

**The Institute of
Statistical Mathematics**

ACTIVITY REPORT

2011.4 – 2013.3

Tokyo, Japan

The Institute of Statistical Mathematics

Activity Report
2011.4 – 2013.3



Tokyo, Japan

October 2013

Center for Engineering and Technical Support

The Institute of Statistical Mathematics

Research Organization of Information and Systems

Inter-University Research Institute Corporation

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

Foreword

This activity report is intended to provide general information on the Institute of Statistical Mathematics (ISM) and its research activities in the past two years.

Up until 20 or 30 years ago, money and information circulated within the structure of society in a rather gradual and steady way, somewhat similar to such physical phenomena advection and diffusion. Now, however, due to the mass penetration of the Internet, money and information move at high speed, without any connection to real-world distances. As a result, the role previously played by the constituents in a social structure has been lost, and many types of work and occupations are disappearing. Under this new structure, there are no first principles (governing equations) that describe the phenomena arising under this new structure, and the conveyance and processing of information—that is, computational services—are generating huge amounts of economic value. In the business world, Big Data are the measurements of this social structure. Thus, instead of solving governing equations, what has become important is to understand phenomena using clues provided by big data and to develop modeling techniques for enabling better predictions and decision-making.

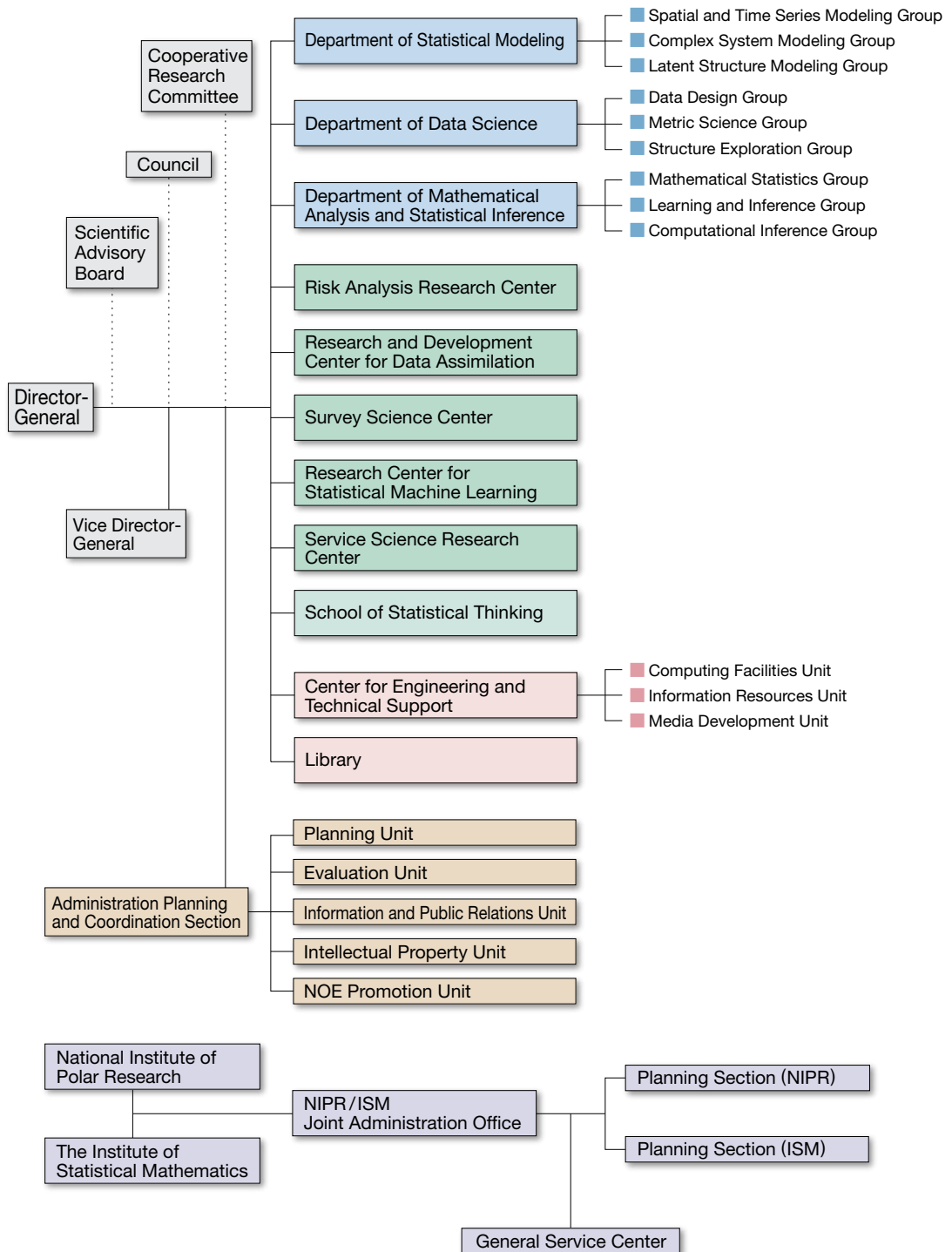
Anticipating the full-scale advent of the “big data era”, the Institute of Statistical Mathematics (ISM) identified the need for professional development to address the demands of this new era as a key goal of its second medium-term plan (financial year 2010–2015). Under the ISM’s Network of Excellence (NOE) initiative, we are pursuing big-data-related R&D utilizing a wide range of tools, including machine learning, data assimilation, risk analysis, and next-generation survey methods. We are also striving to foster young data scientists, through various professional development programs at the ISM’s School of Statistical Thinking, which serves as our principal base for education and training programs in statistical thinking.

The “Coop with Math Program”, launched in November 2012, is a project that ISM is undertaking on contract for the Ministry of Education, Culture, Sports, Science and Technology (MEXT). Under the program, we are devising ways to promote research to stimulate innovation and creativity through collaboration between mathematics/mathematical science and various other sciences and industries, and big data is certainly an important focus of research in this initiative. Selected to serve as the core institution of this project, ISM is actively collaborating with eight major Japanese centers of research and education in mathematics and mathematical science as part of the initiative. As a research institute, ISM is wholeheartedly committed to fundamental research in fields related to data, with a view to fulfilling the expectations of society. In this effort, we look forward to your continued understanding and support for our activities.

Tomoyuki Higuchi
Director-General

October 2013

Organization Diagram (As of April 1, 2013)



Organization

Since its foundation as the one and only national institute for statistical science in Japan, the Institute of Statistical Mathematics 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 the Institute to reorganize itself in 1985 as an inter-university research institute, which puts a major emphasis on research collaboration with all disciplines of science.

In April 2004, the Institute began a new chapter as a member of the Research Organization of Information and Systems, Inter-University Research Institute Corporation, together with three other institutes, National Institute of Informatics, National Institute of Genetics and National Institute of Polar Research. The new Institute building, which is shared with National Institute of Polar Research and National Institute of Japanese Literature, was built in Tachikawa in March 2009. The institute moved to Tachikawa and started its activities in October 2009.

At present, the Institute consists of three departments, five research centers, a school, a support center, an administration office, a council, and a committee. All Institute activity is guided by the leadership of the Director-General and three Vice Director-Generals. The Council of the Institute of Statistical Mathematics implements any necessary recommendations. The Cooperative Research Committee organizes and facilitates collaborative research projects developed between scholars at the Institute and scientists in other academic agencies.

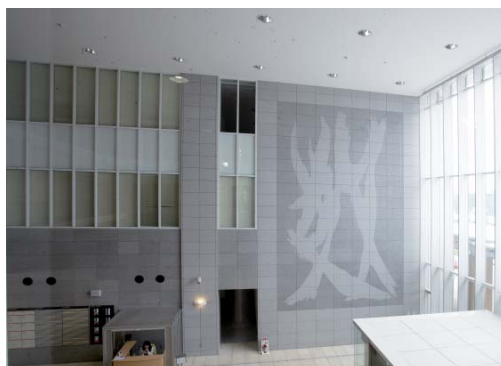
Three research departments, the Department of Statistical Modeling, the Department of Data Science, and the Department of Mathematical Analysis and Statistical Inference, form the active core of the Institute with its 45 academic staff, carrying out research on either statistical theory or its application to other fields of science and industry. The Department of Statistical Modeling and its three groups study statistical modeling aspects on various fields. In the three groups of the Department of Data Science, efforts are concentrated on data collection and handling. The three groups of the Department of Mathematical

Analysis and Statistical Inference are specifically concerned with fundamental aspects of statistics.

The five strategic research centers, Risk Analysis Research Center, Research and Development Center for Data Assimilation, Survey Science Center, Research Center for Statistical Machine Learning, and Service Science Research Center were established in 2005, 2011, 2011, 2012 and 2012 respectively, as main bodies for establishing Network of Excellence (NOE) and performing project research on specific topics. Risk Analysis Research Center studies many topics related to risk, such as food, drug, clinical trials, suicide, environment, resource management, finance, insurance, earthquake and genome information. Research and Development Center for Data Assimilation conducts research and development of data assimilation techniques such as the ensemble Kalman filter and the particle filter and applies them to a variety of research fields. Survey Science Center carries out survey research of Japanese national character and cross-national comparative studies, and studies techniques of survey research. Research Center for Statistical Machine Learning aims at supporting the research community of the field as an activity of the NOE projects, and producing influential research works by carrying out various research projects with domestic and international collaborations. Service Science Research Center brings the data-centric methodologies into the service fields, for example, marketing and supply chain management. More detailed descriptions of the objectives of each department and center are presented in the next chapter. The information covers research subjects and the interests of staff, which range from the physical sciences and life sciences to the social and cultural sciences.

The School of Statistical Thinking was established in 2012 to perform the project for fostering and promoting statistical thinking. As data produced in various fields of the real world become very large and complex, people who can discover important information buried in such data are strongly required. The Institute has provided several educational courses and supports to disseminate statistical thinking for a long time. The School integrates and expands such activities and is a place to study statistical thinking.

The Center for Engineering and Technical Support was established in 2006 to help the activities of the Japanese statistical science commu-



nity by providing adequate computational and informational resources. This center has 11 technical staff that work on special jobs including maintenance of computer systems, editing journals and bibliographical services. The Institute has two big supercomputer systems 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). Lastly, there is also a division of 12 officials who manage general affairs.

The Institute devotes itself to educating young statisticians as well. As a constituent of the Graduate University for Advanced Studies (Department of Statistical Science, School of Multidisciplinary Sciences), the Institute offers graduate programs leading to a Ph.D. degree. (See Supplement on page 93.) (The number of staff mentioned above refer to the full strength on April 1, 2013.)

Departments, Centers and Research Staff

Department of Statistical Modeling

The Department of Statistical Modeling conducts research on the modeling of causally, temporally and/or spatially interrelated complex phenomena, including intelligent information processing systems. It also conducts researches on model-based statistical inference methodologies. (-2012.3.31)

■ Spatial and Time Series Modeling Group (-2012.3.31)

The Spatial and Time Series Modeling Group works on modeling and inference for the statistical analysis of time series, spatial and space-time data, and their applications to prediction and control.

— *Staff* —

Yosihiko OGATA, Prof. (-2012.3.31)

Tomoyuki HIGUCHI, Director-General (2011.4.1-), Prof.

Yoshinori KAWASAKI, Assoc. Prof.

Kenichiro SHIMATANI, Assoc. Prof.

Genta UENO, Assoc. Prof.

Fumikazu MIWAKEICHI, Assoc. Prof.

Ryo YOSHIDA, Assoc. Prof.

Jianchang ZHUANG, Assoc. Prof.

Shin'ya NAKANO, Assist. Prof.

— *Subjects* —

- Methods for prediction and knowledge discovery based on Bayesian model
- Hidden variable modeling with smoothing prior
- Statistical analysis and modeling of stochastic point process
- Study of spatial phenomena
- Point process model and its applications to biosciences
- Genome informatics with graphical modeling
- Community dynamics and diversity analysis based on long-term woods

- monitoring data
- Non-invasive brain activity measurement data and dynamical inversion problem solution
- Construction of large scale Bayesian models
- Estimation and application of regularized non-linear models
- Model integration by particle filter
- Modeling and application of point location and/or spatial structure
- Application of gene point process model to plant community
- Point process modeling of market data and its application
- Development of data assimilation system in Earth science
- Statistical seismology
- Bio-logging and animal behavior modeling
- Reproduction and group sustain mechanism of perennial herb

■ Intelligent Information Processing Group (-2012.3.31)

The Intelligent Information Processing Group works on concepts and methods for the extraction, processing and transformation of information in intelligent systems, motivated by an active interest in practical problems in engineering and science.

— *Staff* —

Hiroshi MARUYAMA, Vice Director-General (2011.4.1-), Prof. (2011.4.1-)

Tomoko MATSUI, Director (2011.4.1-), Prof.

Kenji FUKUMIZU, Prof.

Koji TSUDA, Visiting Prof. (2011.4.1-)

Yukito IBA, Assoc. Prof.

Yumi TAKIZAWA, Assoc. Prof.

Daichi MOCHIIHASHI, Assoc. Prof. (2011.4.1-)

Hiroshi SOMEYA, Assist. Prof. (-2012.3.31)

— *Subjects* —

- Conversation between macro and micro, or non-linear modeling
- Application of sampling methods for complicated distribution
- Statistical analysis of data with geometric structure
- Mathematical schemes of multi-user receiver on Wideband Spectrum Spreading system
- Acquisition and tracking method under multi-path environment for public mobile communications

- Study of perception mechanism of multimodal information
- Stochastic optimization by developing evolutionary algorithms
- Development of Monte Carlo algorithms
- Multivariate analysis of simulation data
- Statistical inference on singular models
- Inductive learning machine
- Audio information processing
- Pattern recognition
- Statistical, analysis by positive definite kernel
- Nonparametric Bayesian methods
- Large scale Bayesian inference

■ Graph Modeling Group (-2012.3.31)

The Graph Modeling Group works on analyses of the data generated by systems with a graph structure and on the modeling required in order to reconstruct the original system.

— *Staff* —

Jun ADACHI, Assoc. Prof.

Ying CAO, Assist. Prof. (-2012.12.31), Project Assist. Prof. (2013.1.1-2013.3.31)

— *Subjects* —

- Estimation of molecular dendrogram
- Modeling of molecular evolution
- Comparison of genome structure
- Theoretical study of life information science

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. By means of the modeling of spatially and/or temporally varying phenomena, complex systems, and latent structures, the department aims to contribute to the development of cross-field modeling intelligence. (2012.4.1-)

■ Spatial and Time Series Modeling Group (2012.4.1-)

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 mod-

eling related to space-time-varying phenomena.

— *Staff* —

Nobuhisa KASHIWAGI, Prof.

Tomoyuki HIGUCHI, Director-General (2011.4.1-), Prof.

Jiancang ZHUANG, Assoc. Prof.

Genta UENO, Assoc. Prof.

Shin'ya NAKANO, Assist. Prof.

— *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

■ Complex System Modeling Group (2012.4.1-)

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.

— *Staff* —

Yoshiyasu TAMURA, Vice Director-General (2011.4.1-), Prof.

Junji NAKANO, Prof.

Yukito IBA, Assoc. Prof.

Yumi TAKIZAWA, Assoc. Prof.

Fumikazu MIWAKEICHI, Assoc. Prof.

Shinsuke KOYAMA, Assist. Prof.

— *Subjects* —

- Non-linear stochastic differential equations and non-linear time series analysis

- Markov chain Monte Carlo/sequential Monte Carlo methods and their applications
- Physical random number generation and evaluation
- Rare event sampling
- Individual and social behavior analysis
- Data and model visualization
- Time series/spatial-temporal analysis for neural data
- Spatial-temporal random event estimation by neural network
- Modeling for intensive data

■ Latent Structure Modeling Group (2012.4.1-)

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* —

Hiroshi MARUYAMA, Vice Director-General (2011.4.1-), Prof. (2011.4.1-)

Tomoko MATSUI, Director (2011.4.1-), Prof.

Yoshinori KAWASAKI, Assoc. Prof.

Seisho SATO, Assoc. Prof. (-2013.3.31)

Ryo YOSHIDA, Assoc. Prof.

Sayaka SHIOTA, Project Assist. Prof. (2013.2.1-)

— *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

Department of Data Science

The Department of Data Science aims to develop research methods for surveys, multidimensional data analyses and computational statistics. (-2012.3.31)

■ Survey Research Group (-2012.3.31)

The Survey Research Group focuses on research related to statistical data collection and data analysis.

— *Staff* —

Takashi NAKAMURA, Director (2011.4.1-), Prof.

Ryozo YOSHINO, Prof.

Tadahiko MAEDA, Assoc. Prof.

Takahiro TSUCHIYA, Assoc. Prof.

Koken OZAKI, Assist. Prof. (-2013.3.31)

— *Subjects* —

- Social research methods and data analysis
- Cohort analysis of repeated social research data
- 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
- Development of indirect questioning techniques
- Development of statistical method on twin data
- Analysis of educational and psychological assessment data
- Theory and applications of multilevel modeling

■ Multidimensional Data Analysis Group (-2012.3.31)

The Multidimensional Data Analysis Group studies methods for analyzing phenomena grasped on multidimensional space and ways for collecting multidimensional data.

— *Staff* —

Hiroe TSUBAKI, Vice Director-General, Prof.

Nobuhisa KASHIWAGI, Prof.
Shigeyuki MATSUI, Prof. (-2013.3.31)
Satoshi YAMASHITA, Prof.
Manabu KUROKI, Visiting Assoc.Prof. (-2011.8.31), Assoc.Prof. (2011.9.1-)
Toshihiko KAWAMURA, Assist.Prof.

— *Subjects* —

- Bayesian methods for analyzing multidimensional data
- Analysis of environmental data
- Statistical methods to establish environment standards
- Receptor modeling
- 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
- Statistical quality control and Taguchi's method
- Causal data analysis for advanced business modeling
- Statistical causal inference
- Graphical modeling

■ Computational Statistics Group (-2012.3.31)

The Computational Statistics Group studies sophisticated uses of computers in statistical methodology such as computer-intensive data analyses, computational scientific methods and statistical systems.

— *Staff* —

Yoshiyasu TAMURA, Vice Director-General (2011.4.1-), Prof.
Junji NAKANO, Prof.
Koji KANEFUJI, Prof.
Yutaka TANAKA, Adjunct Prof. (-2012.3.31)
Michiko WATANABE, Visiting Prof. (-2012.3.31)
Kazunori YAMAGUCHI, Visiting Prof. (-2012.3.31)
Naomasa MARUYAMA, Assoc. Prof.
Seisho SATO, Assoc. Prof. (-2013.3.31)
Norikazu IKOMA, Visiting Assoc. Prof. (-2012.3.31)
Nobuo SHIMIZU, Assist. Prof.

— *Subjects* —

- Discretization method of nonlinear stochastic differential equations and its applications
 - Development of hardware random number generator
 - Statistical data visualization
 - Parallel and distributed processing in statistical system
 - Functional principal points on functional data analysis
 - Reliability theory based on life-span models
 - Environmental statistics
 - Symbolic data analysis
 - Decoding of algebraic geometric codes
 - Methodology for collecting and publishing information relating to statistical science
 - Analysis of high frequency financial data
-

The aim of the Department of Data Science is to contribute to the development of natural and social sciences by conducting research into the methodology of designing statistical data collection systems, measuring and analyzing complex phenomena for evidence-based sciences, and performing exploratory multivariate data analyses. (2012.4.1-)

■ Data Design Group (2012.4.1-)

The Data Design Group focuses on research toward designing statistical data collection systems and developing the related data analysis methods in a variety of survey and experimental environments.

— *Staff* —

Takashi NAKAMURA, Director (2011.4.1-), Prof.

Ryozo YOSHINO, Prof.

Naomasa MARUYAMA, Assoc. Prof.

Tadahiko MAEDA, Assoc. Prof.

Takahiro TSUCHIYA, Assoc. Prof.

Toshihiko KAWAMURA, Assist. Prof.

— *Subjects* —

- Social research methods and data analysis
- Cohort analysis of repeated social research data
- 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
- Development of indirect questioning techniques
- Statistical quality control
- Decoding of algebraic geometric codes
- Methodology for collecting and publishing information relating to statistical science

■ Metric Science Group (2012.4.1-)

The Metric Science Group studies methods for measuring and analyzing complex phenomena to extract statistical evidence behind them in the various fields of science.

— *Staff* —

Satoshi YAMASHITA, Prof.

Shigeyuki MATSUI, Prof. (-2013.3.31)

Kenichiro SHIMATANI, Assoc. Prof.

Masayuki HENMI, Assoc. Prof.

Nobuo SHIMIZU, Assist. Prof.

Hisashi NOMA, Assist. Prof. (2012.4.1-)

— *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

- Functional data analysis

■ Structure Exploration Group (2012.4.1-)

The Structure Exploration Group advances statistical and mathematical research by applying or developing exploratory multivariate data analyses to clarify latent structures of real phenomena in various fields of both natural and social sciences.

— *Staff* —

Hiroe TSUBAKI, Vice Director-General, Prof.

Koji KANEFUJI, Prof.

Jun ADACHI, Assoc. Prof.

Manabu KUROKI, Visiting Assoc. Prof. (-2011.8.31), Assoc.Prof. (2011.9.1-)

Ying CAO, Assist. Prof. (-2012.3.31), Project Assist. Prof. (2013.1.1-2013.3.31)

Koken OZAKI, Assist. Prof. (-2013.3.31)

Yoo Sung PARK, Assist. Prof. (2012.4.1-)

— *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
- Theory and applications of multilevel modeling
- Longitudinal data analysis
- Organizational behavior based on multilevel analysis

Department of Mathematical Analysis and Statistical Inference

The Department of Mathematical Analysis and Statistical Inference car-

ries out research into general statistical theory, statistical learning theory, the theory of optimization, and the practice of statistics in science. (-2012.3.31)

■ **Mathematical Statistics Group (-2012.3.31)**

The Mathematical Statistics Group is concerned with aspects of statistical theory and probability theory that have statistical applications.

— *Staff* —

Satoshi KURIKI, Director (2011.4.1-), Prof.

Yoichi NISHIYAMA, Assoc. Prof.

Shuhei MANO, Assoc. Prof.

Hisayuki HARA, Visiting Assoc. Prof. (2011.4.1-)

Takaaki SHIMURA, Assist. Prof.

Kei KOBAYASHI, Assist. Prof.

Shogo KATO, Assist. Prof.

Takayuki YAMADA, Project Assist. Prof. (2011.6.1-2013.3.31)

— *Subjects* —

- Statistical inference and statistical decisions
- Analysis of multivariate data and contingency tables
- Integral-geometric approach to random field theory
- Multiple comparisons
- Statistical inference for stochastic processes
- Infinite-dimensional statistical models
- Limit theorems for stochastic processes
- Statistical inference in genetic linkage analysis
- Stochastic models in population genetics
- Statistical inference based on graphical models
- Additive processes
- Heavy-tailed distributions

■ **Learning and Inference Group (-2012.3.31)**

The Learning and Inference Group develops statistical methodologies that enable researchers to learn from data sets and to properly extract information through appropriate inference procedures.

— *Staff* —

Shinto EGUCHI, Prof.
Shiro IKEDA, Assoc. Prof.
Hironori FUJISAWA, Assoc. Prof.
Masayuki HENMI, Assoc. Prof.
Tadayoshi FUSHIKI, Assist. Prof.
Shinsuke KOYAMA, Assist. Prof.

— *Subjects* —

- Statistical learning theory
- Information geometry
- Robust inference
- Statistical inference for observational studies
- Theory of multivariate distributions and its application
- Bioinformatics
- Stochastic inference
- Genome statistics

■ Computational Mathematics Group (-2012.3.31)

The Computational Mathematics Group studies optimization and other mathematical methodologies used for statistical modeling and analysis.

— *Staff* —

Yoshihiko MIYASATO, Prof.
Atsushi YOSHIMOTO, Prof.
Satoshi ITO, Prof.

— *Subjects* —

- Algorithms for computational inference
- Optimization modeling in computational inference
- Systems design under uncertainty
- Nonlinear H^∞ control based on inverse optimality
- Adaptive gain-scheduled control
- Mathematics and computational complexity analysis of convex programming
- Theory and computational methods of optimization
- Iterative learning control
- Computational algorithms for state-space modeling

The Department of Mathematical Analysis and Statistical Inference carries out research into general theory of mathematical statistics, statistical learning theory, optimization, and algorithms in statistical inference. (2012.4.1-)

■ Mathematical Statistics Group (2012.4.1-)

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

— *Staff* —

Satoshi KURIKI, Director (2011.4.1-), Prof.

Yoshihiko KONNO, Visiting Prof. (2012.4.1-2013.3.31)

Yoichi NISHIYAMA, Assoc. Prof.

Shuhe MANO, Assoc. Prof.

Takaaki SHIMURA, Assist. Prof.

Shogo KATO, Assist. Prof.

Kei KOBAYASHI, Assist. Prof.

— *Subjects* —

- Statistical inference and statistical decisions
- Analysis of multivariate data and contingency tables
- Integral-geometric approach to random field theory
- Multiple comparisons
- Statistical inference for stochastic processes
- Infinite-dimensional statistical models
- Limit theorems for stochastic processes
- Statistical inference in genetic linkage analysis
- Stochastic models in population genetics
- Statistical inference based on graphical models
- Additive processes
- Heavy-tailed distributions
- Algebraic statistics
- Directional statistics

■ Learning and Inference Group (2012.4.1-)

The Learning and Inference Group develops statistical methodologies to de-

scribe the stochastic structure of data mathematically and clarify the potential and the limitations of the data theoretically.

— *Staff* —

Shinto EGUCHI, Prof.

Kenji FUKUMIZU, Prof.

Shiro IKEDA, Assoc. Prof.

Hironori FUJISAWA, Assoc. Prof.

Daichi MOCHIIHASHI, Assoc. Prof. (2011.4.1-)

— *Subjects* —

- Statistical learning theory
- Information geometry
- Robust inference
- Statistical inference for observational studies
- Theory of multivariate distributions and its application
- Bioinformatics
- Stochastic inference
- Genome statistics
- Statistical inference based on positive semidefinite kernel
- Approximation theory on graph
- Statistical singular model
- Statistical natural language processing

■ Computational Inference Group (2012.4.1-)

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

— *Staff* —

Yoshihiko MIYASATO, Prof.

Atsushi YOSHIMOTO, Prof.

Satoshi ITO, Prof.

Tadayoshi FUSHIKI, Assist. Prof.

— *Subjects* —

- Algorithms for computational inference

- Optimization modeling in computational inference
- Systems design under uncertainty
- Nonlinear H^∞ control based on inverse optimality
- Adaptive gain-scheduled control
- Mathematics and computational complexity analysis of convex programming
- Theory and computational methods of optimization
- Iterative learning control
- Computational algorithms for state-space modeling
- Analysis of social system
- Optimization in natural resource controlling problem
- Control of multi-agent system

Prediction and Knowledge Discovery Research Center (-2011.12.31)

The Prediction and Knowledge Discovery Research Center studies the statistical modeling and inference algorithms that can be used to extract useful information from the huge amount of data which complex systems produce, and thus attempts to solve real-world problems in many different scientific domains, especially genomics, earth and space sciences.

■ Molecular Evolution Research Group

The Molecular Evolution Research Group researches the area of molecular phylogenetics, and seeks to develop statistical methods for inferring evolutionary trees of life using DNA and protein sequences.

— Staff —

Masami HASEGAWA, Adjunct Prof.

Jun ADACHI, Assoc. Prof.

Ying CAO, Assist. Prof. (-2012.3.31), Project Assist. Prof. (2013.1.1-2013.3.31)

— Subjects —

- Modeling of biodiversity and evolution
- Inferring molecular phylogenies
- Bioinformatics of genome evolution

■ Statistical Seismology Research Group

The Statistical Seismology Research Group is concerned with the evaluation of seismicity anomalies, detection of crustal stress changes, their modeling, and the probability forecasting of large aftershocks and earthquakes.

— *Staff* —

Yosihiko OGATA, Prof. (-2012.3.31)

Shinji TODA, Visiting Prof.

Jiancang ZHUANG, Assoc. Prof.

Takaki IWATA, Project Assoc. Prof. (2011.9.1-)

— *Subjects* —

- Diagnostic analysis of sequences of regional earthquakes and aftershocks
- Detection and evaluation of seismicity anomalies and crustal stress changes by statistical models
- Probability forecasting of large aftershocks and earthquakes

■ Statistical Genome Diversity Research Group

The Statistical Genome Diversity Research Group aims to construct novel methodologies for learning and inference from a variety of data sets in the rapidly growing area of bioinformatics.

— *Staff* —

Shinto EGUCHI, Director, Prof.

Satoshi KURIKI, Prof.

Masaaki MATSUURA, Visiting Prof.

Shiro IKEDA, Assoc. Prof.

Hironori FUJISAWA, Assoc. Prof.

Tadayoshi FUSHIKI, Assist. Prof.

Shogo KATO, Assist. Prof.

— *Subjects* —

- Statistical methods for gene expression analysis
- Statistical methods for SNP analysis
- Statistical methods for proteomic analysis
- Statistical confirmation of evidence under improperly superfluous information

Risk Analysis Research Center

The Risk Analysis Research Center is pursuing a scientific approach to the study of the increased uncertainty and risk associated with the increasing globalization of society and the economy. The center is also constructing a network for risk analysis in order to contribute to the creation of a reliable and safe society. (-2011.12.31)

■ Food and Drug Safety Research Group (-2011.12.31)

The Food and Drug Safety Research Group aims to develop the statistical framework and methodology of quantitative risk evaluation for substances ingested by the human body.

— *Staff* —

Hiroe TSUBAKI, Vice Director-General, Director, Prof.

Shigeyuki MATSUI, Prof. (-2013.3.31)

Manabu IWASAKI, Visiting Prof.

Tosiya SATO, Visiting Prof.

Yoichi KATO, Visiting Prof.

Masayuki HENMI, Assoc. Prof.

Satoshi TERAMUKAI, Visiting Assoc. Prof. (2011.4.1-2013.3.31)

Makoto TOMITA, Visiting Assoc. Prof.

Toshio OHNISHI, Visiting Assoc. Prof. (2011.6.1-)

Hisateru TACHIMORI, Visiting Assoc. Prof. (2011.6.1-)

Takaaki SHIMURA, Assist. Prof.

Takafumi KUBOTA, Project Assist. Prof.

■ Environmental Risk Research Group (-2011.12.31)

The Environmental Risk Research Group studies the statistical methodologies related to environmental risk and environmental monitoring.

— *Staff* —

Nobuhisa KASHIWAGI, Prof.

Atsushi YOSHIMOTO, Prof.

Koji KANEFUJI, Prof.

Kunio SHIMIZU, Visiting Prof.

Kazuo YAMAMOTO, Visiting Prof. (-2012.3.31)

Yoshiro ONO, Visiting Prof. (-2012.3.31)

Mihoko MINAMI, Visiting Prof.
Hidetoshi KONNO, Visiting Prof. (2011.6.1-2012.3.31)
Toshihiro HORIGUCHI, Visiting Assoc. Prof. (2011.4.1-)
Takashi KAMEYA, Visiting Assoc. Prof. (2011.4.1-)
Hiroshi SYONO, Visiting Assoc. Prof. (2011.4.1-2013.3.31)
Yoshiyuki NINOMIYA, Visiting Assoc. Prof. (2011.4.1-)
Koji OKUHARA, Visiting Assoc. Prof. (2011.6.1-)

■ Financial Risk and Insurance Research Group (-2011.12.31)

The Financial Risk and Insurance Research Group explores the use of statistical modeling methods to quantify the risks involved with financial instruments and insurance products.

— *Staff* —

Satoshi YAMASHITA, Vice Director, Prof.
Naoto KUNITOMO, Visiting Prof.
Hiroshi TSUDA, Visiting Prof.
Nakahiro YOSHIDA, Visiting Prof. (2011.4.1-)
Toshio HONDA, Visiting Prof. (2011.4.1-)
Michiko MIYAMOTO, Visiting Prof. (2011.6.1-)
Seisho SATO, Assoc. Prof. (-2013.3.31)
Yoshinori KAWASAKI, Assoc. Prof.
Yoichi NISHIYAMA, Assoc. Prof.
Toshinao YOSHIBA, Visiting Assoc. Prof.
Masakazu ANDO, Visiting Assoc. Prof. (2011.6.1-)

■ Research Group for Reliability and Quality Assurance of Service and Product (-2011.12.31)

The research group aims to achieve safe products and services by developing statistical methods that contribute to qualify assurance and reliability, and by promoting the adoption of these methods in the industrial world.

— *Staff* —

Hiroe TSUBAKI, Vice Director-General, Director, Prof.
Kakuro AMASAKA, Visiting Prof. (-2012.3.31)
Kazuo TATEBAYASHI, Visiting Prof. (-2012.3.31)
Sadaaki MIYAMOTO, Visiting Prof.
Shusaku TSUMOTO, Visiting Prof.

Manabu KUROKI, Visiting Assoc. Prof. (-2011.8.31), Assoc. Prof. (2011.9.1-)

Hideki KATAGIRI, Visiting Assoc. Prof.

Yukihiko OKADA, Visiting Assoc. Prof. (-2012.3.31)

Toshihiko KAWAMURA, Assist. Prof.

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. (2012.1.1-)

■ Data Infrastructure for Risk Analysis (2012.1.1-)

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 analyze well anonymized individual information safely.

— Staff —

Hiroe TSUBAKI, Vice Director-General, Director, Prof.

Satoshi YAMASHITA, Vice Director, Prof.

Kakuro AMASAKA, Visiting Prof. (-2012.3.31)

Kazuo TATEBAYASHI, Visiting Prof. (-2012.3.31)

Sadaaki MIYAMOTO, Visiting Prof.

Michiko MIYAMOTO, Visiting Prof.

Masakazu ANDO, Visiting Assoc. Prof.

Koji OKUHARA, Visiting Assoc. Prof. (2011.6.1-)

Hideki KATAGIRI, Visiting Assoc. Prof.

■ Mathematical Analysis of Risk (2012.1.1-)

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 in the mathematical and computational viewpoints. To promote the activity of this research community, we organize the annual cooperative research symposium “Extreme value theory and applications” since 1994.

— *Staff* —

Satoshi KURIKI, Prof.

Rinya TAKAHASHI, Visiting Prof. (2012.4.1-)

Toshikazu KITANO, Visiting Assoc. Prof. (2012.4.1-)

Hisayuki HARA, Visiting Assoc. Prof. (2011.4.1-)

Takaaki SHIMURA, Assist. Prof.

■ Food and Drug Risk Project (2012.1.1-)

The Food and Drug Risk Project aims to develop the statistical framework and methodology of quantitative risk evaluation for substances ingested by the human body.

— *Staff* —

Hiroe TSUBAKI, Vice Director-General, Director, Prof.

Manabu IWASAKI, Visiting Prof.

Yoichi KATO, Visiting Prof.

Tosiya SATO, Visiting Prof.

Masayuki HENMI, Assoc. Prof.

Toshio OHNISHI, Visiting Assoc. Prof. (2011.6.1-)

Hisashi NOMA, Assist. Prof. (2012.4.1-)

■ Construction of a new paradigm for design and analysis of clinical trials for predictive medicine (2012.1.1-)

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.

— *Staff* —

Shigeyuki MATSUI, Prof. (-2013.3.31)

Shinto EGUCHI, Prof.

Masaaki MATSUURA, Visiting Prof.

Manabu KUROKI, Visiting Assoc. Prof. (-2011.8.31), Assoc. Prof. (2011.9.1-)

Shuhei MANO, Assoc. Prof.

Masayuki HENMI, Assoc. Prof.

Fumikazu MIWAKEICHI, Assoc. Prof.

Jun Ohashi, Visiting Assoc. Prof. (2012.4.1-)

Satoshi TERAMUKAI, Visiting Assoc. Prof. (2011.4.1-2013.3.31)

Hisashi NOMA, Assist. Prof. (2012.4.1-)

Takayuki YAMADA, Project Assist. Prof. (2011.6.1-2013.3.31)

■ Suicide and Mental Risk Project (2012.1.1-)

This project will 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* —

Hiroe TSUBAKI, Vice Director-General, Director, Prof.

Hisateru TACHIMORI, Visiting Assoc. Prof. (2011.6.1-)

Makoto TOMITA, Visiting Assoc. Prof.

Takafumi KUBOTA, Project Assist. Prof.

■ Environmental Statistics Project (2012.1.1-)

This group intends to develop statistical methods in the environmental problems we face.

— *Staff* —

Koji KANEFUJI, Prof.

Nobuhisa KASHIWAGI, Prof.

Yoshiro ONO, Visiting Prof. (-2012.3.31)

Hidetoshi KONNO, Visiting Prof. (2011.6.1-2012.3.31)

Tetsuji IMANAKA, Visiting Prof. (2012.4.1-)

Megu OHTAKI, Visiting Prof. (2012.4.1-)

Kunio SHIMIZU, Visiting Prof.

Satoshi TAKIZAWA, Visiting Prof. (2012.4.1-)

Mihoko MINAMI, Visiting Prof.

Kazuo YAMAMOTO, Visiting Prof. (-2012.3.31)

Nobuo YOSHIDA, Visiting Prof. (2012.4.1-)

Satoru ENDO, Visiting Prof. (2012.4.1-)

Takashi KAMEYA, Visiting Assoc. Prof. (2011.4.1-)

Hiroshi SYONO, Visiting Assoc. Prof. (2011.4.1-2013.3.31)

Yoshiyuki NINOMIYA, Visiting Assoc. Prof. (2011.4.1-)

Toshihiro HORIGUCHI, Visiting Assoc. Prof. (2011.4.1-)

■ Risk analysis for resource management Project (2012.1.1-)

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

— *Staff* —

Atsushi YOSHIMOTO, Prof.

Hitoshi ISHIKAWA, Visiting Assoc. Prof. (2012.4.1-2013.3.31)

Toshiaki OWARI, Visiting Assoc. Prof. (2012.4.1-2013.3.31)

Kenichi KAMO, Visiting Assoc. Prof. (2012.4.1-)

Masashi KONOSHIMA, Visiting Assoc. Prof. (2012.4.1-)

■ The risk evaluation, control and management of finance and insurance (2012.1.1-)

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, Vice Director, Prof.

Naoto KUNITOMO, Visiting Prof.

Hiroshi TSUDA, Visiting Prof.

Toshio HONDA, Visiting Prof. (2011.4.1-)

Michiko MIYAMOTO, Visiting Prof. (2011.6.1-)

Nakahiro YOSHIDA, Visiting Prof. (2011.4.1-)

Yoshinori KAWASAKI, Assoc. Prof.

Seisho SATO, Assoc. Prof. (-2013.3.31)

Yoichi NISHIYAMA, Assoc. Prof.

Masayuki HENMI, Assoc. Prof.

Toshinao YOSHIBA, Visiting Assoc. Prof.

Masakazu ANDO, Visiting Assoc. Prof. (2011.6.1-)

Yasutaka SHIMIZU, Visiting Assoc. Prof. (2012.4.1-)

Masaaki FUKASAWA, Visiting Assoc. Prof. (2012.4.1-)

■ Statistical Seismological Research Project (2012.1.1-)

The research scope of the statistical seismological research group includes the developments of statistical models for quantitative analysis of earthquake occurrences and their relationships to anomaly phenomena from geophysical or geochemical observations, techniques of probabilistic earthquake forecasting and evaluation methods for forecasting performance. More general topics are also researched on statistical inferences of other types of random events in time and/or space, such as fires, crimes, etc.

— *Staff* —

Yoshiko OGATA, Prof. (-2012.3.31)

Shinji TODA, Visiting Prof. (-2013.3.31)

Jiancang ZHUANG, Assoc. Prof.

Takaki IWATA, Project Assoc. Prof. (2011.9.1-)

■ Genome Analysis Project (2012.1.1-)

We try to make contribution to understand risks around genome information, by developing methodologies to deduce useful information and methodologies to quantify latent risks from the flood of genome data.

— *Staff* —

Satoshi KURIKI, Prof.

Masami HASEGAWA, Adjunct Prof.

Hirohisa KISHINO, Visiting Prof. (2012.4.1-)

Hidetoshi SHIMODAIRA, Visiting Prof. (2012.4.1-)

Tatsuhiko TSUNODA, Visiting Prof. (2012.6.1-)

Hironori FUJISAWA, Assoc. Prof.

Jun ADACHI, Assoc. Prof.

Shuhei MANO, Assoc. Prof.

Yoshiyuki NINOMIYA, Visiting Assoc. Prof. (2011.4.1-)

Takahiro YONEZAWA, Visiting Assoc. Prof. (2012.4.1-)

Ruriko YOSHIDA, Visiting Assoc. Prof. (2013.1.1-2013.3.31)

Shogo KATO, Assist. Prof.

Ying CAO, Assist. Prof. (-2012.3.31), Project Assist. Prof. (2013.1.1-2013.3.31)

Research Innovation Center (-2011.12.31)

The purpose of this center is to establish innovative research fields in statistical mathematics in accordance with new trends of the real and academic world. The center makes progress of research projects, including in an initial stage, which are based on original ideas of researchers.

■ Functional Analytic Inference Research Group

This group aims to develop the nonparametric methodology for statistical inference using reproducing kernel Hilbert spaces given by positive definite kernels, and applies it to causal inference problems.

— *Staff* —

Kenji FUKUMIZU, Director, Prof.

Kei KOBAYASHI, Assist. Prof.

■ Advanced Monte Carlo Algorithm Research Group

Advanced Monte Carlo Algorithm Research Group aims to develop Markov Chain Monte Carlo and Sequential Monte Carlo algorithms and study their applications.

— *Staff* —

Makoto KIKUCHI, Visiting Prof.

Yukito IBA, Assoc. Prof.

Koji HUKUSHIMA, Visiting Assoc. Prof.

■ Speech and Music Information Research Group

The Speech and Music Information Research Group investigates novel information retrieval methods using machine learning from time series data, including speech, music, and brain data.

— *Staff* —

Tomoko MATSUI, Prof.

Masataka GOTO, Visiting Prof.

Shinsuke KOYAMA, Assist. Prof.

■ Optimization-based Inference Research Group

Optimization-based Inference Research Group focuses on optimization

methodology as a fundamental tool for computational inference and aims to develop new inference techniques in statistical applications.

— *Staff* —

Satoshi ITO, Prof.

Atsuko IKEGAMI, Visiting Prof.

Takashi TSUCHIYA, Visiting Prof.

Tadashi WADAYAMA, Visiting Prof.

Shiro IKEDA, Assoc. Prof.

Genta UENO, Assoc. Prof.

Yuji SHINANO, Visiting Assoc. Prof.

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 the data assimilation based on Bayesian statistics, implements numerical algorithms on high-performance computer systems in order to deal with large-scale problems, and promotes the data assimilation to various fields of sciences.

— *Staff* —

Tomoyuki HIGUCHI, Director-General (2011.4.1-), Director, Prof.

Yoshiyasu TAMURA, Vice Director-General (2011.4.1-), Vice Director, Prof.

Junji NAKANO, Prof.

Yoichi MOTOMURA, Visiting Prof.

Makoto KIKUCHI, Visiting Prof. (-2012.3.31)

Takashi WASHIO, Visiting Prof. (2012.4.1-)

Seisho SATO, Assoc. Prof. (-2013.3.31)

Genta UENO, Assoc. Prof.

Ryo YOSHIDA, Assoc. Prof.

Hikomichi NAGAO, Project Assoc. Prof.

Toru ONODERA, Visiting Assoc. Prof. (2011.1.1-)

Kazuyuki NAKAMURA, Visiting Assoc. Prof. (2012.4.1-)

Koji HUKUSHIMA, Visiting Assoc. Prof. (-2013.3.31)

Shinya NAKANO, Assist. Prof.

Christopher Andrew ZAPART, Project Assist. Prof.
Kenta HONGO, Project Assist. Prof. (2011.6.1-2012.3.31)
Masaya SAITO, Project Assist. Prof. (2012.4.1-)

— *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 problems 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
- 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

Survey Science Center

Founded on the accomplishments in social research by the Institute of Statistical Mathematics spanning over half a century including the Study of the Japanese National Character and the cross-national comparative research on national characteristics, the Survey Science Center was established in January of 2011 in order to facilitate further growth of the aforementioned sets of research as well as the establishment of networking ties with both domestic and international research organizations and the increase in the capacity to make contributions to wider society by creating what we call the NOE (Network Of Excellence).

— *Staff* —

Ryozo YOSHINO, Director, Prof.
Takashi NAKAMURA, Prof.
Tadahiko MAEDA, Assoc. Prof.
Takahiro TSUCHIYA, Assoc. Prof.
Toru KIKKAWA, Visiting Assoc. Prof.

Takahito ABE, Visiting Assoc. Prof. (2011.4.1-2012.9.30, 2012.11.1-)

Wataru MATSUMOTO, Visiting Assoc. Prof. (2012.4.1-)

Koken OZAKI, Assist. Prof. (-2013.3.31)

■ The Study of the Japanese National Character (JNC)

The longitudinal nationwide survey has been carried out since 1953 every 5 years with the purpose of clarifying the Japanese national character. This study shows some stable aspects such as human relationships in Japan, as well as some other aspects changing over years with the changes of economic, political and social conditions.

■ The Cross-National Studies of the National Character

The JNC survey has been developed into the cross-national comparative surveys which cover the people with Japanese ancestry overseas since 1971. This study attempts to understand the Japanese people and their culture in the comparative context as well as the global configuration of psychological distances of many countries (a sort of cultural manifold).

■ The Project on Accumulating Information on Social Research

Many data sets of our past surveys in various fields have been accumulated. These are being organized as a database open to researchers in the ISM collaboration studies, and to public eventually.

■ The Project on Collaborative Experimental Survey Research

In collaborations with universities or institutes, we carry out experimental survey research on various topics. We expect many young researchers to experience practical surveys through our efforts, including statistical sampling, data-cleaning and data analyses.

■ The Project on Utilizing Information on Social Research

Under our paradigm “Science of Data”, we study practical and scientific ways to utilize survey data and develop new statistical methods and techniques to collect and analyze survey data.

Research Center for Statistical Machine Learning (2012.1.1-)

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 (2012.1.1-), Prof.

Tomoko MATSUI, Vice Director (2012.1.1-), Prof.

Shinto EGUCHI, Prof.

Yoshihiko MIYASATO, Prof.

Satoshi ITO, Prof.

Atsuko IKEGAMI, Visiting Prof.

Takashi TSUCHIYA, Visiting Prof.

Tadashi WADAYAMA, Visiting Prof.

Masataka GOTO, Visiting Prof.

Masaaki MATSUURA, Visiting Prof.

Koji TSUDA, Visiting Prof. (2011.4.1-)

Shiro IKEDA, Assoc. Prof.

Daichi MOCHIIHASHI, Assoc. Prof. (2011.4.1-)

Yuji SHINANO, Visiting Assoc. Prof.

Takafumi KANAMORI, Visiting Assoc. Prof. (2012.4.1-2013.3.31)

Arthur GRETTON, Visiting Assoc. Prof. (2012.7.1-2013.3.31)

Tadayoshi FUSHIKI, Assist. Prof.

Kei KOBAYASHI, Assist. Prof.

Shinsuke KOYAMA, Assist. Prof.

Sayaka SHIOTA, Project Assist. Prof. (2013.2.1-)

Service Science Research Center (2012.1.1-)

Very few scientific methodologies have been developed for and applied to service activities, whereas businesses of the service sector produce more than three quarters of the developed world’s economy today. Our Service Science Research Center brings the data-centric methodologies into the service fields — from marketing, supply chain management, management engineering, to modeling of social systems. In order to integrate diverse disciplines, we con-

nect researchers in various fields through collaborations with hundreds of universities nationwide, under our project of the Network-Of-Excellence (NOE) for service science.

— *Staff* —

Hiroshi MARUYAMA, Vice Director-General (2011.4.1-), Director (2012.1.1-), Prof. (2011.4.1-)

Tomoyuki HIGUCHI, Director-General (2011.4.1-), Prof.

Hiroe TSUBAKI, Vice Director-General, Prof.

Tomoko MATSUI, Prof.

Junji NAKANO, Prof.

Yoichi MOTOMURA, Visiting Prof.

Shusaku TSUMOTO, Visiting Prof.

Nobuhiko TERUI, Visiting Prof. (2012.1.1-)

Yoshiki YAMAGATA, Visiting Prof. (2012.1.1-)

Manabu KUROKI, Visiting Assoc. Prof. (-2011.8.31), Assoc. Prof. (2011.9.1-)

Tsukasa ISHIGAKI, Visiting Assoc. Prof. (2012.1.1-)

Tadahiko SATO, Visiting Assoc. Prof. (2012.1.1-)

Yukihiko OKADA, Visiting Assoc. Prof.

Toshihiko KAWAMURA, Assist. Prof.

Nobuo SHIMIZU, Assist. Prof.

■ Project on Quality Assurance and Reliability of Products and Services

We study the statistical methods that have been developed for quality management of products and apply them to services to realize reliability and safety of services.

■ Project on Bayesian Analysis of Marketing Data

We apply the statistical methods such as Bayesian network to large-scale marketing data so that enterprises and the society at large have more detailed and personalized marketing data and predicts their clients' demands.

■ Project on Resilient Society

We investigate general strategies for making complex systems (such as societies) resilient and prove their effectiveness through building multi-domain agent simulator for a city.

■ Project on Building Social Behavior Model

We build an integrated model of collective human behavior by integrating ex-

isting models in various domains such as economics, disaster management, transportation, finance and marketing. This model will enable us to do more reliable predictions of collective human behaviors and could be used for planning in various purposes.

■ Project on Analyzing Structure of Services Industry

We develop a suite of methods to analyze the large-scale and diverse source of data and visualize them. This will enable obtaining insights on the overall structure of the services industry and will lead to efficiency improvement and higher rate of innovation.

■ Project on Data Curation

Data need to be prepared, such as removing outliers, supplying missing values, adjusting units, merging, splitting, coding, etc. for useful analytics. This project aims at developing an organized body of knowledge for this important process for data analysis.

School of Statistical Thinking (2012.1.1-)

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* —

Junji NAKANO, Director (2012.1.1-)

Yoshinori KAWASAKI, Vice Director (2012.1.1-)

Hiroshi MARUYAMA, Prof. (2011.4.1-)

Masami HASEGAWA, Adjunct Prof.

Yasumasa BABA, Adjunct Prof.

Makio ISHIGURO, Adjunct Prof.

Osamu KOMORI, Project Assist. Prof. (2012.4.1-)

— *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 the computer systems used for statistical computing, facilitating public outreach, and supporting the research activities of both staff and collaborators.

— *Staff* —

Junji NAKANO, Director, Prof.

Yasumasa BABA, Adjunct Prof.

Makio ISHIGURO, Adjunct Prof.

Yoshinori KAWASAKI, Vice Director (2011.4.1-), Assoc. Prof.

■ Computing Facility Unit

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

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 —

Doucet, Arnaud	(Canada)	2011. 6. 1 – 2011. 7.31
<i>ibd.</i>	(France)	2012. 6.20 – 2012. 8.21
Synodinos, Nicolaos Emmanuel	(U.S.A.)	2011. 6. 1 – 2011. 7.31
<i>ibd.</i>		2012. 6. 1 – 2012. 7.31
Myrvoll, Tor Andre	(Norway)	2011. 6.20 – 2011. 7.15
<i>ibd.</i>		2012. 7. 9 – 2012. 8.17
Negri, Ilia	(Italy)	2011. 8.29 – 2011. 9.30
<i>ibd.</i>		2012. 6.25 – 2012. 7.20
Jimenez-Sobrino, Juan Carlos	(Cuba)	2011.11.21 – 2012. 2.27
Huang, Fuchun	(Australia)	2012. 1. 5 – 2012. 2.28
Jiang, Changsheng	(China)	2012. 5.22 – 2012. 6.20
Shedlock, Andrew Michael	(U.S.A.)	2012. 6.19 – 2012. 8.18
Wynn, Henry Philip	(United Kingdom)	2012. 6.26 – 2012. 7.27
Hwang, Hsien-kuei	(Taiwan)	2012. 6.28 – 2012. 8.28

De Haan, Laurens	(Netherland)	2012. 7. 2 – 2012. 7.30
Peng, Hui	(China)	2012. 9.24 – 2012.11.22

— *Japanese Visiting Professors* —

Abe, Takahito	2011. 4. 1-2012. 9.30	Syono, Hiroshi	2011. 4. 1-2013. 3.31
<i>ibid.</i>	2012.11. 1-2013. 3.31	Teramukai, Satoshi	2011. 4. 1-2013. 3.31
Amasaka, Kakuro	2011. 4. 1-2012. 3.31	Toda, Shinji	2011. 4. 1-2013. 3.31
Ikoma, Norikazu	2011. 4. 1-2012. 3.31	Tomita, Makoto	2011. 4. 1-2013. 3.31
Kikuchi, Makoto	2011. 4. 1-2012. 3.31	Tsuchiya, Takashi	2011. 4. 1-2013. 3.31
Kuroki, Manabu	2011. 4. 1-2011. 8.31	Tsuda, Hiroshi	2011. 4. 1-2013. 3.31
Ono, Yoshiro	2011. 4. 1-2012. 3.31	Tsuda, Koji	2011. 4. 1-2013. 3.31
Tatebayashi, Kazuo	2011. 4. 1-2012. 3.31	Tsumoto, Shusaku	2011. 4. 1-2013. 3.31
Watanabe, Michiko	2011. 4. 1-2012. 3.31	Wadayama, Tadashi	2011. 4. 1-2013. 3.31
Yamaguchi, Kazunori	2011. 4. 1-2012. 3.31	Yoshiba, Toshinao	2011. 4. 1-2013. 3.31
Yamamoto, Kazuo	2011. 4. 1-2012. 3.31	Yoshida, Nakahiro	2011. 4. 1-2013. 3.31
Goto, Masataka	2011. 4. 1-2013. 3.31	Konno, Hidetoshi	2011. 6. 1-2012. 3.31
Hara, Hisayuki	2011. 4. 1-2013. 3.31	Ando, Masakazu	2011. 6. 1-2013. 3.31
Honda, Toshio	2011. 4. 1-2013. 3.31	Miyamoto, Michiko	2011. 6. 1-2013. 3.31
Horiguchi, Toshihiro	2011. 4. 1-2013. 3.31	Ohnishi, Toshio	2011. 6. 1-2013. 3.31
Hukushima, Koji	2011. 4. 1-2013. 3.31	Okuhara, Koji	2011. 6. 1-2013. 3.31
Ikegami, Atsuko	2011. 4. 1-2013. 3.31	Tachimori, Hisateru	2011. 6. 1-2013. 3.31
Iwasaki, Manabu	2011. 4. 1-2013. 3.31	Ishigaki, Tsukasa	2012. 1. 1-2013. 3.31
Kameya, Takashi	2011. 4. 1-2013. 3.31	Sato, Tadahiko	2012. 1. 1-2013. 3.31
Katagiri, Hideki	2011. 4. 1-2013. 3.31	Terui, Nobuhiko	2012. 1. 1-2013. 3.31
Kato, Yoichi	2011. 4. 1-2013. 3.31	Yamagata, Yoshiki	2012. 1. 1-2013. 3.31
Kikkawa, Toru	2011. 4. 1-2013. 3.31	Endo, Satoru	2012. 4. 1-2013. 3.31
Kunitomo, Naoto	2011. 4. 1-2013. 3.31	Fukasawa, Masaaki	2012. 4. 1-2013. 3.31
Matsuura, Masaaki	2011. 4. 1-2013. 3.31	Imanaka, Tetsuji	2012. 4. 1-2013. 3.31
Minami, Mihoko	2011. 4. 1-2013. 3.31	Ishikawa, Hitoshi	2012. 4. 1-2013. 3.31
Miyamoto, Sadaaki	2011. 4. 1-2013. 3.31	Kamo, Kenichi	2012. 4. 1-2013. 3.31
Motomura, Yoichi	2011. 4. 1-2013. 3.31	Kanamori, Takafumi	2012. 4. 1-2013. 3.31
Nameshida, Takashi	2011. 4. 1-2013. 3.31	Kishino, Hirohisa	2012. 4. 1-2013. 3.31
Ninomiya, Yoshiyuki	2011. 4. 1-2013. 3.31	Kitano, Toshikazu	2012. 4. 1-2013. 3.31
Okada, Yukihiko	2011. 4. 1-2013. 3.31	Konno, Yoshihiko	2012. 4. 1-2013. 3.31
Onodera, Toru	2011. 4. 1-2013. 3.31	Konoshima, Masashi	2012. 4. 1-2013. 3.31
Sato, Tosiya	2011. 4. 1-2013. 3.31	Matsumoto, Wataru	2012. 4. 1-2013. 3.31
Shimizu, Kunio	2011. 4. 1-2013. 3.31	Nakamura, Kazuyuki	2012. 4. 1-2013. 3.31
Shinano, Yuji	2011. 4. 1-2013. 3.31	Ohashi, Jun	2012. 4. 1-2013. 3.31

Ohtaki, Megu	2012. 4. 1-2013. 3.31	Washio, Takashi	2012. 4. 1-2013. 3.31
Owari, Toshiaki	2012. 4. 1-2013. 3.31	Yonezawa, Takahiro	2012. 4. 1-2013. 3.31
Shimizu, Yasutaka	2012. 4. 1-2013. 3.31	Yoshida, Nobuo	2012. 4. 1-2013. 3.31
Shimodaira, Hidetoshi	2012. 4. 1-2013. 3.31	Tsunoda, Tatsuhiko	2012. 6. 1-2013. 3.31
Takahashi, Rinya	2012. 4. 1-2013. 3.31	Gretton, Arthur	2012. 7. 1-2013. 3.31
Takizawa, Satoshi	2012. 4. 1-2013. 3.31	Yoshida, Ruriko	2013. 1. 1-2013. 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 2011 to March 2013.

(The list does not show all of the visiting fellows from abroad. Foreign visiting research fellows are listed under “Foreign Visitors” on page 44.)

— *Project researcher* —

Abe, Toshihiro	Kumazawa, Takao	Saito, Masaya
Akaishi, Ryo	Minami, Kazuhiro	Seki, Mami
Chan, Hei	Miura, Chiaki	Shibai, Kiyohisa
Dou, Xiaoling	Motoyama, Hitoshi	Shibuya, Kazuhiko
Fujita, Taisuke	Nakagome, Shigeki	Suzuki, Kazue
Hongo, Kenta	Nikaido, Kosuke	Takahashi, Hayato
Imoto, Tomoko	Nishiyama, Yu	Takahashi, Hisanao
Kamiyama, Chiho	Okamoto, Motoi	Tanaka, Eiki
Kato, Naoko	Okuda, Masaki	Ujiie, Yutaka
Komori, Osamu	Saita, Satoko	Watanabe, Yusuke

— *Japanese visiting research fellows* —

Ando, Masakazu	Hidaka, Tetsuji	Kageyama, Masayuki
Arakawa, Toshiya	Hirotsu, Chihiro	Kashima, Yoshihisa
Baba, Yasumasa	Ichinokawa, Momoko	Kato, Naohiro
Fujisawa, Katsuki	Inoue, Masashi	Kawai, Shigeharu
Hasegawa, Masami	Ishiguro, Makio	Kawakita, Masanori
Hasuike, Takashi	Isomura, Tetsu	Komatsu, Tatsuya
Hayashi, Hikaru	Itagaki, Masao	Komiyama, Osamu

Konno, Yoshihiko	Ogata, Yosihiko	Takahashi, Hayato
Majima, Haruka	Oka, Mayumi	Takai, Tsutomu
Markov, Konstantin	Okamura, Hiroshi	Takenouchi, Takashi
Matsumoto, Yukio	Orihashi, Yasushi	Tanabe, Kunio
Matsuo, Tomoko	Owada, Takashi	Tanaka, Ushio
Matsu'ura, Mitsuhiro	Pritchard, Mari	Tanaka, Yutaka
Miura, Ryoza	Sakai, Hironori	Tanokura, Yoko
Miyamoto, Michiko	Sakota, Takahiro	Tohmiya, Hideo
Motoyama, Hitoshi	Sano, Natsuki	Tokunaga, Terumasa
Naito, Kanta	Sasaki, Takeshi	Torres, Rafael
Nakagome, Shigeki	Seki, Mami	Ueno, Tsuyoshi
Nishihara, Hidenori	Siew, Hai-Yen	Yamauchi, Takashi
Nomura, Shunichi	Surovy, Peter	Yonezawa, Takahiro

— *Students from graduate school* —

Hayakawa, Takashi	Kawada, Akihiro	Sakabe, Yumiko
Kanagawa, Motonobu	Nozaki, Sena	

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, which has much to do with the past experience of the Institute. Since the very beginning of the history of the Institute, one of the basic principles has been to attach great importance to applications. The principle came from appreciating that innovative methodologies and theories of statistics are frequently developed in an effort to solve real problems.

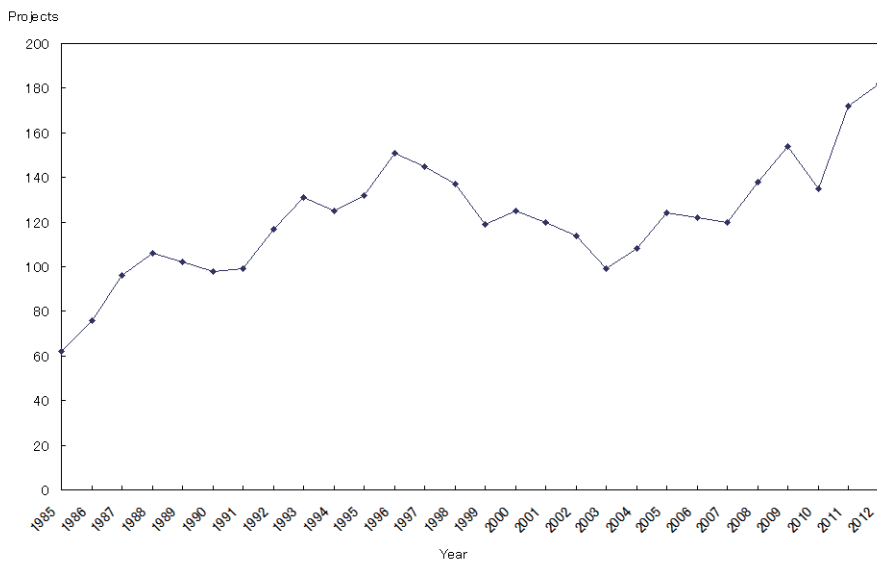
In past decades the Institute has maintained research collaborations between universities, government offices, private companies and various organizations. During this time, much useful work, both in theory and application, has been produced. This tradition of open collaboration with scientists outside the Institute has created a progressive and liberal academic atmosphere which, we believe, has contributed to developing new interdisciplinary research fields in related sciences.

The cooperative research activity was maintained through various research fields at different levels 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 where the solved problems arose, even when our statisticians played the most essential role. 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. Firstly, 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 role similar to the one that hospitals play in the medical sciences. Without constant stimuli from patients in the hospital, little development in medical sciences would be expected.

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 hopes of enlarging 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 open to projects that are to be planned and accomplished through international cooperation.

Our cooperative research projects are classified into several categories: cooperative use registration, general cooperative research 1, general cooperative research 2, specially promoted research and cooperative research symposium.



Number of collaborative research projects

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 Census, U.S.A., 1988-
- Stichting Mathematisch Centrum, The Netherlands, 1989-
- Statistical Research Center for Complex Systems, Seoul National University, Korea, 2002-
- Institute for Statistics and Econometrics, Humboldt University of Berlin, Germany, 2004-
- Institute of Statistical Science, Academia Sinica, Taiwan, 2005-
- The Steklov Mathematical Institute, Russia, 2005-
- Central South University, China, 2005-
- Soongsil University, Korea, 2006-
- Department of Statistics, University of Warwick, U.K., 2007-
- Indian Statistical Institute, India, 2007-
- Department of Empirical Inference, Max Planck Institute for Biological Cybernetics, Germany, 2010-
- Faculdade de Medicina da Universidade de São Paulo, Brazil, 2011-
- Department of Communication Systems, SINTEF Information and Communication Technology, Norway, 2012-

- Human Language Technology Department, Institute for Infocomm Research, Singapore, 2012-
- Centre for Computational Statistics and Machine Learning, University College London, U.K., 2012-
- Department of Electronics and Telecommunications, Norwegian University 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-
- Korean Statistical Society, Korea, 2013-

The Institute has also been active in organizing international conferences and workshops. In April 2011-March 2013, 25 international symposia were held under the auspices of the Institute;

- The Second International Conference on FORCOM - Follow up and New Challenge for Coming Generations - FORCOM 2011 -, September 26-30, 2011
- Forest Technologies for Mitigating Climate Change, October 4-6, 2011
- Workshop on Symbolic Data Analysis, November 1, 2011
- International Year of Forests FORMATH International FORUM, November 21-22, 2011
- ISM-ISI-ISSAS Joint Conference 2012, February 2-3, 2012
- International Seminar on Time Series Modeling of Neuroscience Data, February 14, 2012
- International symposium on statistical modeling and real-time probability forecasting for earthquakes, March 11-14, 2012
- 2012 International Workshop on Statistical Machine Learning for Speech Processing (IWSML) - Scalable Approach in the Era of Abundant Data -, March 31, 2012
- ISO TC69 SC8 Workshop, June 21, 2012
- BayesComp2012, June 22-23, 2012
- International Symposium on A New Era of Forest Management for Ecosystem Services, June 28, 2012
- International Workshop in Marketing Science and Service Research, July 2-3, 2012
- Workshop on Directional Statistics, July 5, 2012

- Recent Developments in Statistical Inference, July 6, 2012
- Workshop on Capacity Building in Cambodian Forestry Introduction to Statistical Analysis in “R” for Forest Resource Management, August 7-9, 2012
- Workshop on Sequential Monte Carlo and Data Assimilation, August 9, 2012
- Joint International Symposium by Japan, Korea and Taiwan Sustainable Forest Ecosystem Management in Rapidly Changing World, September 12-14, 2012
- 2012 IASC-ARS Sessions (in the 26th Symposium of Japanese Society of Computational Statistics), November 1-2, 2012
- Workshop on Applied Physics and Statistics for Quantitative Biology, November 26, 2012
- The Second International CORSSA (the Community Online Resource for Statistical Seismicity Analysis) Workshop, January 22-25, 2013
- ISM Symposium on Environmental Statistics 2013, January 25, 2013
- International Workshop on Particle Filters for Data Assimilation, February 7, 2013
- Dialogues between Neuroscience and Statistical Science 3, February 18-19, 2013
- One-day course on Monte Carlo methods for partial differential equations, February 19, 2013
- JAFEE-Columbia-ISM International Conference on Financial Mathematics, Engineering, and Statistics, March 18-19, 2013

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 71 visitors from 22 different countries. Of these researchers, 48 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 2011-March 2013)

- (
- 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

Peters, Gareth William 11.12.26	*Dunsmuir, William T. M. 12.1.16-12.7.13
* <i>ibd.</i> 12.7.24-12.8.21	*Baddeley, Adrian John 12.7.4-12.7.10
* <i>ibd.</i> 12.10.5-13.3.31	*Daley, Daryl..... 12.7.4-12.7.10
*Huang, Fuchun 12.1.5-12.2.28	Speed, Terrence 12.11.6

From Austria

*Forsell, Nicklas..... 13.3.12-13.3.19	*Kraxner, Florian 13.3.26-13.3.29
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From Canada

*Doucet, Arnaud 11.6.1-11.7.31	Bouchard-Cote, Alexandre..... 11.7.26
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From Chile

*Ruiz-Tagle, Molina Mauricio.. 13.3.12-13.3.19
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From China

*Zhao, Lianwen 12.3.12-12.3.16	Huang, Su-Yun 12.7.12
*Jiang, Changsheng 12.5.22-12.6.20	*Peng, Hui 12.9.24-12.11.22
*Hwang, Hsien-kuei 12.6.28-12.8.28	

From Cuba

*Jimenez-Sobrinno, Juan Carlos.. 11.11.21-12.2.27

From France

*Chiche, Pierre Henri Francois.. 12.5.1-12.10.31	*Vert, Jean Philippe 12.11.6-12.11.13
Ambroise, Christophe..... 12.9.27	

From Germany

Montúfar, Guido..... 11.9.2	*Zhang, Kun 11.11.21-11.11.27
*Dinuzzo, Francesco 11.11.19-11.11.27	*Raymond, Annie 13.3.12-13.3.19

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<i>From India</i>	
<hr/>	
*Dutta, Subhajit	12.7.5-12.7.19
<hr/>	
<i>From Italy</i>	
<hr/>	
*Negri, Ilia.....	11.8.29-11.9.30 * <i>ibd.</i> 12.6.25-12.7.20
<hr/>	
<i>From Korea</i>	
<hr/>	
*Siriteanu, Constantin.....	13.1.7-13.1.11 *Lee, Jung Jin..... 13.2.18-13.2.21
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<i>From Malaysia</i>	
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Ong, S. H.	12.2.1
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<i>From Nederland</i>	
<hr/>	
*De Haan, Laurens	12.7.2-12.7.30 *Aoki, Edson Hiroshi 13.3.25-13.3.29
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<i>From New Zealand</i>	
<hr/>	
Hirose, Yuichi.....	11.12.9 Parry, Matthew12.7.2
Khmaladze, Estate V.....	11.12.12 Wang, Ting.....12.7.24
*Harte, David Shamus	12.3.5-12.3.28 Savage, Martha Kane.....12.11.13
*Bebbington, Mark Stephen...	12.3.10-12.3.16
<hr/>	
<i>From Norway</i>	
<hr/>	
*Myrvoll, Tor Andre	11.6.20-11.7.15 * <i>ibd.</i> 12.7.9-12.8.17
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<i>From Portugal</i>	
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*Diana, Surova	12.4.1-13.3.31
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<i>From Poland</i>	
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*Pokorski, Mieczyslaw.....	12.3.11-13.3.10
<hr/>	
<i>From Spain</i>	
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*Pewsey, Arthur	13.3.22-13.3.31
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<i>From Swiss</i>	
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*Zechar, Jeremy Douglas.....	12.3.10-12.3.30 *Danafar, Somayeh..... 13.1.14-13.3.31
* <i>ibd.</i>	13.1.17-13.1.30

From Taiwan

*Chen, Chun-hou	11.7.17-11.7.30	*Chen, Su-Yun	12.7.5-12.7.13
Chan, Chung-Han	12.5.29	*Hung, Hung	12.7.14-12.8.17

From U.K.

*Eaton, Frederick Hewitt	11.5.10-11.5.29	*Gretton, Arthur	12.7.1-13.3.31
Guillas, Serge	12.5.18	Wood, Simon	12.9.3
*Doucet, Arnaud	12.6.20-12.8.21	*Sriperumbudur, Vangeepuram Bharath Kumar	
*Wynn, Henry Philip	12.6.26-12.7.27	12.10.15-12.11.2
Calderhead, Ben	12.7.2	*Jones, Michael Christopher...	13.3.22-13.3.30

From U.S.A.

*Synodinos, Nicolaos Emmanuel		Owada, Takashi	12.1.12
.....	11.6.1-11.7.31	*Shedlock, Andrew Michael ..	12.6.19-12.8.18
* <i>ibid.</i>	12.6.1-12.7.31	*Hayter, Anthony J.	12.11.18-13.1.19
Galaskiewicz, Josef	11.6.29	*Weir, Brad	13.2.3-13.2.9
Kagan, Yan	11.9.2	Chen, Zhe	13.2.18
Zhang, Jun	11.9.2	*Mascagni, Michael Vincent..	13.2.18-13.2.23
Rundle, John B.	11.10.18	*Nadeau, Robert M.	12.3.10-12.3.18
Lakshmivarahan, S.	12.1.10	*Vlosky, Richard	13.3.26-13.3.29

Colloquia by Foreign Visitors

(2011.4-2013.3)

Speaker (Country)	Title	Date
Eaton, Frederick (U.K.)	A conditional game for comparing approximations	2011. 5.19
Doucet, Arnaud (Canada)	Derivative-free estimation of the score vector and observed information matrix with application to state-space models	2011. 6.17
Galaskiewicz, Josef (U.S.A.)	The market for youth services in Phoenix	2011. 6.29
Galaskiewicz, Josef (U.S.A.)	Dynamic social network analysis of the formation of international environmental regimes	2011. 6.29
Bouchard-Cote, Alexandre (Canada)	Probabilistic models of language change	2011. 7.26
Montúfar, Guido (Germany)	Geometry and approximation errors of restricted Boltzmann machines	2011. 9. 2
Zhang, Jun (U.S.A.)	Regularized learning in reproducing kernel Banach spaces	2011. 9. 2
Kagan, Yan (U.S.A.)	Statistical properties of earthquake occurrence and their application for earthquake forecasting	2011. 9. 2
Rundle, John B. (U.S.A.)	Forecasting large earthquakes: problems, pitfalls and Promise	2011.10.18
Zhang, Kun (Germany)	Recent advances in causal discovery: conditional independence, non-Gaussianity, and nonlinearity	2011.11.22
Dinuzzo, Francesco (Germany)	Learning kernels for the output space	2011.11.22
Hirose, Yuichi (New Zealand)	Information criteria for parametric and semi-parametric models	2011.12. 9
Khmaladze, Estate V. (New Zealand)	Infinitesimal analysis of set-valued functions and applications to spatial statistics and image analysis	2011.12.12

Speaker (Country)	Title	Date
Peters, Gareth William (Australia)	Calibration and filtering for multi factor commodity models with seasonality: incorporating panel data from futures contracts	2011.12.26
Owada, Takashi (U.S.A.)	Functional central limit theorem of stochastic integral infinitely divisible processes generated by conservative null flows	2012. 1.12
Lakshmivaran, S. (U.S.A.)	Information theoretic analysis of the impact of observations	2012. 1.10
Ong, S. H. (Malaysia)	Some models for dispersion in count data	2012. 2. 1
Zhao, Lianwen (China)	Oracle inequalities and model selection	2012. 3.15
Guillas, Serge (U.K.)	Earthquake occurrence: emulation and climate forcing	2012. 5.18
Chan, Chung-Han (Taiwan)	Short-term earthquake forecasting through a smoothing Kernel and the rate-and-state friction law: application to Taiwan and the Kanto region, Japan	2012. 5.29
Jiang, Changsheng (China)	Background seismicity and its application in the study of Accelerating Moment release (AMR) and Pattern Informatics (PI) method	2012. 6.19
Parry, Matthew (New Zealand)	The entropy of scoring rules	2012. 7. 2
Calderhead, Ben (U.K.)	A sample of differential geometric MCMC methods	2012. 7. 2
Daley, Daryl (Australia)	Dimension walks and schoenberg spectral measures for isotropic random fields	2012. 7. 6
Baddeley, Adrian John (Australia)	Leverage, influence and residual diagnostics for point process models	2012. 7. 6
Gretton, Arthur (U.K.)	Consistent nonparametric tests of independence: L_1 , log-likelihood and kernel	2012. 7.12

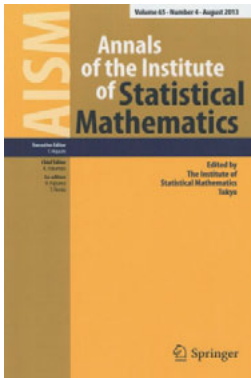
Speaker (Country)	Title	Date
Dutta, Subhajt (India)	Classification using localized spatial depth with multiple localization	2012. 7.12
Huang, Su-Yun (Canada)	Multilinear principal component analysis -asymptotic theory	2012. 7.12
Hung, Hung (Taiwan)	Matrix variate logistic regression model with application to EEG data	2012. 7.12
Wang, Ting (New Zealand)	Hidden Markov models in modelling earthquake data	2012. 7.24
Wood, Simon (U.K.)	Simple statistical models for complex ecological data	2012. 9. 3
Ambroise, Christophe (France)	New consistent and asymptotically normal parameter estimates for random-graph mixture models	2012. 9.27
Speed, Terrence (Australia)	Removing unwanted variation from high dimensional data using negative control	2012.11. 6
Savage, Martha Kane (New Zealand)	Towards predicting earthquakes and volcanic eruptions using statistical techniques	2012.11.13
Weir, Brad (U.S.A.)	Implicit sampling: theory and implementation	2013. 2. 7
Chen, Zhe (U.S.A.)	Tutorial talk: state space methods in neuronal data analysis	2013. 2.18
Chen, Zhe (U.S.A.)	Uncovering rodent hippocampal population codes: topographic vs. topological maps	2013. 2.18
Aoki, Edson Hiroshi (Nederland)	Understanding and countering the particle filter degeneracy phenomenon	2013. 3.25
Jones, Michael Christopher (U.K.)	Extending univariate families of distributions to the bivariate case	2013. 3.26
Pewsey, Arthur (Spain)	Circular statistics in R and beyond	2013. 3.26

Publications

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 *the Annals of the Institute of Statistical Mathematics* (AISM) in 1949 shortly after its foundation. Today AISM has a worldwide reputation and is listed in citation review journals. The aims of AISM are shown in the excerpt below. Information for submitting papers can be found at <http://www.ism.ac.jp/>.

AISM

The journal aims to provide an international forum for open communication among statisticians and research workers who have the common purpose of advancing human knowledge through the development of the science and technology of statistics.



AISM will publish the broadest possible coverage of statistical papers of the highest quality. Emphasis will be placed on the publication of papers relating to (a) establishment of new areas of application, (b) development of new procedures and algorithms, (c) development of unifying theories, (d) analysis and improvement of existing procedures and theories, and (e) communication of empirical findings supported by real data.

The objective of AISM is to contribute to the advancement of statistics as a science for human handling of information to cope with uncertainties. Special emphasis will thus be placed on the publication of papers that will eventually lead to significant improvements in the practice of statistics. In addition to papers by professional statisticians, contributions from authors in various fields of application will be welcomed.

AISM is presently distributed by Springer. Titles, abstracts, and full texts

of papers can be found at <http://www.ism.ac.jp/editsec/aism/> and <http://springerlink.com/>.

The Institute publishes another periodical, *Proceedings of the Institute of Statistical Mathematics*. The periodical made its first appearance in 1953 and now carries scientific papers and articles on topics of research (in Japanese with abstracts in English). Refer to the following for titles, abstracts and full texts of those papers: <http://www.ism.ac.jp/editsec/toukei/>.

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

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

Research Memorandum, though named *memorandum*, has almost the content of full research papers, and fulfills the important mission of giving immediate publicity to research findings. *Research Memorandum* enables Institute staff to announce achievements with minimal delay.

A list of the six reports released from April 2011 to March 2013 follows.



(Research Memorandum)

Technical Reports

Cooperative Research Reports

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

- No.268: Izumi, K., Summer Seminar on Statistics. (*August 2011*)
- No.269: Kiyono, K., New Development of Statistics for Medical Applications III. (*March 2012*)
- No.270: Iwaki, S., Inverse Problems and Applications on Medical Science and Engineering (3). (*March 2012*)
- No.271: Tanaka, M., Econophysics and its Applications (8). (*March 2012*)
- No.272: Takeuchi, A., Research on best practice in teaching statistics. (*March 2012*)
- No.273: Cho, K., Statistical Analyses of Conceptual Structures of Japanese Learners of English. (*March 2012*)
- No.274: Takahashi, R., Extreme Value Theory and Applications (9). (*February 2012*)
- No.275: Shimura, T., Infinitely divisible processes and related topics (16). (*February 2012*)
- No.276: Koyama, Y., Domain Specific Expressions from ESP Corpora And Their Pedagogical Applications. (*March 2012*)
- No.277: Ishikawa, S., A Statistical Approach to Classification of Language Datas. (*March 2012*)
- No.278: Tabata, T., Mining Textual Patterns. (*March 2012*)
- No.279: Shimatani, K., Field Data for Large Animals and Statistical Mathematics. (*March 2012*)
- No.280: Ishikawa, Y., Statistics for Quantitative Analysis of Texts. (*March 2012*)
- No.281: Hotta, S., A Statistical Study of Lay Participation in Criminal Trials. (*March 2012*)
- No.282: Matsuda, Y., Compilation of Multi-national Enterprise Statistics. (*March 2012*)
- No.283: Inokuchi, M., Website for practice to improve the ability of statistical analysis of registered dietitian. (*March 2012*)
- No.284: Komori, O., Progress report on the database of Antarctic observation teams and the future plan. (*March 2012*)
- No.285: Kobayashi, Y., Abstract Report of the Research Meeting on use of official statistics microdata. (*December 2011*)

- No.286: Tomita, M., Some approaches for statistical analyses of large-scale epidemiological data. (*March 2012*)
- No.287: Sudo, N., Nakai, M., Kawabata, A., Kikkawa, T., Todoroki, M. and Hamada, H., Cooperative Use of Survey-Related Resources of ISM, Volume 1: The Case of SSP-O2010 Survey. (*March 2012*)
- No.288: Tsubaki, H., Genesis and circulation mechanism of symbolic signals, and its application to social sciences (Progressive Report). (*October 2012*)
- No.289: Cho, K., Conceptual Structures of Japanese Learners of English: Analyses of learners' corpora. (*March 2013*)
- No.290: Ishikawa, S., Methodology for Quantitative Analysis of Language Data. (*March 2013*)
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- No.292: Tanaka, M., Econophysics and its Applications (9). (*March 2013*)
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- No.296: Sudo, N., Nakai, M., Kawabata, A., Kikkawa, T., Todoroki, M. and Hamada, H., Cooperative Use of Survey-Related Resources of ISM, Volume2: The Case of SSP-I2010 and Other Surveys. (*March 2013*)
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- No.103: Yoshino, R. and Nikaido, K. (eds.), The Asia-Pacific Values Survey –Cultural Manifold Analysis (CULMAN) on People’s Sense of Trust– JAPAN 2010 Survey. (*May 2011*)
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- No.1141: Nishiyama, Y., Adaptive semiparametric Bayes estimation. (*May 23, 2011*)
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No.32: Nakano, J. (ed.), Annual Symposium of the Graduate Students of the Department of Statistical Science, 2011. (*January 2012*)

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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 2011 to March 2013, to complete the following list. Also included are works by visiting professors and students.

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Tutorial and Consultation Programs

Tutorial courses on statistical science are held around 13 times a year for the benefit of researchers, students, and the general public. The levels of courses vary from beginner's level to advanced level.

— *in 2011* —

- Akaike Information Criterion and Statistical Modeling
- Introduction to Sampling Methods and Sample Surveys
- Basic Course of Statistics
- An Introduction to Statistical Analysis Based on Martingale Theory
- Introduction to Multivariate Analysis
- New Development of Model-Free Controller Design – Basics and Applications of Fictitious Reference Iterative Tuning (FRIT) –
- Statistical Pattern Recognition – Toward Comprehensive Understanding –
- Theory and Practice for Inferring Molecular Phylogenies
- Implementation of the Ensemble Kalman Filter
- Introduction to Time Series Analysis for Bioscience

— *in 2012* —

- Statistical Analysis by Information Criteria
- An Introduction to Statistical Analysis by the Theory of Martingales
- Basic Course of Statistics
- Introduction to Multivariate Analysis
- Analysis of Sample Surveys with R
- An Introduction to Statistical Graphical Models
- Statistical Analysis of Forest Growth Data and Its Applications
- Statistical Methods for Missing Data
- Introduction to Statistical Topic Models
- Bayesian Data Analysis; Case Examples
- Theory and Practice of Information Processing Based on Sparsity, –

Compressed Sensing and Related Topics –

In addition, once a year, the Institute holds a special introductory lecture to inform the public of various topics that have emerged out of research and study.

The Institute accepts, mainly through the School of Statistical Thinking, to acquaint the public with the statistical methodology developed in the course of research, and to offer services for consultancy. The Institute also accepts graduate students, technicians, and researchers from universities and private institutions for non-degree programs of continuing education.

Since 1989 the Institute has accepted students for education and research in three-year doctoral programs. In 2006, the Institute adopted a five-year system, offering either a five-year education and research program for master level students, or a three-year education and research program starting from the third year of study for doctor level students.

Software Products

The creation of new theories and new methods of analysis generally accompany testing procedures, which are often fulfilled through complicated calculations run by elaborate computer programs. The Institute believes that programs and software completed in the course of research should be delivered as quickly as possible to the relevant fields of science and business. Therefore the Center for Engineering and Technical Support is engaged in cataloguing and storing in a library the software products developed at the Institute. Detailed information on the library, named ISMLIB, is available through: kks@ism.ac.jp (e-mail), <http://www.ism.ac.jp/> (URL). Some programs in the library can be downloaded from the Internet site. The following is a partial list of programs developed in the Institute. 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)	— <i>Main features</i> — Package of programs for analysis, prediction and control of time series. — <i>Typical examples of application</i> — <ul style="list-style-type: none"> • Analysis of channel records of brain wave • Analysis of economic data • Optimal control of plants • Implementation of ship's auto-pilot • Analysis of seismological data 	Mail to kks@ism.ac.jp

Program	Explanation etc.	Access
■ TIMSAC for Windows	<p>— <i>Main features</i> —</p> <p>TIMSAC program implemented on Windows.</p> <p>— <i>Typical examples of application</i> —</p> <ul style="list-style-type: none"> • Analysis of brain wave • Prediction of sales • Prediction of stock price • Analysis of seismological data 	Mail to kks@ism.ac.jp
■ 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)	<p>— <i>Main features</i> —</p> <p>A dialogue system for system analysis.</p> <p>— <i>Typical examples of application</i> —</p> <ul style="list-style-type: none"> • Analysis of industrial plants • System analysis • Analysis of chemical processes in human bodies 	http://www.ism.ac.jp/ismlib/jpn/ismlib/
■ TIMSAC84: Statistical Analysis of Series of Events (TIMSAC84-SASE) Version 2	Progrms for point process analysis.	http://www.ism.ac.jp/~ogata/Ssg/ssg_softwareSE.html
■ BAYSEA (BAYesian SEasonal Adjustment)	<p>— <i>Main features</i> —</p> <p>Computer program for realizing a decomposition of a time series into trend, seasonal and irregular components.</p> <p>— <i>Typical examples of application</i> —</p> <ul style="list-style-type: none"> • Seasonal adjustment of economic time series 	Mail to kks@ism.ac.jp

Program	Explanation etc.	Access
<p>■ CATDAP (CATegorical Data Analysis)</p>	<p>— <i>Main features</i> — A program for the selection of variables that explain well the structure of categorical data.</p> <p>— <i>Typical examples of application</i> —</p> <ul style="list-style-type: none"> • Analysis of multi-dimensional contingency tables 	Mail to kks@ism.ac.jp
<p>■ CATDAP for Windows</p>	CATDAP program implemented on Windows.	Mail to kks@ism.ac.jp
<p>■ CATDAP for R package</p>	CATDAP program implemented as an R package.	http://jasp.ism.ac.jp/ism/catdap/
<p>■ QUANT (QUANTification theory)</p>	<p>— <i>Main features</i> — Programs for the quantification theories of type I, II, III.</p> <p>— <i>Typical examples of application</i> —</p> <ul style="list-style-type: none"> • 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
<p>■ DALL</p>	<p>— <i>Main features</i> — Davidon's variance algorithm subroutine customized for maximum likelihood.</p> <p>— <i>Typical examples of application</i> —</p> <ul style="list-style-type: none"> • Analysis of medical data • Analysis of multi-dimensional non-stationary data 	http://www.ism.ac.jp/ism/lib/jpn/ism/lib/
<p>■ Jasp (Java based Statistical Processor)</p>	<p>— <i>Main features</i> — An experimental statistical analysis system written in Java language.</p> <p>— <i>Typical examples of application</i> —</p> <ul style="list-style-type: none"> • Explanatory data analysis • Developing new computational statistical methodology 	http://jasp.ism.ac.jp/

Program	Explanation etc.	Access
■ Jasplot (Java statistical plot)	— <i>Main features</i> — Statistical graphics library in Java language. — <i>Typical examples of application</i> — • Data visualization	http://jasp.ism.ac.jp/jasplot/
■ Statistical Analysis of Seismicity - updated version (SASeis2006)	Programs for seismicity analysis.	http://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/
■ NScluster	An R package for simulation and estimation of the Neyman-Scott type spatial cluster models.	http://jasp.ism.ac.jp/ism/NScluster/
■ CloCK-TIME	Web service to analyze multivariate time series by the particle filter.	http://sheep.ism.ac.jp/CloCK-TIME/



(Supercomputer-1)



(Supercomputer-2)

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

“In Japan, inter-university research institutes have been established in various research fields as centers of advanced studies and large-scale joint researches since 1971 when National Laboratory for High Energy Physics was built as the first one. A novel idea of applying the excellent academic staff and facilities of inter-university research institutes to postgraduate education had been extensively discussed since 1982. Consequently it was decided to establish the Graduate University for Advanced Studies as a new postgraduate education system operated under close contact and tight cooperation with inter-university research institutes (“parent institutes”). The main purposes of the University are to cultivate young scientists of rich originality backed with wider vision and an international sense and also to promote fundamental research in the direction of opening up new scientific disciplines.”

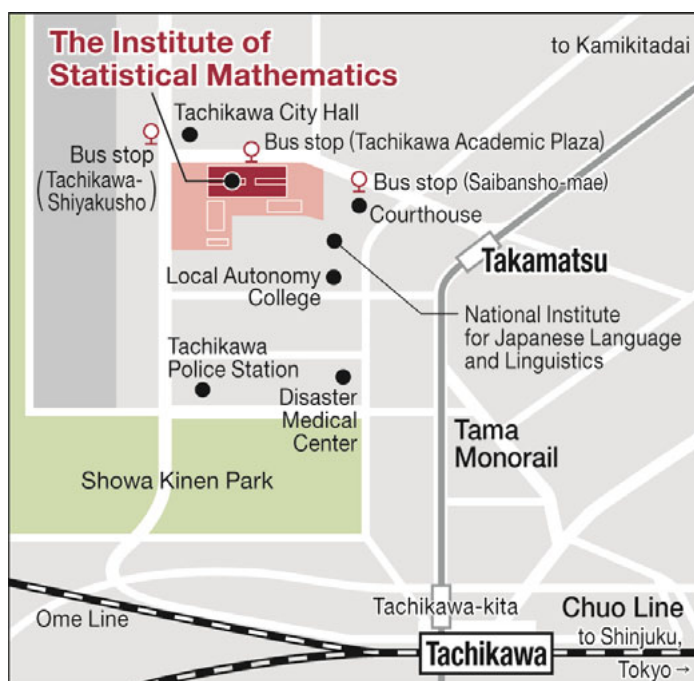
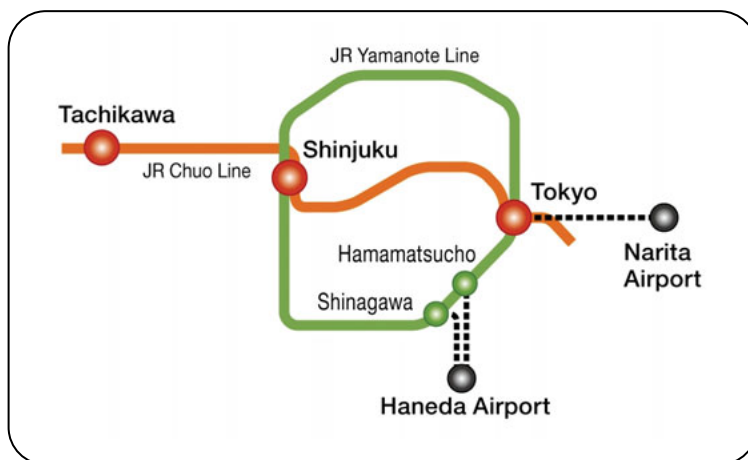
(from the *President’s Statement*)

The Graduate University for Advanced Studies was thus established in October 1988 with seven institutes as parents. As of April 2013, the University has grown to have 18 parent institutes and 1620 Ph.D. students. The organization is composed of 6 schools that comprise 21 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, statistical methodologies, and the theory of prediction and control.

Since its establishment, 103 Doctors of Philosophy have been conferred by the Department. As of April 2013, the Department has 29 students. (The regular number is 19 students. (In total five school year))

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
Research Organization of Information and Systems

THE INSTITUTE OF STATISTICAL MATHEMATICS

including the

DEPARTMENT OF STATISTICAL SCIENCE,
SCHOOL OF MULTIDISCIPLINARY SCIENCES,
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