi	2017. 4. 1 - 2019. 3.31
Honda, Toshio	2017. 4. 1 - 2019. 3.31	Nakamura, Kazuyuki	2017. 4. 1 - 2019. 3.31
Horiguchi, Toshihiro	2017. 4. 1 - 2019. 3.31	Nakamura, Ryota	2017. 4. 1 - 2019. 3.31
Imada, Takatoshi	2017. 4. 1 - 2019. 3.31	Nakanishi, Hiroko	2017. 4. 1 - 2018. 3.31
Ishigaki, Tsukasa	2017. 4. 1 - 2019. 3.31	Nishiyama, Yoichi	2017. 4. 1 - 2018. 3.31
Iwasaki, Manabu	2017. 4. 1 - 2019. 3.31	Okada, Yukihiko	2017. 4. 1 - 2019. 3.31
Iwata, Takaki	2017. 4. 1 - 2019. 3.31	Ono, Tadashi	2017. 4. 1 - 2019. 3.31
Kameya, Takashi	2017. 4. 1 - 2019. 3.31	Ota, Michihiro	2017. 4. 1 - 2018. 3.31
Kamo, Kenichi	2017. 4. 1 - 2019. 3.31	Otani, Shinichi	2017. 4. 1 - 2019. 3.31
Kato, Hiroshi	2017. 4. 1 - 2019. 3.31	Ozaki, Koken	2017. 4. 1 - 2019. 3.31
Kawamura, Toshihiko	2017. 4. 1 - 2018. 3.31	Saito, Shigeru	2017. 4. 1 - 2018. 3.31
Kikkawa, Toru	2017. 4. 1 - 2019. 3.31	Sakai, Naoki	2017. 4. 1 - 2019. 3.31
Kikuzawa, Saeko	2017. 4. 1 - 2019. 3.31	Sakaori, Fumitake	2017. 4. 1 - 2018. 3.31
Komori, Osamu	2017. 4. 1 - 2018. 3.31	Sato, Tadahiko	2017. 4. 1 - 2019. 3.31
Ibid.	2018. 6. 1 - 2019. 3.31	Sato, Toshiya	2017. 4. 1 - 2019. 3.31
Konoshima, Masashi	2017. 4. 1 - 2019. 3.31	Sato, Yoshimichi	2017. 4. 1 - 2019. 3.31
Kubota, Takafumi	2017. 4. 1 - 2019. 3.31	Shiina, Yo	2017. 4. 1 - 2019. 3.31
Kubota, Yasuhiro	2017. 4. 1 - 2019. 3.31	Shimizu, Makoto	2017. 4. 1 - 2018. 3.31

Shimizu, Yasutaka	2017. 4. 1 - 2019. 3.31	Yoshiba, Toshinao	2017. 4. 1 - 2019. 3.31
Shinano, Yuji	2017. 4. 1 - 2019. 3.31	Yoshida, Nakahiro	2017. 4. 1 - 2019. 3.31
Someya, Hiroshi	2017. 4. 1 - 2018. 3.31	Yoshino, Takaaki	2017. 4. 1 - 2019. 3.31
Sono, Shintaro	2017. 4. 1 - 2018. 3.31	Sato, Seisho	2017. 5. 1 - 2019. 3.31
Tachimori, Hisateru	2017. 4. 1 - 2019. 3.31	Yamada, Makoto	2017. 5. 1 - 2019. 3.31
Taguri, Masataka	2017. 4. 1 - 2019. 3.31	Ueki, Masao	2017.10. 1 - 2019. 3.31
Takaguchi, Taro	2017. 4. 1 - 2018. 3.31	Takahashi, Junichi	2017.12. 1 - 2019. 3.31
Takahashi, Kei	2017. 4. 1 - 2018. 3.31	Koike, Yuta	2018. 1. 1 - 2019. 3.31
Ibid.	2018. 6. 1 - 2019. 3.31	Hattori, Satoshi	2018. 4. 1 - 2019. 3.31
Takahashi, Rinya	2017. 4. 1 - 2019. 3.31	Ito, Shinsuke	2018. 4. 1 - 2019. 3.31
Takemura, Akimichi	2017. 4. 1 - 2019. 3.31	Izumi, Shizue	2018. 4. 1 - 2019. 3.31
Takizawa, Satoshi	2017. 4. 1 - 2019. 3.31	Kamiyama, Masako	2018. 4. 1 - 2019. 3.31
Teramukai, Satoshi	2017. 4. 1 - 2019. 3.31	Kikuchi, Senichiro	2018. 4. 1 - 2019. 3.31
Terui, Nobuhiko	2017. 4. 1 - 2019. 3.31	Kimura, Ryoichi	2018. 4. 1 - 2019. 3.31
Tomita, Makoto	2017. 4. 1 - 2018. 3.31	Kitano, Toshikazu	2018. 4. 1 - 2019. 3.31
Tonda, Tetsuji	2017. 4. 1 - 2019. 3.31	Kiyono, Ken	2018. 4. 1 - 2019. 3.31
Tsuchiya, Takashi	2017. 4. 1 - 2019. 3.31	Nanjo, Kazuyoshi	2018. 4. 1 - 2019. 3.31
Tsuda, Hiroshi	2017. 4. 1 - 2019. 3.31	Ohashi, Yasuo	2018. 4. 1 - 2019. 3.31
Tsukahara, Hideatsu	2017. 4. 1 - 2019. 3.31	Takahashi, Kunihiko	2018. 4. 1 - 2019. 3.31
Tsumoto, Shusaku	2017. 4. 1 - 2019. 3.31	Takeda, Akiko	2018. 4. 1 - 2019. 3.31
Tsunoda, Hiroko	2017. 4. 1 - 2018. 3.31	Takeuchi, Tsutomu	2018. 4. 1 - 2019. 3.31
Tsunoda, Tatsuhiko	2017. 4. 1 - 2019. 3.31	Tanaka, Noriko	2018. 4. 1 - 2019. 3.31
Washio, Takashi	2017. 4. 1 - 2018. 3.31	Tokunaga, Terumasa	2018. 4. 1 - 2019. 3.31
Watanabe, Michiko	2017. 4. 1 - 2019. 3.31	Hoshino, Takahiro	2018. 6. 1 - 2019. 3.31
Yamagata, Yoshiki	2017. 4. 1 - 2019. 3.31	Harte, David S.	2018. 9.15 - 2018.11.16
Yamashita, Hiroshi	2017. 4. 1 - 2018. 3.31	Baba, Yukino	2018.11.16 - 2019. 3.31
Yoneda, Masato	2017. 4. 1 - 2018. 3.31		

Visiting Research Fellows

In addition to visiting professors, the Institute provides research fellowships to researchers in Japan and abroad, from companies as well as from universities. The Institute also provides support for those who are appointed as staff of programs by the Japan Society for the Promotion of Science (JSPS). A list follows showing research fellows received during the period April 2017 to March 2019.

(The list does not show all of the visiting fellows from abroad. Foreign visiting research fellows are listed under “Foreign Visitors” on page 39.)

— *Research fellows upon JSPS program* —

Fukaya, Keiichi
Imaizumi, Masaaki
Noda, Takuji

— *Japanese visiting research fellows* —

Baba, Yasumasa
Dou, Xiaoling
Fuchiwaki, Junta
Fukaya, Keiichi
Funatogawa, Takashi
Guo, Yicun
Han, Peng
Hayashi, Kenichi
Hirai, Takahiro
Hirotsu, Chihiro
Ikebata, Hisaki
Ikemori, Toshifumi
Ikoma, Norikazu
Imaizumi, Masaaki
Imamura, Takeshi
Imoto, Tomoaki
Ishiguro, Makio
Isomura, Tetsu
Itaka, Shizu
Kashiwagi, Nobuhisa
Kawakita, Masanori
Kawamori, Ai
Kazama, Kimie
Kobayashi, Megumi
Koike, Yuta
Komori, Osamu
Konno, Hidetoshi
Kumazawa, Takao
Liu, Chang
Markov, Konstantin
Maruyama, Naomasa
Masuda, Tomoe
Matsu'ura, Mitsuhiro
Nagai, Tomoki
Nakamura, Takashi
Nanjo, Kazuyoshi
Ninomiya, Yoshiyuki
Nishihara, Hidenori
Noda, Takuji
Nomura, Shunichi
Notsu, Akifumi
Nozaki, Hiroo
Ogata, Yosihiko
Ohnishi, Yu-ya
Omae, Katsuhiro
Onoduka, Ayuko
Otani, Takahiro
Saito, Yuki
Sakota, Takahiro
Sano, Natsuki
Segawa, Takahiro
Shimizu, Kunio
Shiota, Sayaka
Shioya, Toshinao
Sodeyama, Keitaro
Sudo, Shotaro
Sugasawa, Shonosuke
Suzuki, Kazue
Takenouchi, Takashi
Tanabe, Kunio
Tanaka, Mieko
Tanaka, Ushio
Tanoue, Yuta
Tokunaga, Terumasa
Toyoda, Tadashi
Tsubaki, Hiroe
Tsujikawa, Misaki
Vuong, Thi Hai Yen
Wakabayashi, Ryutaro
Watanabe, Hayafumi
Xu, Hong
Yamasaki, Kazuko
Yamashita, Hiroshi
Yamazaki, Tamio
Yamazaki, Youichi
Yanagimoto, Takemi

— *Students from graduate school* —

Ebiki, Mitsutaka
Ito, Naoki
Kurisu, Daisuke
Sasaki, Tomoya

Professor Emeritus

Baba, Yasumasa
Hasegawa, Masami
Higuchi, Tomoyuki

Hirano, Katsuomi
Ishiguro, Makio
Itoh, Yoshiaki
Kashiwagi, Nobuhisa
Kitagawa, Genshiro
Matsunawa, Tadashi
Murakami, Masakatsu
Nakamura, Takashi
Nakano, Junji
Ogata, Yosihiko
Ohsumi, Noboru
Sakamoto, Yoshiyuki
Shimizu, Ryoichi
Suzuki, Giitiro
Suzuki, Tatsuzo
Tamura, Yoshiyasu
Tanabe, Kunio
Tanemura, Masaharu
Tsubaki, Hiroe
Yanagimoto, Takemi

3 Research Collaboration

The Institute runs a unique system to promote collaborative research activities between statisticians and scientists in related fields, such as the social sciences, the humanities, life sciences, earth and space sciences and engineering. The system was initiated in 1985 with a special intention, based on past experience of the Institute. Since the genesis of the Institute, one of the basic principles has been to attach greater importance to applications (applied science). The principle came from the appreciation that innovative methodologies and theories of statistics are frequently developed in an effort to solve real life problems.

In the past decades the Institute has maintained research collaborations with universities, governmental organizations, private companies and various organizations domestically as well as internationally. This period produced a lot of useful works, both in theory and application. This tradition of open collaboration with scientists outside the Institute has created a progressive and liberal academic atmosphere which, we believe, has contributed to developing new interdisciplinary research fields in related sciences.

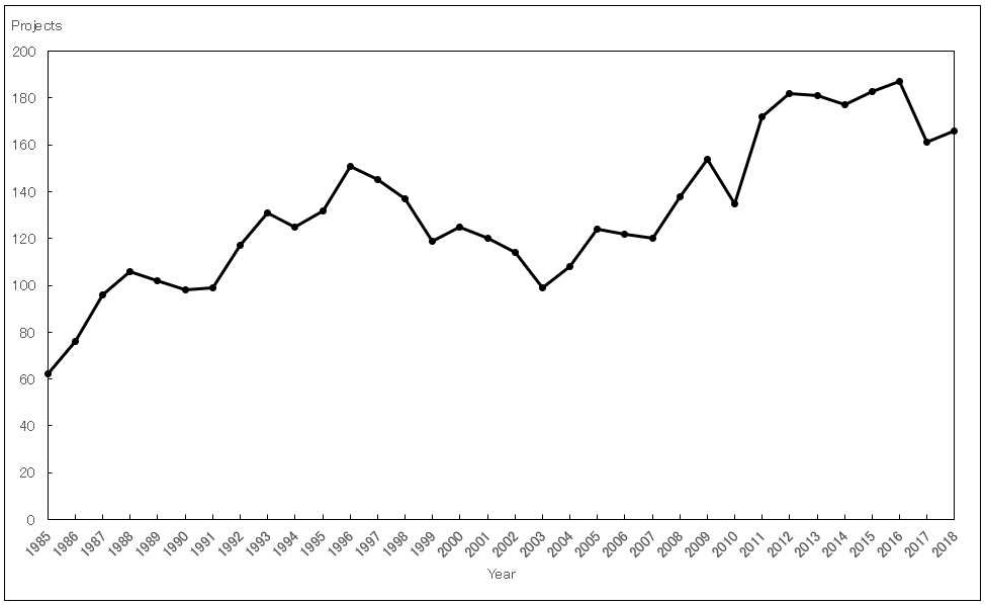
These cooperative research activities were maintained through various research fields at different levels and with various types of collaboration, long before the Institute was reorganized into an inter-university research institute. Many remarkable results have been produced through collaborative research in the last decades. To our regret, however, when joint work is organized by researchers at the individual level, the fruit of the collaborative research tends to be received by the general public as a successful contribution to the science that addressed the problem. Without acknowledgment the true contributions by our statisticians are not credited or noticed. Obviously this tendency comes from the inherently abstract nature of statistics. The statistician's contribution, although essential, is not as easy to explain to the general public as explaining the problem itself in applied science. Accordingly, it seemed that the value and the raison d'être of the statisticians and the Institute was not appreciated as much as other scientists and research institutes

in the applied sciences.

Our cooperative research system was initiated on the basis of two understandings. First, this kind of collaborative research activity is beneficial to both statistics and other related sciences. Secondly, statisticians working in such circumstances need recognition, support and encouragement. We hope that the present system will play a vital role to bring "Win-Win" benefits to both statisticians and applied scientists in the related field.

Since 1985 the system has been run by the Cooperative Research Committee, half of whose members are scientists from outside the Institute. Cooperative research projects between statisticians and scientists in related scientific fields are called for each year. More than a hundred projects in applied sciences and statistics are supported each year (see the figure below). In 1998, in order to enlarge the area of collaboration, the Institute relaxed a condition of application for projects which had stipulated that at least one member of the research project should belong to the Institute. The system of cooperation is also open to projects that are planned and accomplished through international cooperation.

Our cooperative research projects are classified into several categories: cooperative user registration, general cooperative research "Type 1", general cooperative research "Type 2", subject-oriented cooperative research, and cooperative research symposium.



Number of collaborative research projects

4 International Research Exchange

Historically, statistical science has developed in response to the need for statistical ideas and methods to be exploited in other fields of science and industry. Therefore the Institute has established a systematic way to promote cross-disciplinary research projects either at a domestic or an international scale (see the previous chapter).

The Institute has also pushed forward research collaboration with a wide variety of foreign institutions including universities and governmental agencies.

Since 1988, the Institute has entered into special relationship with the following institutes to conduct programs on academic exchange and facilitate joint research projects;

- The Statistical Research Division of the U.S. Bureau of the Census, U.S.A., 1988-
- Stichting Mathematisch Centrum, Netherlands, 1989-
- Institute for Statistics and Econometrics, Humboldt University of Berlin, Germany, 2004-
- The Steklov Mathematical Institute, Russia, 2005-
- Central South University, China, 2005-
- Soongsil University, Korea, 2006-
- Department of Statistics, University of Warwick, U.K., 2007-
- The Indian Statistical Institute, India, 2007-
- Institute of Statistical Science, Academia Sinica, Taiwan, 2008-
- Department of Empirical Inference, Max Planck Institute for Biological Cybernetics, Germany, 2010-
- Department of Communication Systems, SINTEF Information and Communication Technology, Norway, 2012-
- Centre for Computational Statistics and Machine Learning, University College London, U.K., 2012-
- Department of Electronics and Telecommunications, Norwegian Uni-

versity of Science and Technology, Norway, 2012-
- Department of Probability and Mathematical Statistics, Charles University in Prague, Czech Republic, 2012-
- The Department of Ecoinformatics, Biometrics and Forest Growth of the Georg-August University of Goettingen, Germany, 2012-
- The Korean Statistical Society, Korea, 2013-
- Toyota Technological Institute at Chicago, U.S.A., 2014-
- Mathematical Sciences Institute Australian National University, Australia, 2014-
- RiskLab ETH Zurich, Switzerland, 2015-
- Institut de Recherche en Composants logiciel et matériel pour l'Information et la Communication Avancee (IRCICA), France, 2015-
- Le laboratoire de mathématiques de l'Universite Blaise Pascal, France, 2015-
- Centre de Rechereche en Informatique, Signal et Automatique de Lille (CRIStAL), France, 2015-
- University College London (UCL) Big Data Institute, U.K., 2015-
- The Institute of Forestry, Pokhara of Tribhuvan University, Nepal, 2015-
- The Institute of Forest and Wildlife Research and Development of the Forestry Administration of Cambodia, Cambodia, 2015-
- The Chancellor masters and Scholars of the University of Oxford, U.K., 2015-
- Forest Inventory and Planning Institute, Vietnam, 2015-
- The University of Porto, Portugal, 2016-
- Zuse Institute Berlin, Germany, 2016-
- Natinonal University of Laos, Laos, 2017-
- Institute of Geophysics China Earthquake Administration, China, 2017-
- Hong Kong Baptist University, Hong Kong, 2017-
- University of Malaya, Malaysia, 2017-
- Unversidade de Évora, Portugal, 2017-
- Universität Ulm, Germany, 2017-
- The Korean Association for Survey Research, Korea, 2018-
- The Jean Golding Institute for data-intensive research, University of Bristol, U.K., 2019-
- Survey Research Center, Sungkyunkwan University, Korea, 2019-
- University of Lampung, Indonesia, 2019-
- Department of Earth and Space Sciences, Southern University of Sci-

ence and Technology, China, 2019-
- Université Bretagne Sud, France, 2019-

The Institute has also been active in organizing international conferences and workshops. In April 2017-March 2019, 22 international symposia were held under the auspices of the Institute;

- 2nd ISM-ZIB-IMI MODAL Workshop on Mathematical Optimization and Data Analysis, September 22-26, 2017
- 2017 IEEE International Workshop on Machine Learning for Signal Processing (MLSP2017), September 25-28, 2017
- 8th International Workshop on Analysis of Micro Data of Official Statistics, November 9-14, 2017
- the Korea-Japan joint workshop on Frontiers of social survey research, February 13, 2018
- Workshop on Functional Inference and Machine Intelligence 2018, February 19-21, 2018
- Risk Analysis and Random Fields, February 22, 2018
- 2018 International Workshop on Spatial and Temporal Modeling from Statistical, Machine Learning and Engineering perspectives (STM2018), February 27-28, 2018
- The 14th Japan Conference on Teaching Statistics (JCOTS17), March 2-3, 2018
- Seminar on topic model and deep learning, March 9, 2018
- ISM Symposium on Environmental Statistics 2018, March 22-23, 2018
- NTNU-ISM Joint Workshop on Sustainability and Statistical Machine Learning, June 3-5, 2018
- Workshop on the Frontiers of Applied Bayesian Inference and Computation, September 14, 2018
- The 3rd IMI-ISM-ZIB MODAL Wrokshop on Challenges in Real World Data Analytics and High-Performance Optimization, September 26-October 1, 2018
- 9th Japanese Data Assimilation Workshop, October 10, 2018
- Workshop on Computational Statistics and Machine Learning, October 15-16, 2018
- Stochastic Processes and Risk Analysis, October 19, 2018
- 9th International Workshop on Analysis of Micro Data of Official Statistics, November 29-December 4, 2018

- HW-ISM-UoE Workshop on Machine Learning for Risk and Insurance, February 4-6, 2019
- Pioneering Workshop on Extreme Value and Distribution Theories in Honor of Professor Masaaki Sibuya, March 21-23, 2019
- ISM Symposium on Environmental Statistics 2019, March 25-26, 2019
- The 4th ISM-ZIB-IMI MODAL Workshop on Mathematical Optimization and Data Analysis, March 25-30, 2019
- Workshop on Functional Inference and Machine Intelligence 2019, March 28-29, 2019

The Institute actively encourages researchers to come to talk or give lectures and also to stay for collaboration with the staff. As shown in the list below, the Institute has received 116 visitors from 21 different countries. Of these researchers, 101 entered into a visiting research fellowship including a visiting professorship. Another list follows showing all the colloquia that were given by foreign visitors.

Foreign Visitors (April 2017-March 2019)

- The asterisk * before a visitor's name indicates that he/she is a visiting professor or a visiting research fellow.
- Date in the list refers to the period of visiting professorship/research-fellowship or the date of colloquium.

From Australia

*Chan, Jennifer 18.2.15-18.3.1
*Ibid 18.7.14-18.7.26
*Jin, Sun 19.1.4-19.1.30
*Kawai, Reiichiro 18.1.5-18.2.6
*Shevchenko, Pavel 17.10.2-17.10.30
*Ibid 18.2.24-18.3.3
*Ibid 19.2.12-19.3.15
Ting, Kai Ming 18.11.9
*Ya, Hongxuan 17.6.25-19.3.31
*Ye, Chen 19.2.23-19.3.3
*Yi, Jiang 19.3.1-20.2.29

From Canada

Tatsuno, Masami 17.4.17

From China

*Cao, Ying 17.4.1-19.3.31
*Chen, Shi 18.8.20-18.9.18
*Chen, Song Xi 17.7.10-17.7.19
*Chen, Xiaofei 19.1.20-19.1.25
*Gong, Xuan 19.1.3-19.2.2
*Guo, Lianghui 17.5.10-17.5.30
*Han, Peng 17.9.4-18.3.31
*Ibid 19.1.10-19.1.25
*Hasegawa, Masami 17.4.1-19.3.31
*Hung, Ying -Chao 17.7.26-17.8.24
Jing, Wu 17.8.29
*Li, Hongyi 18.8.25-18.8.31
*Li, Rui 19.2.10-19.3.24
*Lin, Liang-Ching 18.2.27-18.3.6
*Mu, He-Qing 17.8.31-17.9.8
*Niu, Yuanyuan 18.1.10-18.2.15
*Shi, Lei 17.5.10-17.5.30
*Shi, Ningzhong 17.9.11-17.12.1
*Si, Zhengya 19.1.3-19.2.2
*Wang, Linhai 19.1.15-19.2.14
*Xiong, Ziyao 17.10.20-17.11.22
*Ibid 18.9.1-19.8.31
*Yonezawa, Takahiro 17.4.1-19.3.31
*Zhang, Bei 18.8.20-18.9.18
*Zhang, Shengfeng 17.11.22-18.11.21
*Zheng, Zeyu 17.8.1-17.8.10

From Finland

*Aakala, Tuomas 18.3.25-18.4.10
*Xu, Yingying 17.6.1-17.7.30

From France

*Azzaoui, Nourddine 18.2.24-18.3.4
*Clavier, Laurent 18.2.23-18.3.1

*Gloter, Arnaud Edouard....18.10.18-18.10.26
*Guegan, Dominique.....17.8.1-17.8.4
*Septier, François Jean Michel 17.6.14-17.7.10
*Ibid 18.2.23-18.3.4
*Ibid 18.7.6-18.8.1
*Tsybakov, Alexandre 18.2.19-18.2.21

From Germany

Agostini, Daniele 18.4.4
Duelmer, Hermann 17.9.15
Galka, Andreas 18.10.17
Härdle, WolfgangKarl 18.12.10
*Jagodzinski, Wolfgang.....17.5.16-17.6.1
*Kanagawa, Motonobu 18.2.17-18.3.15
*Ibid.....19.3.18-19.3.29
*Lindner, Alexander.....18.2.20-18.2.25
Mak, Sum.....17.8.29
*Spodarev, Evgeny 18.2.18-18.3.4
*Stadje, Mitja Alexander.....18.10.13-18.10.20
*Stelzer, Robert Josef 18.2.20-18.2.24
Vigerske, Stefan.....17.10.3

From Hong Kong

*Liu, Ye.....18.9.1-18.11.30

From India

*Bandyopadhyay, Antar.....17.11.27-17.12.2
*Gupta, Anjani.....18.5.21-18.7.20
*Kashikar, Akanksha Shrikant 18.3.14-18.5.20
*Kaul, Manohar.....17.5.18-17.8.12
*Kaur, Gursharn 17.11.27-17.12.20
*Mukherjee, Tanmoy 18.2.15-18.3.30
*Sarkar, Soham 17.11.20-17.12.14

From Italy

*Falcone, Giuseppe 18.2.19-18.3.3
*Lombardo, Rosaria 18.3.8-18.3.12
*Ibid.....19.2.28-19.3.5
*Taroni, Matteo.....17.5.8-17.5.20
*Varini, Elisa 18.2.19-18.3.23

From Korea

*Lee, Jae Eun.....18.1.9-18.2.8

From Malaysia

*Ibrahim, Adriana Irawati Nur Binti.....18.3.18-18.3.31
*Lee, Young.....18.1.16-18.2.25
*Ng, Choung Min 18.9.23-18.10.13
*Ong, Seng Huat.....19.3.18-19.3.23
*Yunus, Rossita Binti Mohamad.... 18.9.28-18.10.25

From Nederland

*Schmidt-Hieber, Johannes 18.2.19-18.2.21

From New Zealand

*Buckby, Jodie 17.10.30-17.11.10
*Ibid 18.9.23-18.10.6

From Norway

*Myrvoll, Tor Andre 17.6.5-17.6.30
*Ibid 18.6.11-18.7.6
*Ibid 18.2.24-18.3.4

From Portugal

Pedroso, João Pedro 18.8.21
*Ibid 19.2.26-19.3.31

From Singapore

Dauwles, Justin 17.12.28
*Ibid 18.8.7-18.8.10
*Nevat, Ido 18.2.25-18.3.1

From Spain

*Pewsey, Arthur 17.9.7-17.9.22
*Ibid 18.11.22-18.12.3

From Taiwan

*Chang, Shen-Da 17.11.26-17.12.3
*Hung, Hung 18.7.13-18.9.17
*Hwang, Hsien-Kuei 17.12.1-18.3.31
*Ibid 19.3.20-19.4.4
*Kuo, Po-Chih 17.11.26-17.12.3
*Liao, Yiwun 18.10.22-18.11.21
Liu, Jann-Yenq 17.6.13
*Lu, Rung- Sheng 17.11.29-17.12.15
*Ibid 18.7.13-18.9.17
Ma, Kuo-Fong 17.1.31
*Phoa, Frederick Kin Hing 18.9.20-18.10.16
*Wu, Chi-Hao 17.11.25-17.12.22
*Ibid 18.7.9-18.7.30

From Thailand

*Muandet, Krikamol 17.7.4-17.7.24
*Ibid 18.2.19-18.2.23

From U.K.

*Brannelly, Holly Georgina 18.2.25-18.3.9
*Campi, Marta 18.1.15-18.2.28
*Chen, Mingli 17.4.24-17.4.28
*Doucet, Arnaud 17.7.21-17.8.23
*Ibid 18.7.26-18.8.20
*Gal, Yarin 18.2.17-18.2.22
*Kanagawa, Heishiro 19.3.26-19.3.31
*Law, Ho Chung 18.2.12-18.5.30
*Lin, Lizhen 18.2.19-18.2.23
*Liu, Song 18.2.19-18.2.23
*Macrina, Andrea 18.2.25-18.3.9
*Nakamura Brannvall, Lars Rickard 18.2.19-18.3.20
*Peters, Gareth William 17.4.3-17.4.11
*Ibid 18.2.19-18.3.16
*Ibid 18.7.23-18.8.30
*Sejdinovic, Dino 19.3.22-19.3.29

*Toczydlowska, Dorota.....18.7.15-18.8.16

*Zhang, Xiaoming.....18.2.24-18.3.10

From U.S.A.

*Chen, Yen-Chi.....19.3.27-19.3.29

Dimakis, Alexandros.....18.7.19

*Harkonen, Marc 19.3.10-19.3.24

*Kolar, Mladen.....18.2.19-18.2.24

*Kozubowski, Thomasz 19.3.18-19.3.23

*Lele, Subhash R 19.3.18-19.3.31

*Richards, Donald ST. P 18.5.11-18.7.4

Sinz, Fabian 17.8.31

*Sriperumbudur, Bharath Kumar.... 17.2.19-17.2.24

*Ibid 19.3.25-19.3.29

*Vishwanath, Siddharth..... 18.7.1-18.8.5

*Yoneoka, Daisuke..... 18.6.12-18.8.31

*Yoshida, Ruriko 18.8.26-18.9.15

Zhang, Jun.....19.3.25

Colloquia by Foreign Visitors

(2017.4-2019.3)

Speaker (Country)	Title	Date
Tatsuno, Masami (Canada)	Reactivation of cell assemblies during the off-line brain states	2017. 4.17
Chen, Mingli (United Kingdom)	Quantile graphical models: Prediction and conditional independence with applications to financial risk management	2017. 4.24
Liu, Jann-Yenq (Taiwan)	Statistical analyses on seismo-ionospheric disturbances and precursors of the 11 March 2011 M9.0 Tohoku Earthquake	2017. 6.13
Chen, Song Xi (China)	Detecting rare and faint signals via thresholding maximum likelihood estimators	2017. 7.11
Guegan, Dominique (France)	Risk measures at risk - Are we missing the point? Discussions around sub-additivity and distorsion	2017. 8. 3
Jing, Wu (China)	Seismicity and seismic anisotropy beneath eastern Tibet	2017. 8.29
Mak, Sum (Germany)	Empirical validation of seismic hazard models	2017. 8.29
Sinz, Fabian (U.S.A.)	Reverse engineering neocortical intelligence	2017. 8.31
Mu, He-Qing (China)	Outlier detection and post-analysis	2017. 9. 1
Duelmer, Hermann (Germany)	Modernization, culture, and moral change in Europe: From universalism to contextualism	2017. 9.15
Vigerske, Stefan (Germany)	MINLP solver technology	2017.10. 3
Shevchenko, Pavel V. (Australia)	Valuation of variable annuity guarantees	2017.10.24
Dauwles, Justin (Singapore)	AI for applications in neurology and psychiatry	2017.12.28

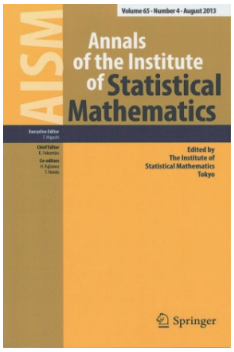
Speaker (Country)	Title	Date
Ma, Kuo-Fong (Taiwan)	Probability on seismic hazard assessment of Taiwan: Progress and challenge	2018. 1.31
Kanagawa, Motonobu (Germany)	Why uncertainty matters in deterministic computations? A decision theoretic perspective	2018. 3.13
Varini, Elisa (Italy)	Identification of earthquake clusters in Northeastern Italy by different approaches	2018. 3.20
Agostini, Daniele (Germany)	Discrete Gaussian distributions via theta functions	2018. 4. 4
Kashikar, Akanksha (India)	Estimation of growth rate in second order branching process	2018. 4.23
Dimakis, Alexandros (U.S.A.)	Generative Adversarial Networks (GANs) and compressed sensing	2018. 7.19
Pedroso, João Pedro (Portugal)	Online correlated orienteering on continuous surfaces	2018. 8.21
Shi, Chen (China)	A new approach for terrestrial relative gravity adjustment using smoothness priors of drift rate	2018. 8.28
Galka, Andreas (Germany)	Blind signal separation by linear Gaussian modelling: The EM algorithm	2018.10.17
Harte, David S. (New Zealand)	Evaluation of earthquake stochastic models based on their real-time forecasts: A case study of Kaikoura 2016	2018.11. 6
Ting, Kai Ming (Australia)	Isolation kernel and its impacts on SVM and density-based clustering	2018.11. 9
Härdle, Wolfgang Karl (Germany)	Pricing green financial products	2018.12.10
Chen, Xiaofei (China)	Phase diagram of earthquakes and implications	2019. 1.22
Zhang, Jun (U.S.A.)	Some recent progress of information geometry	2019. 3.25

5 Publications

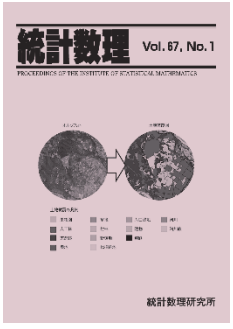
Periodicals

One of the driving forces behind the rapid progress of modern science has undoubtedly stemmed from the broad communication of research findings through international journals and reports. For the sake of publicizing its activities throughout academic and industrial circles, the Institute launched ***Annals of the Institute of Statistical Mathematics*** (AISM) in 1949 shortly after its foundation. Today AISM, distributed by Springer, has a worldwide reputation and is listed in citation review journals.

In the past two years, Volumes 69 to 71 (ten issues) were published. For paper titles, abstracts, and full texts, visit our website at https://www.ism.ac.jp/editsec/aism/, or at https://springerlink.com/. The aims of AISM are shown in the excerpt below:



AISM aims to provide a forum for open communication among statisticians, and to contribute to the advancement of statistics as a science to enable humans to handle information in order to cope with uncertainties. It publishes high-quality papers that shed new light on the theoretical, computational and/or methodological aspects of statistical science. Emphasis is placed on (a) development of new methodologies motivated by real data, (b) development of unifying theories, and (c) analysis and improvement of existing methodologies and theories.



The Institute publishes another periodical, ***Proceedings of the Institute of Statistical Mathematics***. This biannual journal made its first appearance in 1953 and now carries scientific papers and articles on topics of research (in Japanese with abstracts in English). Volumes

65 and 66 (four issues) were published in the past two years. Refer to https://www.ism.ac.jp/editsec/toukei/ for paper titles, abstracts and full texts.

Technical Reports

In addition to the two journals mentioned above, the Institute issues seven technical reports:

- *Cooperative Research Report*
- *ISM Survey Research Report*
- *Computer Science Monographs*
- *Research Memorandum*
- *ISM Report on Research and Education*
- *ISM Reports on Statistical Computing*
- *School of Statistical Thinking Research Report*

A list of the seven reports released from April 2017 to March 2019 follows.

Cooperative Research Report

(Reports, in Japanese and English, on the achievements emerging from collaborative research projects in the Institute.)

No.394: Cho, K., Quantitative Approaches in Cognitive Linguistic Studies. (March 2018)

No.395: Shimizu, K., Environmental and Ecological Data Analysis. (March 2018)

No.396: Maruyama, N., Development and Popularization of Dynamic Geometry Software GeoGebra (3). (Feburary 2018)

No.397: Fujieda, M., Using ESP Corpora for Learning Support and Assessment. (March 2018)

No.398: Sakaori, F., Research on Sports Data Analysis : Theory, Methodology, and Applications Vol. 5. (March 2018)

No.399: Suenaga, K., Research on best practice in teaching statistics Vol. 10. (March 2018)

No.400: Ishikawa, S., Statistical Approach to Frequency Obtained from Corpora. (March 2018)

No.401: Kitano, T., Extreme Value Theory and Applications (15). (Feburary 2018)

No.402: Shimura, T., Infinitely divisible processes and related topics (22). (Feburary 2018)

No.403: Imaizumi, T., Research on common infrastructure construction of analysis flow using RStudio. (March 2018)

No.404: Ishikawa, Y., Quantitative Approaches to Teaching English for Engineers. (March 2018)

No.405: Tabata, T., Practical Stylometry: Genres, Topics, and Key Words. (March 2018)

No.406: Ikoma, N., Dynamic State Estimation under Uncertainty and its Fusion with Intelligence Information Science (1). (March 2018)

No.407: Tsuchiya, T., Optimization: Modeling and Algorithms 30. (March 2018)

No.408: Kiyono, K., Development of Dynamical Bioinformatics Based on Biosignal and Bioimaging Data Analysis. (March 2018)

No.409: Shirakawa, K., Abstract Report of "Trends in utilization of public-private sector's open data and initiative for human resource development". (March 2018)

No.410: Horihata, S., Inverse Problems and Applications on Complex System (2). (March 2018)

No.411: Tsubaki, H., Fuzzy-Bayes Decision Theory and its Application. (March 2018)

No.412: Suenaga, K., Research on best practice in teaching statistics Vol. 11. (July 2018)

No.413: Ueda, M., Corpus-based approaches to usage-based models. (March 2019)

No.414: Ishikawa, S., Quantification of Linguistic Features of Texts. (March 2019)

No.415: Kiyono, K., Development of Medical and Health Science Based on Biosignal and Bioimaging Data Analysis. (March 2019)

No.416: Shimizu, K., Environmental and Ecological Data Analysis. (March 2019)

No.417: Kitano, T., Extreme Value Theory and Applications (16). (March 2019)

No.418: Shimura, T., Infinitely divisible processes and related topics (23). (March 2019)

No.419: Ikoma, T., Dynamic state estimation under uncertainty and its Fusion with Intelligence information science (2). (March 2019)

No.420: Tsuchiya, T., Optimization-MODELING AND ALGORITHMS-. (March 2019)

No.421: Fujieda, M., Multifaceted Approaches to Using ESP Corpora as Education and Research Resources. (March 2019)

No.422: Shirakawa, K., Abstract Report of "Trends in utilization of public-private sector's open data and initiative for human resource development". (March 2019)

No.423: Sakaori, F., Research on Sports Data Analysis : Theory, Methodology, and Applications Vol. 6. (March 2019)

No.424: Tabata, T., Practical Stylometry II: New inquiries into lexical and semantic style. (March 2019)

No.425: Ishikawa, Y., Quantitative approaches to text analysis and their application to ESP/JSP courses. (March 2019)

No.426: Maruyama, N., Development and Popularization of Dynamic Geometry Software GeoGebra (4). (March 2019)

ISM Survey Research Report

Technical reports, mostly in Japanese, on the methodology of survey and analysis of measured data. Formerly published as Research Report (No.1-101). Full text can be downloaded from https://www.ism.ac.jp/. Not issued during the period April 2017 to March 2019.

Computer Science Monographs

Technical reports in English on Computer programs and software for statistical science. Full text and supplementary materials of No.31 onwards can be downloaded from https://www.ism.ac.jp/. Not issued during the period April 2017 to March 2019.

Research Memorandum

Technical Reports, mostly in English, that give immediate publicity to research findings. The full content of some of them can be downloaded from https://www.ism.ac.jp/.

No.1204: Inagaki, Y., A Study of Relationship between Subjective Happiness and Real Experiences. (June 15, 2017)

No.1205: Hisashi, N., Bartlett-type corrections and bootstrap adjustments of

likelihood-based inference methods for network meta-analysis. (July 28, 2017)

No.1206: Iwata, T., A Bayesian approach to estimating a spatial stress pattern from P-wave first-motions. (December 26, 2017)

No.1207: Tsukuda, K. and Mano, S., A reversal phenomenon in estimation based on multiple samples from the Poisson-Dirichlet distribution. (February 5, 2018)

No.1208: Kato, N., A guide to statistical methods for genome-wide association studies. (March 26, 2019)

ISM Report on Research and Education

(Reports and documents concerned with education and research.)

No.43: The Institute of Statistical Mathematics, and Department of Statistical Science, The Graduate University for Advanced Studies (ed.), 2017 ISM Openhouse Posters and Annual Symposium of the Graduate Students of the Department of Statistical Science. (June 2017)

No.44: Yoshimoto, A. (ed.), Annual Symposium of the Graduate Students of the Department of Statistical Science, 2017. (February 2018)

No.45: The Institute of Statistical Mathematics, and Department of Statistical Science, The Graduate University for Advanced Studies (ed.), 2018 ISM Openhouse Posters and Annual Symposium of the Graduate Students of the Department of Statistical Science. (June 2018)

No.46: Department of Statistical Science, The Graduate University for Advanced Studies (ed.), Annual Symposium of the Graduate Students of the Department of Statistical Science, 2018. (February 2019)

ISM Reports on Statistical Computing

(Technical reports in Japanese and English that describe management and manipulation of computer systems. Not issued during the period April 2017 to March 2019.)

School of Statistical Thinking Research Report

(Reports on the achievements emerging from project for fostering and promoting statistical thinking. All the articles published so far are in Japanese, and English titles are appended just as bibliographic information. Not issued during the period April 2017 to March 2019.)

6 Published Papers and Books

Many of the achievements made by the staff of the Institute consist of scientific papers and monographs. Each of the staff has selected works worthy of note out of his/her papers and books published in the period from April 2017 to March 2019, to complete the following list. Also included are works by visiting professors and students.

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7 Tutorial Programs and Consultation

Tutorial courses on statistical science are held for the benefit of researchers, students, and the general public. The levels of courses vary from beginner's level to advanced level.

Year	Level/ Category	Title	Month	Number of participants
Single Courses				
2017	Basic	Basic Course of Statistics	May	79
	Advanced	Theory of Bayesian statistics: modeling and information criterion	June	99
	Standard	Sparse estimation	July	100
	Basic	Statistical modeling and Akaike information criterion	July	70
	Basic	Introduction to Multivariate Analysis	September	77
	Basic	Statistical modeling and Akaike information criterion	October	72
	Standard	Robust Statistics	October	93
	Standard	Big data analysis by R, Hadoop and Spark	November	67
	Basic	Statistical modeling and Akaike information criterion 2	December	94
2018	Advanced	Theory of Bayesian statistics: modeling and information criterion	January	95
	Basic	Introduction to Time Series Modeling	February	98
	Standard	Sparse estimation	May	96
	Standard	Stochastic optimization for statistics and machine learning	June	98

Year	Level/ Category	Title	Month	Number of participants
2018	Basic	Refresher course in statistics: from a philosophical point of view	July	97
	Basic	Introduction to Multivariate Analysis	August	83
	Standard	Introduction to the statistical analysis of series of events	October	96
	Basic	Why does the estimator of variance use n-1 in the denominator? Introduction to statistical estimation	November	101
Leading DAT (Data Analytics Talents)				
2018	L-B1	Bayesian Modeling in Practice	February	61
	L-B2	Machine Learning and Modern Methodologies in Data Science	February	61
		Leading DAT Training Course	February ～March	34
	L-A	Introductory Data Science	September	98
	L-B1	An Introduction to Statistical Modeling	November	92
	L-B2	Machine Learning and Modern Methodologies in Data Science	December	96
		Leading DAT Training Course	November ～January 2019	39
2019	L-S	Geographic information and Spatial Modeling	February	97

The Institute launched the School of Statistical Thinking in January 2012. Since then, the School has centralized control over the educational programs for the general public except regular courses in SOKNDAI, the Graduate University for Advanced Studies, see Supplement.

Tutorial courses are the most popular among the programs operated by the School. There is consistent demand for non-degree pursuing continuous education from the private sector. Actually around 70% of the total attendants are from private companies. A yearly open lecture is a more accessible half-day program where a timely topic relating to statistical science is explained in plain language.

In FY 2017, the School of Statistical Thinking launched a program called

“Leading DAT (Data Analytics Talents)” aimed at training data scientists with the knowledge and skills in statistical mathematics required by modern society. As the program's first projects, we organized two Leading DAT lectures entitled “L-B1: Bayesian Modeling in Practice” and “L-B2: Machine Learning and Modern Methodologies in Data Science.” At the same time, we established the Leading DAT Training Course, in which we grant certificates to participants who have fulfilled the course requirements, including attendance in all lectures and submission of reports. A total of 25 people have been granted the certificate of completion.

In FY 2018, we added two lectures to the Leading DAT program. One is “L-A: Introductory Data Science,” which aims to consolidate the basics of probability and statistics. The other is the “L-S: Geographic information and Spatial Modeling,” which specifically focuses on spatial statistics and its application. The title of L-B1 has been changed to “An Introduction to Statistical Modeling;” however, the contents are mostly the same. As for the Leading DAT training course, 27 people have been certified.

Former services for consultancy have been renovated as the “Research Collaboration Start-Up” program. A team of experienced emeritus professors and young research fellows give advice and handle nearly 40 cases a year. Some of them have led to the registration for our Cooperative Research Program or funded joint project between the Institute and the client company.

The ISM Summer School program is also integrated as an activity of the School. It was started in 2006 as a free crash course open to graduate students from all over Japan. The topic of 2013 was “Information Geometry” which gathered 120 registrations. Since 2014 we have been providing a program for “Mathematical Modeling for Pandemic Disease” which lasts for 10 consecutive days. In 2016, all the lectures were done in English. This program attracts nearly one hundred participants including international students, and surprisingly we find almost no dropouts.

8 Software Products

The Institute of Statistical Mathematics has been developing new programs to put the latest theoretical results into practical use.

The Center for Engineering and Technical Support is engaged in cataloging and storing in a library the software products developed at ISM. Detailed information on the library, called ISMLIB, can be assessed through kks@ism.ac.jp (e-mail), https://www.ism.ac.jp/ (URL). Some programs in the library can be downloaded from the Internet site. Most of the programs are coded in Fortran, C, C++, Java, S, and R.

Programs developed in ISM

Program	Explanation etc.	Access
■ TIMSAC (*TIMe Series Analysis and Control*)	— *Main features* — Package of programs for analysis, prediction and control of time series. — *Typical examples of application* — ・ Analysis of channel records of brain wave ・ Analysis of economic data ・ Optimal control of plants ・ Implementation of ship's autopilot ・ Analysis of seismological data	Mail to kks@ism.ac.jp
■ TIMSAC for Windows	— *Main features* — TIMSAC program implemented on Windows. — *Typical examples of application* — ・ Analysis of brain wave ・ Prediction of sales ・ Prediction of stock price ・ Analysis of seismological data	Mail to kks@ism.ac.jp

Program	Explanation etc.	Access
■ TIMSAC for R package	TIMSAC program implemented as an R package.	http://jasp.ism.ac.jp/ism/timsac/
■ Web Decomp	A system for time series analysis, mainly for seasonal adjustment or decomposition, used through our Web page.	http://ssnt.ism.ac.jp/inets/inets.html
■ Ardock (dock for AR models)	— *Main features* — A dialogue system for system analysis. — *Typical examples of application* — ・ Analysis of industrial plants ・ System analysis ・ Analysis of chemical processes in human bodies	https://www.ism.ac.jp/ismlib/jpn/ismlib/
■ TIMSAC84: Statistical Analysis of Series of Events (TIMSAC84-SASE) Version 2	Programs for point process analysis.	https://www.ism.ac.jp/~ogata/Ssg/ssg_softwaresE.html
■ BAYSEA (BAYesian SEasonal Adjustment)	— *Main features* — Computer program for realizing a decomposition of a time series into trend, seasonal and irregular components. — *Typical examples of application* — ・ Seasonal adjustment of economic time series	Mail to kks@ism.ac.jp
■ CATDAP (CATegorical Data Analysis)	— *Main features* — A program for the selection of variables that explain well the structure of categorical data. — *Typical examples of application* — ・ Analysis of multi-dimensional contingency tables	Mail to kks@ism.ac.jp
■ CATDAP for Windows	CATDAP program implemented on Windows.	Mail to kks@ism.ac.jp
■ CATDAP for R package	CATDAP program implemented as an R package.	http://jasp.ism.ac.jp/ism/catdap/

Program	Explanation etc.	Access
■ QUANT (QUANTification theory)	— *Main features* — Programs for the quantification theories of type I, II, III. — *Typical examples of application* — ・Survey of behavior of the younger generation ・Analysis of clinical data ・Prediction of elections ・Effect of advertisement ・Data analysis in educational psychology	Mail to kks@ism.ac.jp
■ DALL	— *Main features* — Davidon's variance algorithm subroutine customized for maximum likelihood. — *Typical examples of application* — ・Analysis of medical data ・Analysis of multi-dimensional non-stationary data	https://www.ism.ac.jp/ismlib/jpn/ismlib/
■ Jasp (Java based Statistical Processor)	— *Main features* — An experimental statistical analysis system written in Java language. — *Typical examples of application* — ・Explanatory data analysis ・Developing new computational statistical methodology	http://jasp.ism.ac.jp/
■ Jasplot (Java statistical plot)	— *Main features* — Statistical graphics library in Java language. — *Typical examples of application* — ・Data visualization	http://jasp.ism.ac.jp/jasplot/
■ Statistical Analysis of Seismicity - updated version (SASeis2006)	Programs for seismicity analysis.	https://www.ism.ac.jp/~ogata/Ssg/ssg_softwaresE.html
■ SAPP	An R package for seismicity analysis based on TIMSAC84-SASE Version 2 and SASeis2006.	http://jasp.ism.ac.jp/ism/sapp/

Program	Explanation etc.	Access
■ NScluster	An R package for simulation and estimation of the Neyman-Scott type spatial cluster models.	http://jasp.ism.ac.jp/ism/NScluster/
■ TSSS	An R package for time series analysis with state space model	http://jasp.ism.ac.jp/ism/TSSS

(Supercomputer)

Supplement

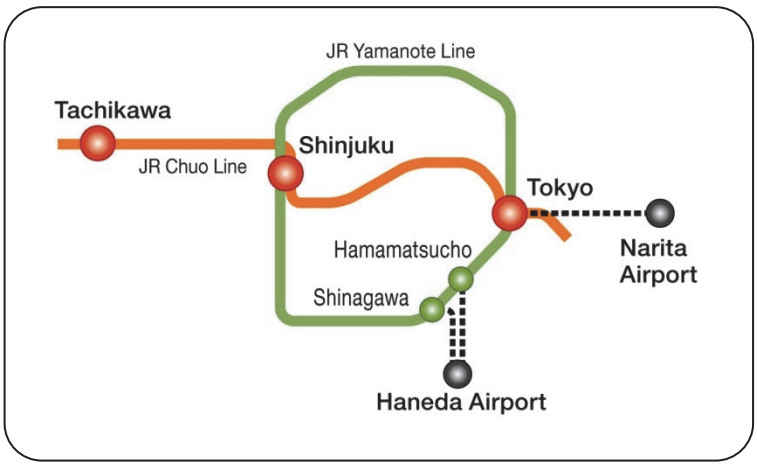
Introduction to the Department of Statistical Science, School of Multidisciplinary Sciences, SOKENDAI (The Graduate University for Advanced Studies)

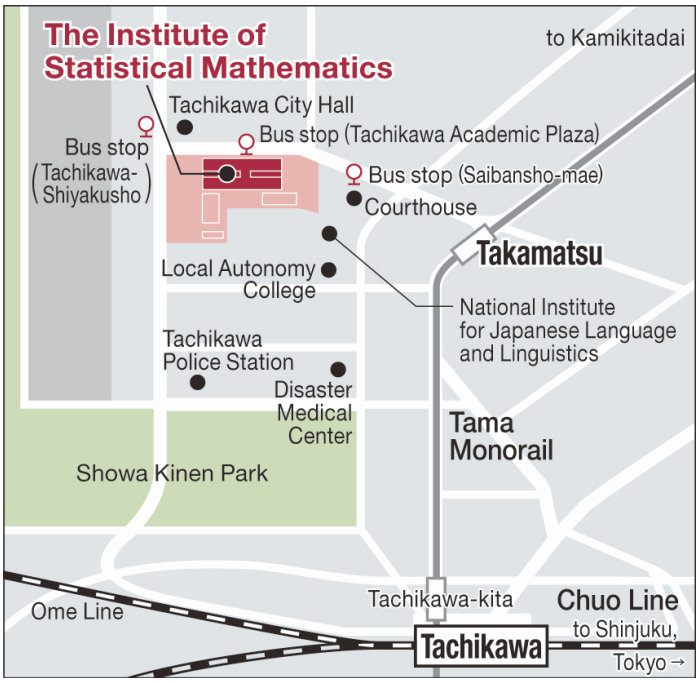
"SOKENDAI (The Graduate University for Advanced Studies) is a graduate university with no undergraduate programs that consists of departments housed in affiliated Inter-University Research Institutes and the School of Advanced Sciences attached directly to SOKENDAI. The Inter-University Research Institutes are research centers for joint use by universities throughout Japan in their various research fields. As such, these institutes serve as centers of advanced research in their respective research fields and as nodes of scholarly communication that support international joint research. The School of Advanced Sciences, which is located in Hayama and has no such parent institute, conducts advanced research into the evolution of life and the relationship between science and society."

(from the President's Statement)

SOKENDAI (The Graduate University for Advanced Studies) was thus established in October 1988 with seven institutes as parents. As of April 2019, the University has grown to have 17 parent institutes and 2097 Ph.D. students. The organization is composed of 6 schools that comprise 20 departments and a center. In the Department of Statistical Science, research and educational activities focus on the effective use of data for the realization of rational inferences or predictions, in the same way as in the construction and confirmation of scientific hypotheses. The subject area covers the theory and application of statistical science, such as fundamental statistical theory and statistical methodologies including prediction, data assimilation, survey science, machine learning, risk analysis, optimization, decision making, and control. Since its establishment, 136 Doctors of Philosophy have been conferred by the Department. As of April 2019, the Department has 35 students.

Location of the Institute





Access to the ISM

- Tama Monorail
  - -10 min walk from Takamatsu Sta.
- Tachikawa Bus
  - -Tachikawa Academic Plaza bus stop
  - -5 min walk from Saibansho-mae or Tachikawa-Shiyakusho bus stop

Inter-University Research Institute Corporation
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THE INSTITUTE OF STATISTICAL MATHEMATICS

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