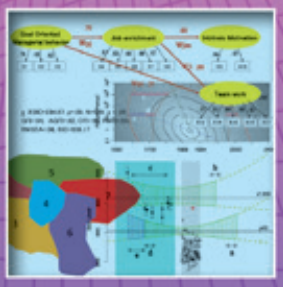
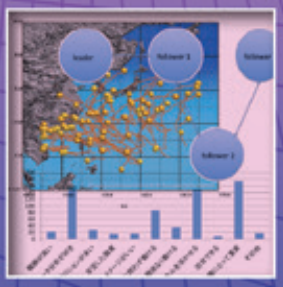
Research Organization of Information and Systems

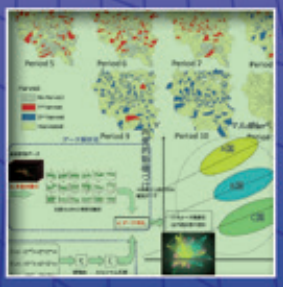
The Institute of Statistical Mathematics

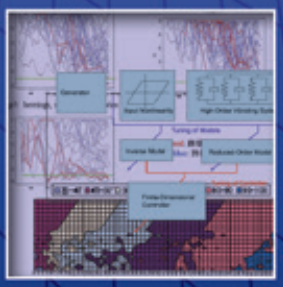
2014-2015

ISM









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Message from Director-General

The Institute of Statistical Mathematics (ISM) was established in 1944, close to the end of World War II. This year, therefore, marks the 70th anniversary of our founding. The ISM was launched with the aim of conducting studies on the mathematics of probability and its applications, as well as of communicating, unifying, and promoting such studies. To this day, without interruption, the same determined spirit of inquiry that was directed to research in those early years has been preserved in our identity, enabling us to make contributions to expanding the depth and advancing the frontiers of statistical mathematics. With two years remaining of our 2nd Medium-term Plan as an Inter-university Research Institute Corporation, we must face the challenging environment surrounding national universities and also this year accelerate our preparations for transitioning to the 3rd term.

This 2014-2015 Japanese academic year will be the final year of my (first four-year) term as Director-General. I was appointed amid the confusion that followed the Great East Japan Earthquake—the youngest person ever to take on the job—and to the best of my abilities, I strived to get our two major projects at the institute, the Network Of Excellence (NOE) Project and the Project for Fostering and Promoting Statistical Thinking, fully up and running and to ensure the stable operation of the institute.

The three key focal points of operation in this academic year are (1) advancing our inter-university and cooperative research functions, (2) enhancing our organizational capacity, and (3) formulating a first draft for our 3rd Medium-term Plan.

Within the first half of this academic year, we have introduced three supercomputer systems, each equipped with different functions, in part with the help of supplementary budget funds. One of these supercomputers is to be part of Japan's revolutionary High-Performance Computing Infrastructure (HPCI), a key component of Japan's national computing infrastructure. ISM is the first Inter-university Research Institute to join HPCI. We are intent on systematically utilizing the three systems, in accordance with the diverse skills and purposes of users, and to efficiently promote their use for inter-university and cooperative research. In addition, we plan to start construction on an extension of our guesthouse (to increase the number of apartments), which has proved so fruitful in helping us to host prominent researchers from abroad.

To enhance our organizational capacity, with budget funds from the program for promoting the enhancement of research universities by the Ministry of Education, Culture, Sports, Science and Technology, we are investing effort in ensuring the stable operation of a group of University Research Administrators (known as URAs) appointed in November of last year to function as support enhancing research at ISM. We will conduct a drastic overhaul of our public relations system, which has been inadequate. Utilizing this URA human resource team, we will aim for the realization of public relations activities that are more efficient and of higher quality. We recognize that with all the current public attention on "big data" and statistical science the role of public relations is extremely vital. Although statistical mathematics is difficult to understand and unapproachable to most people, because our research plays an important role in society, we are committed to communicating and explaining what we do in an approachable way.

In April of this year, a large commercial facility was built on vacant land close to ISM and within about one and a half years, another large commercial facility is expected to be constructed nearby. Clearly, this is one of the fastest growing parts of the western half of Tokyo. With the influx of many new restaurants, the variety of meals is greatly expanding, making life much more convenient for visitors staying at our guesthouse. ISM can take advantage of this trend to strengthen itself as an Inter-university Research Institute, thereby making our contribution to the development of the local economy.

As a research center focused on data-centric science, in the face of fierce global competition, we remain dedicated to meeting the expectations of society through the coordinated efforts of all our personnel. We look forward to your continued understanding and support in this mission.

Tomoyuki Higuchi
Director-General
The Institute of Statistical Mathematics

Institute Overview

Basic Research

Department of Statistical Modeling

The Department of Statistical Modeling works on the structural modeling of physical phenomenon 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.

Spatial and Time Series Modeling Group

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

Complex System Modeling Group

The Complex System Modeling Group conducts studies in order to discover the structures of complex systems, such as nonlinear systems and hierarchical networks, through statistical modeling.

Latent Structure Modeling Group

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

Department of Data Science

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.

Data Design Group

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.

Metric Science Group

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

Structure Exploration Group

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.

Department of Mathematical Analysis and Statistical Inference

The Department of Mathematical Analysis and Statistical Inference carries out research into general statistical theory, statistical learning theory, optimization, and algorithms in statistical inference.

Mathematical Statistics Group

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

Learning and Inference Group

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

Computational Inference Group

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.

NOE-type Research

Risk Analysis Research Center

The 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. The Center is also constructing a network for risk analysis with the goal of contributing to creating a safe and resilient society.

Research and Development Center for Data Assimilation

Research and Development Center for Data Assimilation aims to construct simulation models that can predict the future and to produce designs for effective observation systems by means of “data assimilation”, which is a fundamental technology integrating numerical simulations and observational data.

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).

Research Center for Statistical Machine Learning

Machine learning is a research field studying autonomous systems that learn from data. This field is based on the statistical science that concerns inference from data and the computer science that studies algorithms. The application of machine learning is broad, ranging from engineering, including robotics, and information sciences to natural science, such as brain science. This research center aims at supporting the academic community of the field, in addition to producing influential works via various joint projects.

Service Science Research Center

The aim of the newly established Service Science Research Center is to apply data-centric methodologies to the service fields — from marketing, supply chain management, and management engineering, to the modeling of social systems. We will integrate the insights from these fields to establish data-centric service sciences as a common discipline, through collaborations with universities and institutions worldwide, taking advantage of ISM’s Network Of Excellence (NOE) program.

Professional Development

School of Statistical Thinking

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

Research Support

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.

Computing Facilities Unit

The Computing Facilities Unit is in charge of managing computer facilities, software for research, networking infrastructure and network security.

Information Resources Unit

The Information Resources Unit is responsible for maintaining an extensive library and an electronic repository, and is in charge of planning statistical education courses to popularize research results.

Media Development Unit

The Media Development Unit is in charge of publishing and editing of research results and PR brochures.

Risk Management Based on Extreme Value Theory

Extreme value theory and its applications

A massive earthquake rarely occurs. Nevertheless it causes great damage on society.

Extraordinary natural phenomena such as torrential rain, tremendous snow and strong wind cause natural disaster such as flood high tide, tsunami and etc. Not only in natural disasters, in general, it is no exaggeration to say that the most important in risk management is to tackle rare but serious events. Extreme value theory (EVT) deals with extraordinary events not ordinary ones. A cooperative research symposium "Extreme value theory and its applications" has been held since 1994 and its report is published and distributed widely.

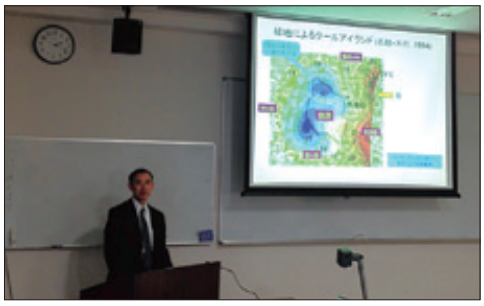


Figure 1: The invited talk by Dr. Fujibe (2013).

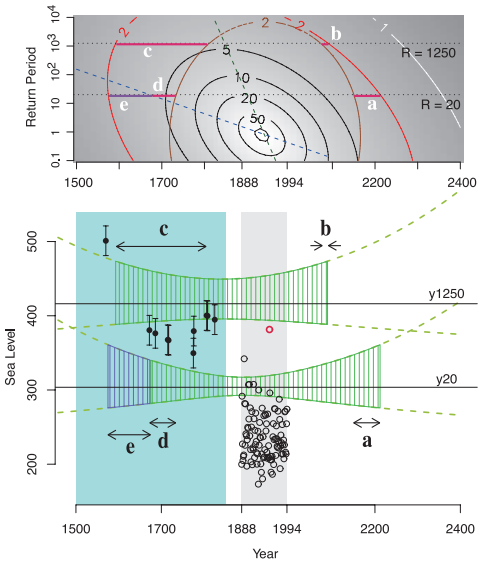


Figure 2:
The worst 10 floods sea level in the historical term of 350 years, adding to the annual maximum in the modern observation of 108 years, at the Hoek van Holland in the Netherlands. In the figure the red point is the value of the North sea flood of 1953, and the contour lines and gray density plot shows the degree of experience, which indicates the estimation error of the return levels.
[by T. Kitano (Nagoya Institute of Technology)]

Evaluating the encounter probability to natural hazards by use of the historical extremes

Precipitation, discharge in river, temperature, wind speed, sea level, wave height at offshore; extremes of these natural forces are very important factors to examine the risks which give a great menace to the infrastructures (electric power, water supply, gas, transportations) and public works for support to our daily life. The Netherlands, almost 40% of which is beneath the mean sea level, suffered the devastating damage due to the North sea flood 1953. It has accomplished the coastal defenses, so-called Delta plan, for the protections of the lowest areas. In this plan, EVT has been incorporated to determine the design of coastal dikes. After the 2011 Tohoku earthquake and tsunami, the older historical data excavated in strata and in old documents have recently attracted the public interest in the viewpoint of a clue to the occurrence probability of huge force. One of our projects is to develop new methods of evaluating probability of the natural hazards and to make effective use of the older and ambiguous historical data when attached in the modern observations.

Spreading application fields and developing theory

In addition to the prevention to natural disasters, EVT has been applying to various fields in insurance and reliability. Moreover, EVT is getting to spread its application to biometrics, sports statistics. Risk management in finance is one of them. Black Monday and Bankruptcy of Lehman Brothers have a great impact on world economy. As these examples show, recently, extremely large fluctuations in finance give massive damage on worldwide scale. In parallel with spreading application areas, statistical theory is also developing to analyze complicated real phenomena.

Takaaki Shimura

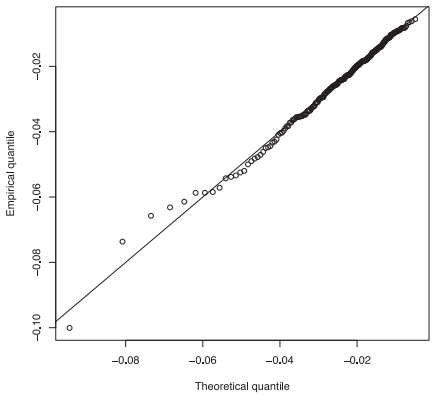


Figure 3:
QQ plot applying generalized extreme value distribution to monthly minimum of price-earnings ratio (TOPIX 1990-2010).
[by N. Makimoto (Tsukuba Univ.)]

Exploring Efficient and Effective Management Approaches to Mitigate Risk by Disturbance

Optimization model for forest management planning

"When, where and how much to harvest" has been a primary concern for resource managers for many years. In order to assist such decisions, considerable effort has been given to develop optimization models searching for the optimal management strategy, which maximizes the amount of harvest from resources or profit induced from such harvests subject to given constraints. Integer programming allows us to formulate the constraints necessary to avoid resource degradation due to unplanned harvesting activities. For example, harvested units can be dispersed over space and time to avoid the creation of large openings, simply by introducing adjacent constraints that prohibit harvesting adjacent management units in the same period.

Use of Geographic Information System (GIS)

In order to consider spatial distribution of resource harvest units, it is important to figure out adjacency relationships (Fig. 1) among management units based on the spatial information of each management unit. Not only can GIS be use to archive spatial information, but it can also be used efficiently to generate adjacency relationships among management units. GIS can be used to visualize the optimal spatial harvest pattern generated from an optimization model (Fig.2).

Figure 1: Adjacency relationships among management units.

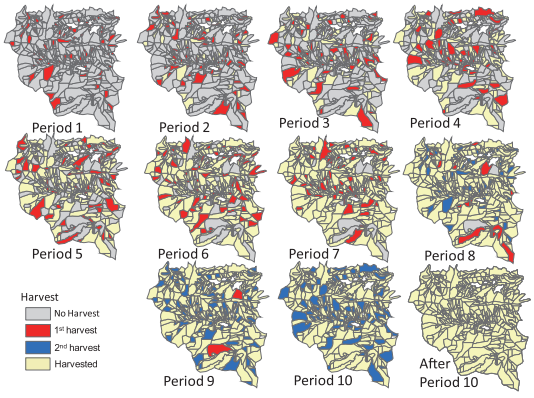


Figure 2: Visualizing optimal spatial harvest pattern with GIS.

Mitigating the risk surrounding forest resources with optimization model

As a result of global climate change, forest managers are now faced with the challenge of how to mitigate the damage caused by disturbance agents such as forest fires, insects attack, and invasive species. Damages caused by disturbance agents are spatial in nature, for example, fire spreads from an ignition location over space and time. Spatial patterns of forest vegetation affect the degree and extent of forest damages caused by these disturbance agents. Fire for example, spreads rapidly when it enters a contiguous area where fuel has been accumulated. Forest managers can mitigate the damage caused by disturbance agents simply by controlling the spatial distribution of forest vegetation which takes into account the expected spatial damage patterns. Optimization models can be used to explore the optimal spatial patterns that mitigate the damages caused by disturbance agents. The results presented in Fig 3 were produced by integrating a simulation model that projects spatial damage patterns into an optimization model to search for the efficient and effective forest management allocation patterns for mitigating these kinds of risk.

Atsushi Yoshimoto

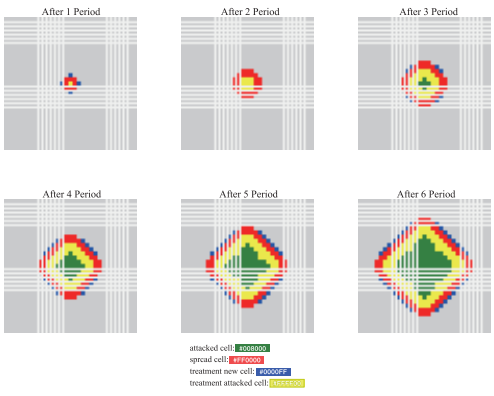


Figure 3: The optimal management pattern for mitigating the risk of damage from invasive species.

Participation in the Program for Risk Information on Climate Change

Purpose of this program

Our group has been an associated member of the Program for Risk Information on Climate Change since 2012. The program aims to generate basic information required for managing various risks resulting from climate change using Global Climate Models (GCMs) and Regional Climate Models (RCMs) with downscaling techniques. We have two goals. First one is to estimate probability distribution of "climate reproductions" by the various climate models and to develop an evaluation of "predictions of future climate" for each climate model. The other is to generate a probability distribution of extreme events such as typhoon attacks to a big city like Tokyo. Focusing on the latter, we introduce our research here.

Necessity of a stochastic tropical cyclone model

Recent studies have pointed that there are some problems in GCMs about Tropical cyclones (TCs) predictions. Basically, the number of TCs was not large enough to obtain their probability distribution. The estimated number of TCs which may occur around the East Asia is around thirty per year. The calculation of the GCM simulation needs a long time with a huge numbers of CPUs on super computers. For these reasons, we cannot gain sufficient TC tracks from GCM and RCM outputs to estimate the probability distributions. Moreover, it is known that there are biases on the GCMs and RCMs.

To solve the problem of the insufficient TC numbers, we are developing a stochastic TC model that generates a lot of TC tracks. Some models have been developed to solve the same problem, insufficient TC numbers. However, researchers found that there are biases in the stochastic models themselves. For keeping out of this problem for both of biases in GCMs and stochastic models, our stochastic TC model is applied to JMA/MRI-AGCM (developed by Meteorological Research Institute, Japan Meteorological Agency) outputs.

ISM-stochastic tropical cyclone model

The ISM-stochastic TC model has three components based on a typhoon life cycle: generation, transition and dissipation. Figure 1 indicates a flowchart of the model. Artificial TC tracks in September were calculated using this model (Fig. 2). We are going to step up our research to estimate probability distribution of TC tracks in the future climate calculated by GCMs / RCMs.

Kazue Suzuki, Shin'ya Nakano, Yukito Iba and Genta Ueno

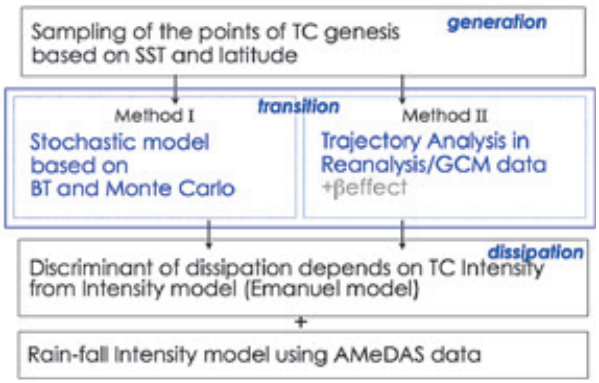


Figure 1: A flowchart of ISM-stochastic TC model.

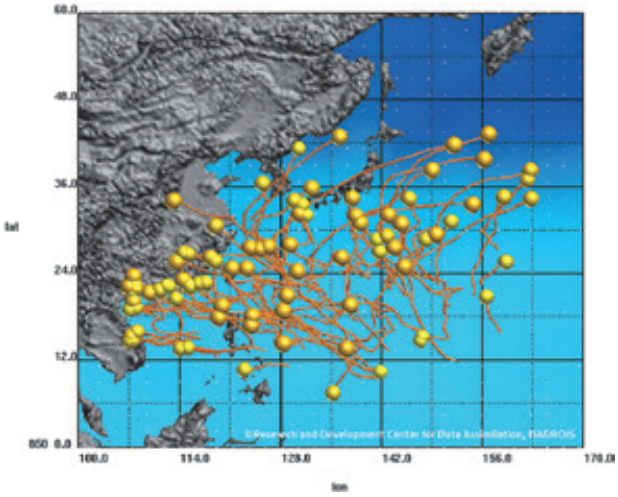


Figure 2: Tracks of the artificial TCs in September calculated by the ISM-stochastic TC model. Locations of the generation are selected by the bootstrap method based on the observation data (JMA, 1951-).

Comprehensive Understanding of the Nervous System by Data Assimilation

Live-cell imaging of nervous activity

The nervous system of animal living organisms realizes advanced and robust information processing in response to diverse external signals. However, there are many missing pieces of the puzzle about in the principle of action in the neuronal circuit system. Recently, a rapid advance of live-cell imaging techniques for nervous activities has been made it possible to visualize a fine texture of nervous activities at the molecular and cellular levels. In neuroscience, a model organism called *C. elegans* has been investigated well. The neural circuit of *C. elegans* consists of only 302 neurons and nearly 7,000 synapses, and both of them are completely identified. I am now engaged on a collaborative project that aims to unveil the whole nervous system of *C. elegans* in the living state using the calcium ion imaging method. In the project, temporal changes of the nervous activities are measured by a confocal microscope and recorded as a time-lapse 3D image sequences. By analyzing the live-cell images, we aim to clarify the principle of action of the complex dynamic system.

Data assimilation on the neural circuit model of *C. elegans*

In the present study, a simultaneous observation of 150 neurons is on the verge of becoming possible. Besides, a simulation model of the whole nervous system is being developed based on the databases of synaptic connectivity of *C. elegans*. Using data assimilation methods, we aim to estimate internal states of the whole nervous system by integrating the simulation model and the records of neuronal activities partially observed by the calcium ion imaging. Figure 1 illustrates a roadmap for our project. The project team consists of three groups: the experiment group, the modeling group and the data analysis group. The data analysis group is led by Associate Professor Yoshida at ISM. Our group plays a role of integrating the live-imaging data provided by the experiment group and the neural circuit model developed by the modeling group. Data assimilation techniques are used to identify a parameter set of the simulation model. In addition, the data assimilation will be a powerful tool for the reconstruction of the internal states of the whole nervous system including activities of unobserved neurons.

Image processing method for automatic quantification of neuronal activities

In order to improve throughput of the project, we are building a pipeline of image processing methods that automates all the quantification process based on time-lapse 3D images. The currently obtained 3D image data contains approximately 120 neurons. During the measurement, the worm moves irregularly. In order to quantify the activity of each neuron, the trajectory of neurons must be tracked exactly. However, an exact tracking of cells located around head is quite difficult because they are distributed densely and sometimes move rapidly. Base on an idea of Bayesian statistics, we developed the new tracking algorithm that can track such many cells with a high degree of accuracy even where cells are distributed densely (the result is shown in Figure 2). Although many tracking methods have been developed in the field of computer vision, any of them could track such densely distributed moving objects. We expect that our tracking technique is applicable for not only neuroscience but also other various problems.

Terumasa Tokunaga

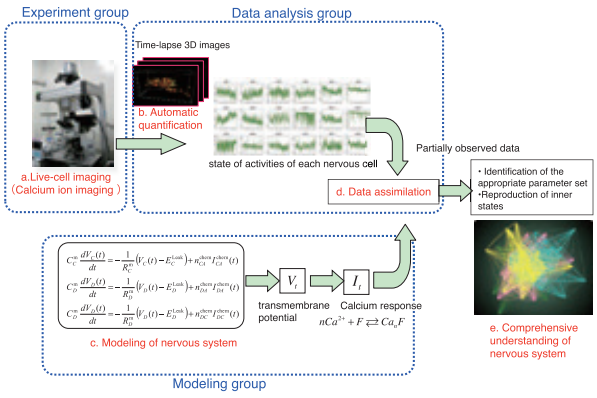


Figure 1: Road map of the project.

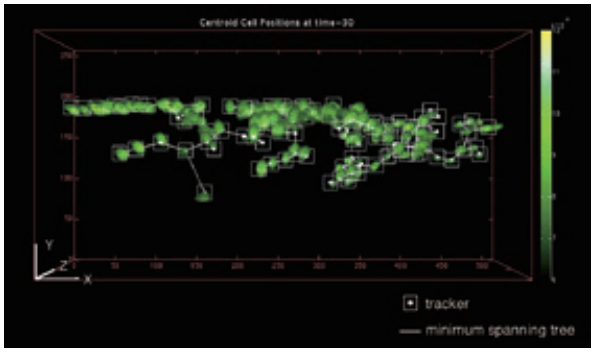


Figure 2: Tracking of many neuronal cells.

The Asia-Pacific Values Survey — A Study on Cultural Manifold Analysis (CULMAN) —

From "Statistics for War" to "Statistics for Peace"

Based on a proposal submitted by Japan National Research Council, the Institute of Statistical Mathematics (ISM) was founded under the Ministry of Education in 1944 during WWII. After the war, the ISM's mission was shifted from operations research to the development of official statistics and scientific public opinion systems for the post-war democracy in Japan. Most of systems on official statistics and survey research were established by the ISM as various collaborated works with members of other universities, institutes and the government, i.e., all over Japan.

Japanese literacy survey & democracy

During the post-war time, some people of the US government insisted on "Romanization of the Japanese language", because they believed that the use of Chinese characters presented difficulties in education and daily life. In 1948, the ISM played a central role in an interdisciplinary team under the Ministry of Education in order to carry out a nationwide survey on "the Japanese Literacy" based on statistical random sampling theory. The result confirmed the sufficient literacy of the Japanese to develop the post-war democracy and it eventually saved the Japanese language from possible social confusions. Based on the methodology invented in the survey, the ISM has started "the Japanese National Character Survey" in 1953 to study the attitudes, opinions, and social values of the people in daily life, which lasts over 60 years now. This is a world- widely unique and significant survey supported by the Ministry of Education, and it stimulated many other countries to start the same type of statistical sampling survey such as GSS in the USA, EuroBarometer in EU, etc.

Figure 1: Mt. Fuji, Japan.

Cross-national comparative survey on national character

Since 1971, it has been extended to cross-national surveys for more comprehensive study, including surveys on the Japanese immigrants in Hawaii and Brazil. The most significant task involves the cross-national comparability of the peoples beyond differences such as cultures, languages, and social systems. We have developed a paradigm called "Cultural Linkage Analysis" to overcome the difficulties of comparability, which has now evolved as "Cultural Manifold Analysis (CULMAN)" for the three sets of hierarchical comparative frameworks: time, space, and research themes. Now the Asia-Pacific Values Survey" has been in progress with the support of Japan Society for the Promotion of Science during 2010-2014 fiscal years.

- http://www.ism.ac.jp/ism_info_j/kokuminsei.html
- https://www.jsps.go.jp/j-grantsinaid/12_kiban/ichiran_22/e-data/e33_yoshino.pdf

Ryozo Yoshino

Figure 2: Hanoi, Vietnam.

Figure 3: New Delhi, India.

Multi-level Approaches in the Japanese National Character and Organizational Climate

The social system and the Japanese National Character

The Institute of Statistical Mathematics has been conducting a longitudinal nationwide survey, called "Nihonjin no Kokuminsei Chosa" on the Japanese national character since 1953. The main goal of the survey is to investigate nature of Japanese people and track change of Japanese society. I focus on organizations and groups to whom an individual belongs as part of national character research. The atmosphere of workplace are mentioned as an example.

In order to assess the most recent attitudes and behaviors of the Japanese National Character in organizational climate, it is important to examine individuals embedded within organizations or countries. To achieve this goal, on top of individual assessment, we also focus on the variables in an organization level for each organization, such as corporate, school, regional society, etc. that an individual belongs to. Furthermore, we are conducting cross-cultural research on the national character including international comparison, so as to catch the Japanese National Character in the wide range and various contexts.

Large-scale surveys and new statistics techniques

In order to develop a study of the Japanese National Character, it is required to conduct large-scale surveys based on a statistical sampling method, and carry out surveys on Japanese National Character including international as well as inter-organization comparative study by using the new statistical techniques such as structural equation modeling and multilevel analysis.

Yoosung Park

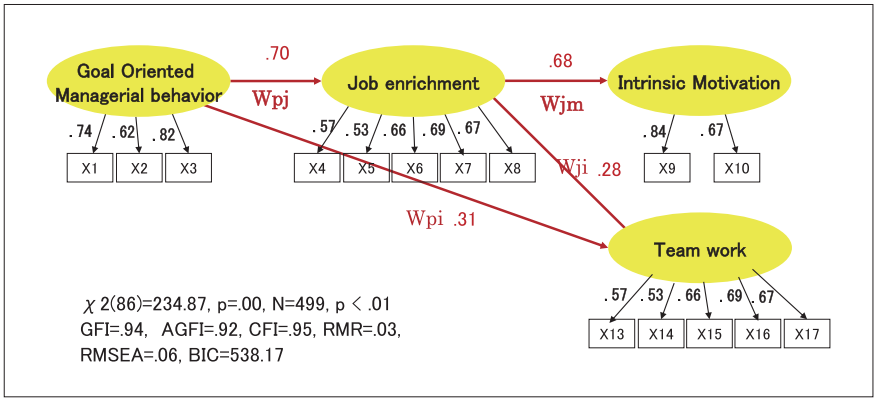


Figure 1:
The mechanism of the intrinsic motivation and teamwork in an individual level.

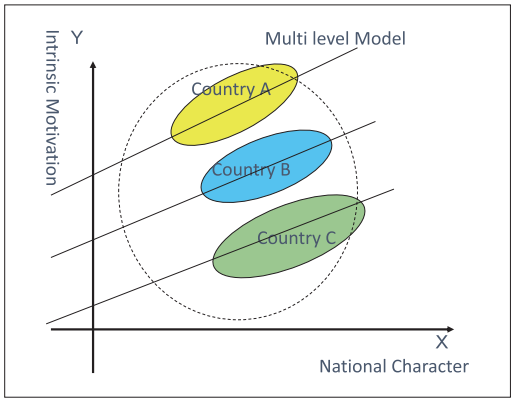


Figure 2: Moderating effect of nation and organization in the Japanese National Character.

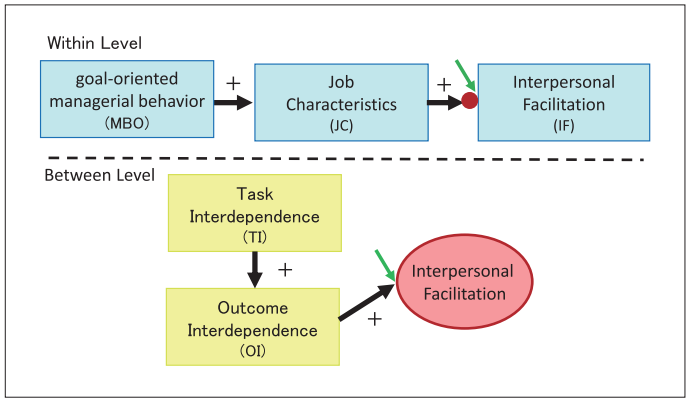


Figure 3: The machanism of the interpersonal facilitation in multilevel.

Research on Adaptive and Learning Control Theory

Research on modeling and control of complicated systems

The purpose of the research project is to obtain integrated design procedures of modeling and control for a class of complicated systems having nonlinear characteristics and high-order vibrating modes such as nonlinear mechanical processes, large flexible structures and flexible arms. Linear and nonlinear parametric models are introduced to identify uncertain processes, and adaptive H_∞ control schemes are developed based on inverse optimality in order to attenuate the effects of modeling errors and neglected high-order modes. Adaptive inverse models are also introduced to compensate uncertain input nonlinearities such as dead-zones and backlashes. Sophisticated integrations of modeling and control are highly required in order to achieve the research objective.

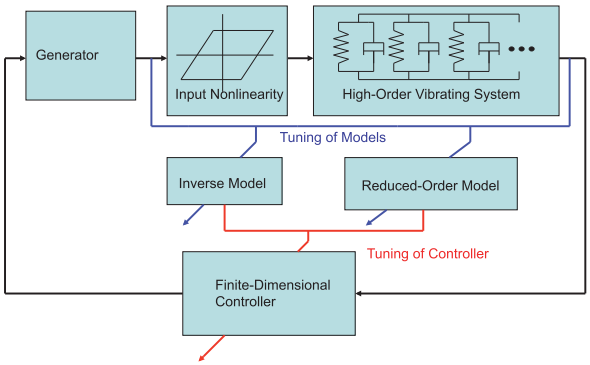


Figure 1: Reduced-order disturbance attenuation control of high-order vibration processes (distributed parameter systems) and input compensation.

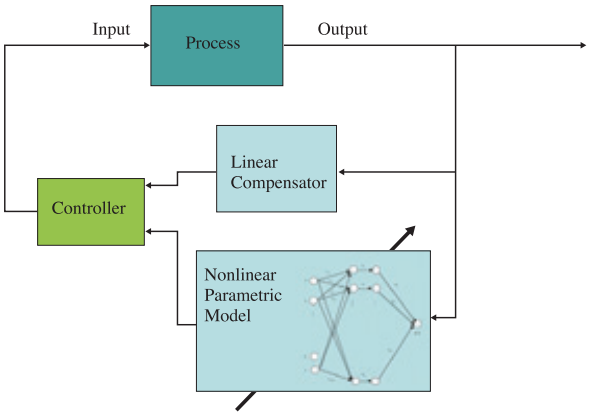


Figure 2: Identification and control of nonlinear parametric model.

Research on coordinate control of multi-agent systems

In the research project, coordinate control problems of multi-agent systems, such as formation control and consensus control for plural components are considered, and fundamental control principles of large-scaled complex systems, such as smart highway and coordinate control of multiple manipulators or space crafts, are to be developed. The limited communication structure among agents is also an important topic in the control problem, and it is described as an information network graph. Adaptive H_∞ control schemes are introduced in order to attenuate the effects of errors in system models, related potential functions or imperfect information of the virtual leaders. The compatibility of modeling and control of uncertain multi-agent systems is an indispensable factor of the research project.

Yoshihiko Miyasato

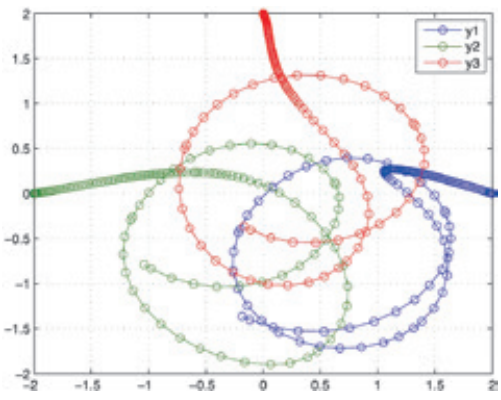


Figure 3: Formation control of multi-agent systems.

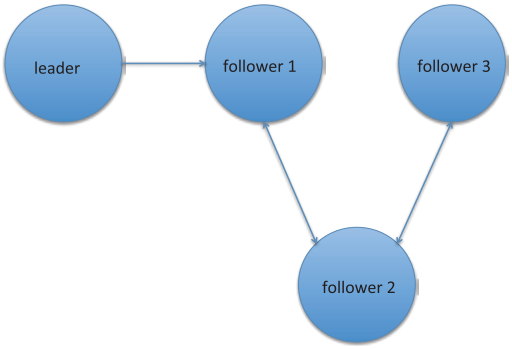


Figure 4: Information structure (network graph) of multi-agent system.

Creating Efficient Index to Assess Marine Biodiversity via Machine Learning

Prediction for global collapse for fish stocks in 2048

A project of CREST, JST on developments for ecological assessments with partial data via fusion of marine ecology and machine learning started in 2012 with team leader, Hiroshi Okamura at National Research Institute of Fisheries Science. In the community of marine ecology there are different ideas about the sustainability for fish stocks. In particular Worm et al. published a shocking conjecture in Science that **all fish stocks will collapse by 2048**. At that moment New York Times featured this paper at the top page, and all mass media also reported this news. On the other hand several papers pointed from a viewpoint of fisheries science that this prediction is misleading. In this way there occurred confused situations with different opinions for the assessments, so that a problem of strong limitation for data release was faced for scientists. Quite recently a tendency for data release pushes us to join this project as statistical researchers.

RAM Legacy Fish Stock database

Worm et al. define collapse for a fish stock by a condition that the catch at the year is less than 10% of the maximum catch. However there is an essential question of "Does catch reflect abundance?" The solution for this question is a key to clarify the problem of which prediction for fish stocks is correct. As one of difficult aspects to solve this there are backgrounds for data such that any biomass data are missing and only catch data are available. For example FAO has global records for fish data over 50 years however the records consist of fish name, region code and catch without any biomass assessments. We approach a statistical assessment for RAM Legacy Fish Stock database which is dedicated by Ransom A. Mayer. The biomass variable is reduced to a binary label whether the relative biomass is less than 20% or not. Hence the objectivity of the analysis is to predict the binary labels of collapse and non-collapse from catches, trophic levels, region codes and maximum lengths as feature variables. We propose asymmetric logistic model which permits the different models for the collapsed and non-collapsed samples. As a result the analysis in the asymmetric model has much better performance than the conventional catch-only-method used in Worm et al. We think that if the statistical model appropriately combines not only catches but other variables with mixed effects, then we can build a good prediction method. We will employ this proposed method to predict the fish stock status in FAO data as the next project.

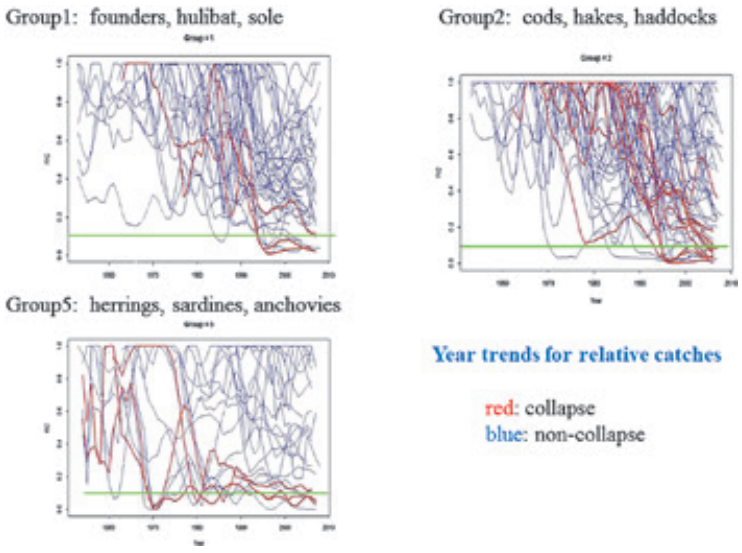


Figure 1: Relative catch curves in fish groups.

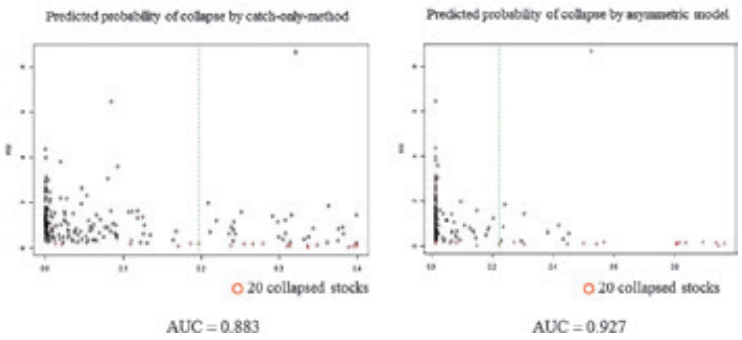


Figure 2: Prediction for fish stock status.

Shinto Eguchi

Prediction of Purchasing Behavior by Age Group

An important issue in a super-aging society is deciding on a policy under which elderly people can be actively involved in the society's production and consumption processes. To realize such a policy, technology for predicting future purchasing behaviors of elderly people is crucial. We investigated the prediction of consumer awareness and of changes in purchasing behavior due to awareness by using two datasets, consumer purchase history data and media-integration research data.

Consumer purchase history data

The consumer purchase history data was product purchase survey data obtained using a bar code scanner. While its use enabled individual product purchases to be exhaustively tracked, the survey has been underway for only a few years, so tracking long-term changes in purchasing behavior was difficult. However, the dataset includes an abundant amount of short-term information on purchasing behavior. Since consumer attitudes were surveyed as well, the relationship between purchasing behavior and consumer awareness could be clarified.

Media-integration research data

The media-integration research data include questionnaire survey data that capture, for a specimen set, the contact situation with the primary medium (television, radio, magazine, or Internet). They also include survey data that captures the situation (product use, possession, or purchase) for the same specimen set. Moreover they include research data related to consumer awareness and behavior. The data cover about 20 years, so the long-term trends can be understood in terms of purchasing behavior by consumer generation, consumer age, and time period.

Prediction of consumer awareness in the future

The consumer purchase history data and the media-integration research data commonly include behavior place and time, environment, health, and interest in the media. Here we utilize these common items. Consumers represented in the media-integration research data were grouped in accordance with their age and generation. Each group was characterized by the responses for the common items. For each item, we examined the ability to predict consumer awareness in the future by using multiple regression analysis with the response as a dependent variable and the consumer's age and survey year as independent variables. Figure 1 shows the results for "has a strong interest in health" for each age group from 2013 to 2020.

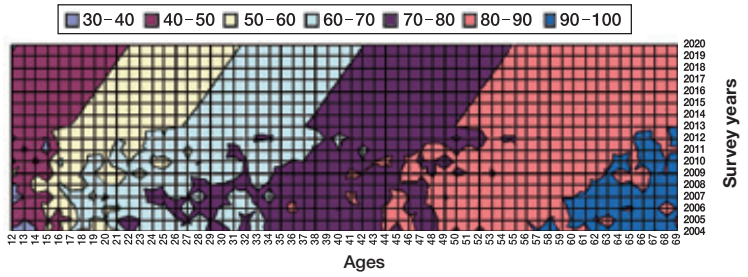


Figure 1: Prediction rates [%] for "has a strong interest in health" for each age group from 2013 to 2020.

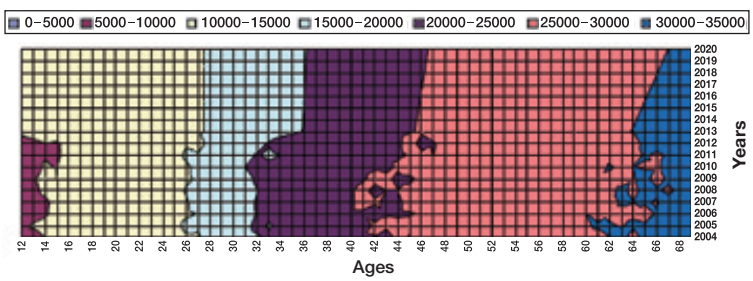


Figure 2: Purchase amount (per month) [yen] estimated for each age group.

Prediction of changes in purchasing behavior in the future

Using the prediction results (that is, the predicted responses for the common items in the future) based on the media-integration research data for consumer awareness, we examined the prediction of purchasing behavior in the future by multiple regression analysis of the responses for each group (classified by purchase behavior) in the consumer purchase history data with the common items as independent variables and the purchasing behaviors as dependent variables. Figure 2 shows the results of estimating the purchase amount (per month) for each age group.

We examined the prediction of changes in purchasing behavior by integrating short-term purchase history data with long-term media-integration research data.

Tomoko Matsui and Hiroshi Maruyama

How to Develop Data Analytics Talents

Developing talents for big data

Data analytics is quickly becoming an essential tool to make business decisions in various industries, such as retail, distribution, medical, education, and public sectors. One of the major obstacles of applying data analytics is the lack of talents. To address this issue, The Ministry of Education, Culture, Sports, Science & Technology in Japan (MEXT) launched a three-year project for developing data analytics talents and making the best use of them. The ISM is leading this project with the help of The Graduate School of Information Science and Technology, The University of Tokyo. The goal is to identify the model of talent development and their career that are best suited in Japan, and to share the model among the stakeholders such as academia, industry, and the governments as well as NGO's.

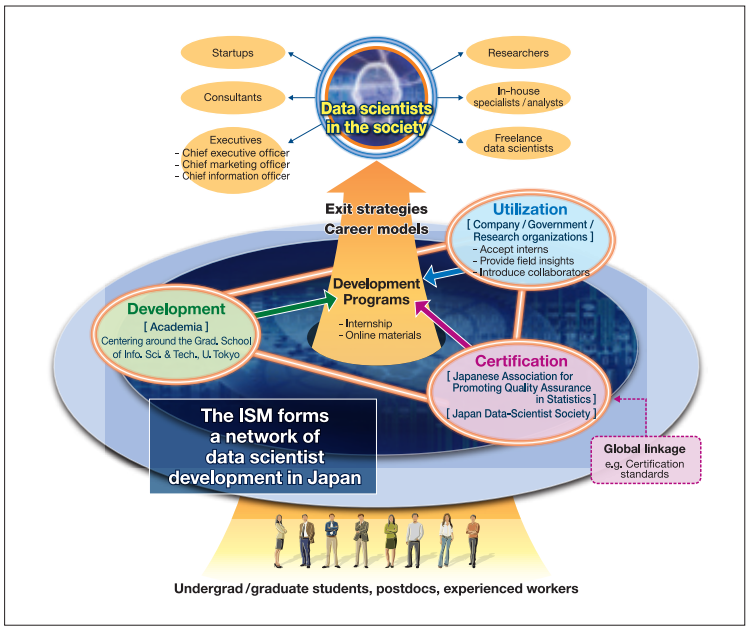


Figure 1: The concept of the project.

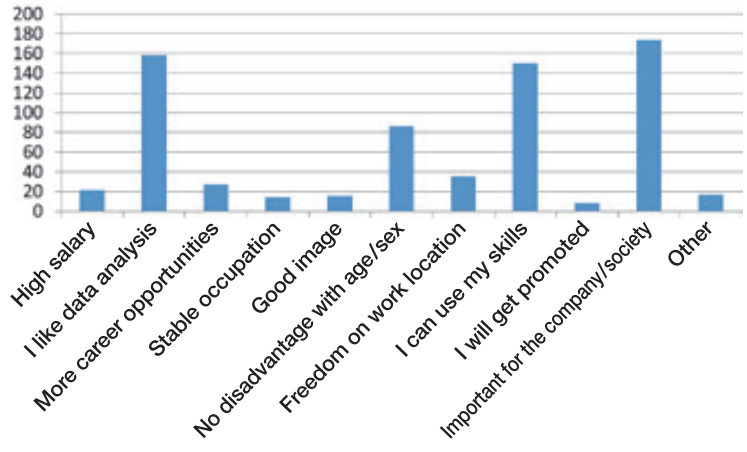


Figure 2: Answers to "Why do you want to be a data analytics professional?".

Current status of "Data Scientists" in Japan

In the first year of the project, we conducted a study on the current status of "data scientists" in Japan. The study consists of a) a survey on those who passed certain levels of the certification tests of Japan Statistical Society Certificate (319 valid responses) and b) a series of interviews with 20 well-known data scientists in Japan. The results indicate that typical data scientist in the United States and those in Japan are somewhat different; in the US, data scientist are more product-focused, meaning that they develop working systems with embedded data analytics, while in Japan, data scientists are typically service professionals who help analyzing their clients' data.

The next steps

Based on the findings acquired in the first year of the project, we have identified skills needed in these data scientists and started to develop program for them. The program includes a) an online training material, titled "Data Scientist Crush Course," that teaches basic data analytics concepts in a very concise manner, and b) an internship program that presents an opportunity for students who want to be a data scientist to get first-hand experiences of analyzing data.

The detailed information on the project can be found on our website at http://datascientist.ism.ac.jp/.

Hiroshi Maruyama

NOE (Network Of Excellence) Project

Building a Framework for Advancing Strategic Research and Pursuing a New Approach to Collaborative Research

Biaxial Structure

The Institute of Statistical Mathematics pursues research and education along the two lines of basic research and NOE (Network Of Excellence)-type research, (we explain about "NOE" later), conducted by the basic research departments along a horizontal axis and the NOE-type research centers along a vertical axis (Figure 1). By its nature, the basic research departments cut across and link various disciplines, developing tools for interdisciplinary research. The field of statistical mathematics must itself evolve to meet the changing needs of society and the data environment, and is therefore constantly evolving as a field of study. At the same time, there are approaches and directions that remain unchanged as the field evolves. For that reason, we have chosen not to call it fundamental research or foundational research but "basic research", to reflect both the fixed and evolving qualities of statistical mathematics. There are three basic research departments: Statistical Modeling, Data Science, and Mathematical Analysis and Statistical Inference. These departments engage in cutting-edge research to develop methodologies for rational prediction and decision making, based on data and existing knowledge. Each of the Institute's permanent researchers is assigned to one of these basic research departments.

Goal-oriented Activities

The Institute's goal-oriented activities are promoted by NOE-type research centers and a school for developing professionals. The NOE-type research centers (vertical axis) are staffed by permanent researchers within the Institute, project researchers (post-doctoral staff), and visiting professors and researchers. The current NOE-type research centers are the 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. These centers conduct research activities that interface statistical mathematics with individual scientific disciplines in order to find solutions to urgent social problems. In addition, these centers promote the NOE activities as the cores in each NOE domain.

We launched the School of Statistical Thinking to foster and promote "statistical thinking". In the School of Statistical Thinking, researchers and students who have an eye on the creation of a new statistical research field and various people who realize the necessity of statistics in their particular research field train together to foster statistical thinking. For that, we have changed the personnel system to post newly employed assistant professors at the School of Statistical Thinking.

NOE Project

In accordance with the second medium-term plan of the Research Organization of Information and Systems, the Institute of Statistical Mathematics has set as a goal the establishment of NOE in statistical mathematics. We have been establishing NOE in the five research areas of risk research, next-generation simulation, survey science, statistical machine learning, and service science. The NOE Project pursues activities to establish new methodologies in their respective research fields and serve as hubs for interdisciplinary interaction. We operate an NOE Promotion Unit to strengthen our coordination skills and to facilitate the overall advancement of the NOE Project, crucially supporting the goal of erecting a fourth scientific methodology in our knowledge society that extends beyond resolving individual problems.

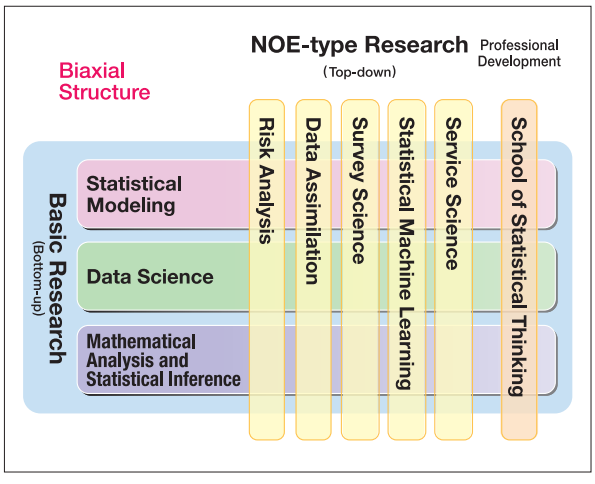


Figure 1: Biaxial Structure for research and education

Senior Advisor, RIKEN Brain Science Institute	Dr. Shun-ichi Amari
Adjunct Professor, Computational Science Education Center, Kobe University	Dr. Yoshio Oyanagi
President, Shiga University	Dr. Takamitsu Sawa
Professor Emeritus, Tokyo University	Dr. Motoyuki Suzuki
President, Center for International Public Policy Studies	Prof. Naoki Tanaka
President, The Japan Pharmaceutical Manufactures Association	Dr. Isao Teshirogi
Professor, Sociology and Research Methodology School of Cultural and Creative Studies, Aoyama Gakuin University	Dr. Kazufumi Manabe
Director-General, Center for Research Development and Strategy, Japan Science and Technology Agency	Dr. Hiroyuki Yoshikawa
Director-General, Institute for Monetary and Economic Studies	Prof. Tomoo Yoshida

Table 1: Advisory Board of the NOE Project (April 1st, 2014)

The Advisory Board of the NOE Project, which is organized as experts in the private sector, academia, and the government (Table 1), advises our Managing Committee of the NOE Project and each NOE-type research center so that we can formulate a unified management strategy for the project.

On September 24th, 2012, we held the Advisory Board meeting of the NOE Project in order to explain our past NOE activities and to collect opinions from the members of the Advisory Board for further research activities in the next stage of the NOE Project. (Photo 1)

Eight of nine members of the Advisory Board took part in the meeting, and we could hear many valuable opinions about the future of NOE. The logo of NOE (Figure 2) symbolizes the advancement of comprehensive research through the combined and cumulative efforts of the five NOE domains. The logo is used for the activities of the NOE Project at the Institute and at our related organizations.

統計数理研究所
NOE形成事業

Figure 2: logo

Photo 1: Advisory Board meeting on Sept. 24th, 2012

Expansion of Activities by NOE

The Institute is actively pursuing agreements with other research organizations in order to expand the role of the five NOE-type research centers as core research hubs. In addition, in the 2013-2014 Japanese academic year, new previously agreed to Memorandum of Agreements between two NOE domains became effective.

From a methodological perspective, our Institute is focusing all activities on advancing research in each of the research fields of risk research, next-generation simulation, survey science, statistical machine learning, and service science. Also, we plan to unite the five NOE mentioned above with the NOE Research Promotion Organization. Using this NOE Research Promotion Organization, the Institute will aim to develop new research areas and establish new collaborative research systems (Figure 3). To learn more about the project, please visit the website of NOE (http://noe.ism.ac.jp/english/).

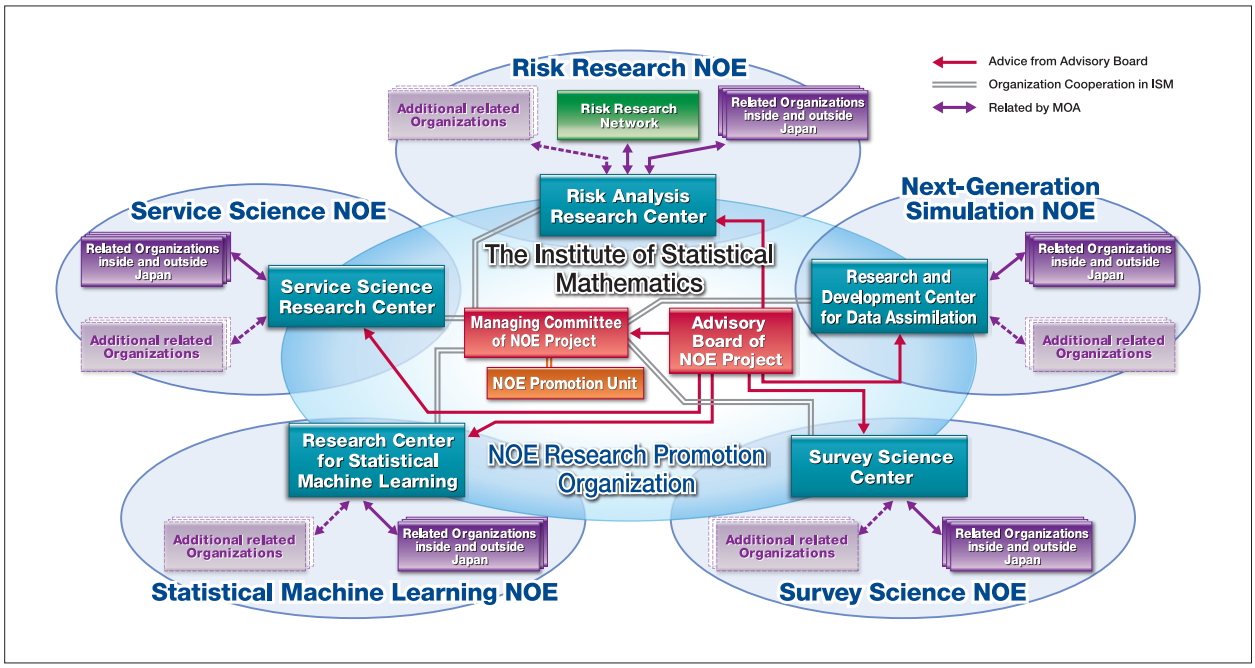


Figure 3: Relationship Diagram of NOE (Network Of Excellence)

Project for Fostering and Promoting Statistical Thinking

Because of the "data explosion" in modern society, people who can think and handle such data statistically and retrieve useful information are greatly required in all fields of science and society. The Japanese education system unfortunately has fallen short in producing a sufficient number of people who have useful statistical thinking abilities. We established the School of Statistical Thinking in ISM to improve this situation. We hope that our activities, including tutorial courses, seminars, and cooperative research projects, are useful for developing professionals with the proper knowledge and skills to tackle complicated problems involving huge amounts of data.

Research Collaboration Start-up

The Institute had been providing a consultation service on statistical science. Along with the launch of the School of Statistical Thinking in November 2011, this service was reorganized as a research collaboration start-up. This program, being one of the projects to foster and promote statistical thinking, is mainly aimed at supporting applied scientists and other related people. Expert statisticians affiliated with the Institute give scientists and others advice on statistical modeling, data analysis, and research. Some cases develop into official research collaborations, which are our primary duty as an inter-university research institute. The start-up program covers a variety of topics, ranging from introductory to more specialized studies. Half of the clients are from the private sector, and the rest are staff at public organizations, university professors, or students. The Institute accepts about 40 cases annually, some of which benefit society in diverse ways.

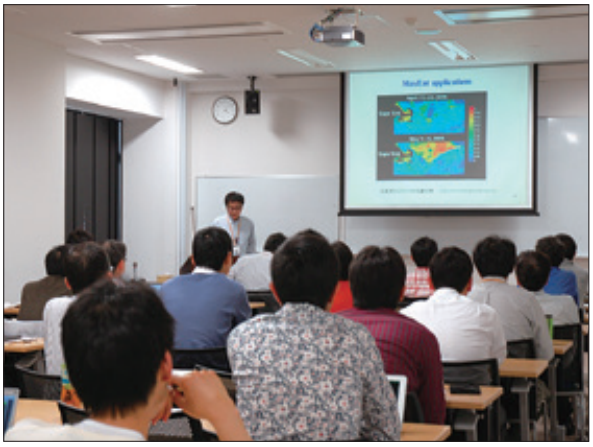
Open-type Human Resource Development Program

In order to foster and promote "statistical thinking", the Institute of Statistical Mathematics invites proposals of research projects and workshops to develop young researchers. In FY 2014, one project and five workshops have been adopted after review.

Statistical Mathematics Seminar Series

The Institute holds weekly seminar series on statistical mathematics every Wednesday. The seminars are led by in-house and external lecturers to showcase their latest studies. These lectures are free to attend. To view the seminar schedule and learn more about the program, please visit the Institute of Statistical Mathematics website.

http://www.ism.ac.jp/



Open Lecture

We hold an open lecture during Education and Culture Week every year (November 1 through 7), to introduce the Institute's activities and to promote statistical science. We invite lecturers to speak on a timely topic relating to statistical science. The lecture is open to the general public. For further information, please visit the website of the Institute of Statistical Mathematics.

http://www.ism.ac.jp/kouenkai/

Tutorial Courses

History

The Statistical Education Program started in 1944, the year that the Institute of Statistical Mathematics was founded, as an education program at the Numerical Computation Training Center of the Science Research Technical Assistant Training Center of the Ministry of Education, located within the Institute. In 1947, the affiliated Statistical Technician Training Center was opened as an educational organization for statistical technicians and instructors.

As social needs have changed, the purpose of the education program has gradually shifted away from supplying statistical technicians for the government, towards educating working people. Tutorial courses were therefore initiated.

In 1985, the Institute was reorganized as a member of the Inter-University Research Institute Corporation, and the affiliated Statistical Technician Training Center was abolished. However, in response to consistent public demand for tutorial courses, the Center for Engineering and Technical Support, together with other departments, ran three to four courses annually. In 2005, the number of courses rose to 13. Since 2012, the School of Statistical Thinking, which the Institute launched in 2011 in order to foster and promote statistical thinking, has been running tutorial courses. In 2013, the number of courses was 15.

Courses

The total number of courses held from 1969 to March, 2014 was 308, with a total of 22,270 participants. These courses covered a wide range of fields from basic to applied statistics. The following table lists the courses held in the past year:

Year	Category	Title	Month	Number of participants
2013	Standard course	Data Assimilation with the Ensemble Kalman Filter	April	47
	Standard course	A Prospect of Earthquake Prediction Research	April	38
	Basic course	Introduction to Sampling Methods and Sample Surveys	May	67
	Standard course	Electro- Physical Modeling of Neural Systems and Its Mathematics of Dynamics	June	35
	Basic course	Basic Course of Statistics	June	86
	Basic course	Introduction to Dynamic Geometry Software "GeoGebra" and Its Application to Mathematic Education	July	31
	Basic course	Introduction to Multivariate Analysis	August	94
	Standard course	Statistical Mathematics of Quality Control	September	35
	Standard course	Special Lecture on Micro Marketing and Bayesian Modeling	October	60
	Standard course	Discrete Optimization	November	68
	Standard - Advanced course	Introduction to Statistical Topic Models	December	96
2014	Standard course	New Developments on Omics Data Science	January	49
	Standard course	Special Lecture on Micro Marketing and Bayesian Modeling	February	69
	Standard course	Robust Statistics	March	99
	Standard - Advanced course	Statistical Analysis of Random Partitions	March	33

The schedule of tutorial courses can be found on the website of the Institute of Statistical Mathematics.

http://www.ism.ac.jp/lectures/kouza.html

Research Cooperation

International Cooperation

Associated Foreign Research Institutes

Organization name	Address	Conclusion day
The Statistical Research Division of the U.S. Bureau of the Census	USA (Washington)	July 27, 1988
Stichting Mathematisch Centrum	The Kingdom of the Netherlands (Amsterdam)	May 10, 1989
Institute for Statistics and Econometrics, Humboldt University of Berlin	Germany (Berlin)	December 8, 2004
Institute of Statistical Science, Academia Sinica	Taiwan (Taipei)	June 30, 2005
The Steklov Mathematical Institute	Russia (Moscow)	August 9, 2005
Central South University	China (Changsha)	November 18, 2005
Soongsil University	The Republic of Korea (Seoul)	April 27, 2006
Department of Statistics, University of Warwick	The United Kingdom (Coventry)	January 16, 2007
The Indian Statistical Institute	India (Kolkata)	October 11, 2007
Department of Empirical Inference, Max Planck Institute for Biological Cybernetics	Germany (Tubingen)	August 11, 2010
Faculty of Medicine, University of São Paulo	Brasil (São Paulo)	April 15, 2011
Deparztment of Communication Systems, SINTEF Information and Communication Technology	Norway (Trondheim)	January 30, 2012
Human Language Technology Department Institute for Infocomm Research	Singapore (Singapore)	February 16, 2012
Centre for Computational Statistics and Machine Learning, University College London	The United Kingdom (London)	February 16, 2012
Department of Electronics and Telecommunications, Norwegian University of Science and Technology	Norway (Trondheim)	May 22, 2012
Department of Probability and Mathematical Statistics, Charles University in Prague	Czech Republic (Prague)	October 10, 2012
The Department of Ecoinformatics, Biometrics and Forest Growth of the Georg-August University of Goettingen	Germany (Goettingen)	October 18, 2012
The Korean Statistical Society	The Republic of Korea (Seoul)	July 9, 2013
Toyota Technological Institute at Chicago	USA (Chicago)	February 10, 2014

Research Collaboration

This academic study program provides researchers from other academic institutes with access to the facilities of the Institute, and provides opportunities for researchers to conduct theoretical and applied studies on statistics.

Number of Activities

2008	2009	2010	2011	2012	2013
138	154	135	172	182	181

Fields of Research Collaboration

Research collaboration is classified by research field as follows. Applicants can use the table below to find the most appropriate type of project.

ISM Fields

Number	Fields	Number	Fields	Number	Fields
a	Spatial and Time Series Modeling Group	d	Data Design Group	h	Learning and Inference Group
b	Complex System Modeling Group	e	Metric Science Group	i	Computational Inference Group
c	Latent Structure Modeling Group	f	Structure Exploration Group	j	Others
		g	Mathematical Statistics Group		

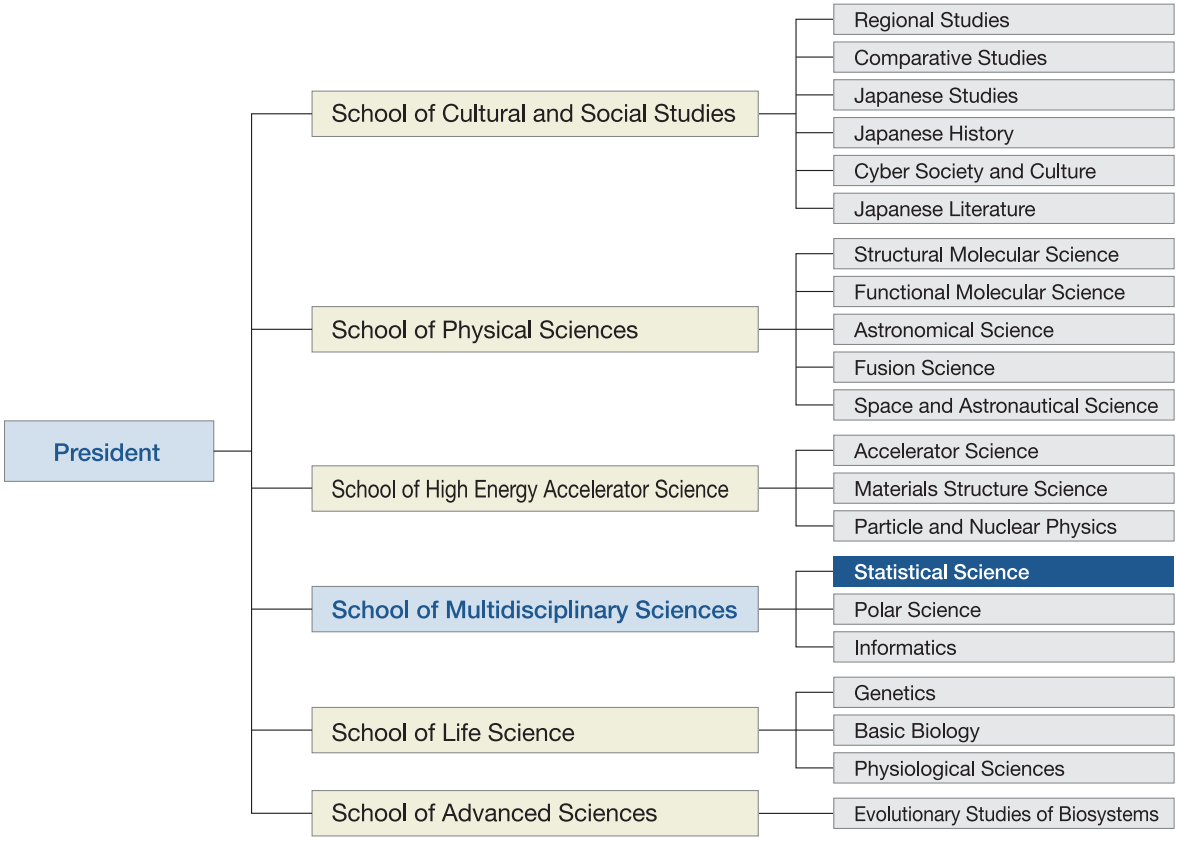
Major Research Fields

Number	Fields	Major Research Domains	Number	Fields	Major Research Domains
1	Statistical mathematics	Mathematical theory of statistics, optimization, etc.	6	Human science	Philosophy, art, psychology, education, history, geography, culture, language, etc.
2	Information science	Algorithms, use of computer in statistics, etc.	7	Social science	Economics, law, politics, society, management, official statistics, population, etc.
3	Biological science	Medicine, pharmacy, epidemiology, genetics, etc.	8	Environmental science	Environmental Statistics, Environmetrics, Agricultural Statistics, Land Economics, Landscape Management, Forest Management, etc.
4	Physical science	Space, planet, earth, polar region, materials, etc.			
5	Engineering	Mechanics, electronics, control, chemistry, architecture, etc.	9	Others	Other research fields

Graduate School Program

Organization

The Institute of Statistical Mathematics is one of the platforms of the Graduate University for Advanced Studies (the headquarters in Hayama, Kanagawa), which was opened in October 1988 to offer graduate education. Since its opening, the Institute has created the Department of Statistical Science and, since April 1989, has accepted students for education and research in doctoral programs. In 2006, the Institute adopted a five-year system, offering either a five-year education and research program, or a three-year education and research program starting from the third year of study.



Outline of Education and Research

The course includes designing of data-gathering systems, modeling, inference and forecasting in order to extract information and knowledge from the real world based on empirical data, as well as basic, mathematical and applied education and research related to these fields. The course aims to provide the student with skills that help to contribute to solving important and connected issues and give the ability to perform original research.

Field of Education and Research	Contents
Statistical Modeling	Education and research focuses on dynamic modeling such as spatial and space-time modeling, graphical modeling of temporally and/or spatially inter-related complex phenomena, and intelligent information processing. We also provide education and research on statistical inference based on various models, methods of calculation for inference, and evaluation of models based on data.
Data Science	We provide education and research on data design, investigation and analytical methods to cope with the uncertainty and incompleteness of information, as well as on computational statistics.
Mathematical and Statistical Inference	We provide education and research on the theory of statistics and related basic mathematics, statistical learning theory to extract information from data by automated learning and inference techniques; as well as theory and applications of optimization and computation algorithms which serve as the basis for computational inference.

Features of Education and Research

- The course is the only integrated doctoral program on statistical science in Japan. It has received students from a wide variety of disciplines and has offered education and research on statistical science by professors specialized in many different fields, from theory through to practical applications.
- The Institute of Statistical Mathematics, the platform for the course, is equipped with a world-class super computer, high-speed 3D graphic computers and simulators to generate physical random numbers, as well as a variety of software, including original statistical software developed by the Institute.
- The academic publications and books on statistical and mathematical sciences produced are some of the best in the world.
- In its role as an inter-university research institute, the Institute holds frequent workshops and seminars by visiting professors and researchers from both Japan and abroad. Students are free to attend and participate.
- It is possible to collaborate with researchers from other universities and institutions. It is also possible for students to develop their own projects by participating in research projects with other institutions through the Transdisciplinary Research Integration Center, Research Organization of Information and Systems.

Course Requirements and Type of Degree Granted

- Requirements to complete the course are as follows:
  Completion of at least 40 credits while a graduate student of five years, or completion of at least 10 credits while a doctorate student of three years who graduated Master's course meeting all the criteria set by the thesis committee of the Institute and successfully completing the final examination.
- On completion of the course, either a Doctorate in Statistical Science or, if the thesis deals mainly with an inter-disciplinary field related to statistical science, a Doctorate of Philosophy is awarded.
- The required number of years of study will be flexible if a student demonstrates outstanding research results.

Number of Students (As of April 1, 2014)

■ Doctor's course five years

Year of enrollment	2009	2010	2012	2013	2014
Number of students	1 (1)	2	2	2	1

■ Doctor's course three years

Year of enrollment	2008	2010	2011	2012	2013	2014
Number of students	1 ①	1 ①	5 ⑤	3 ②	5 ②	6 ④ (1)

* The figures in parentheses indicate the number of foreign students being supported at government expense.
* The figures in circles indicate those who are employed by other organizations.

University Background of Students

National and public universities

• Hokkaido University (2) • Tohoku University (3) • Fukushima University (1) • University of Tsukuba (6) • Saitama University (1) • Ochanomizu University (1) • Hitotsubashi University (6) • Chiba University (1) • The University of Tokyo (18) • Tokyo Medical and Dental University (1) • Tokyo Gakugei University (2) • Tokyo Institute of Technology (4) • Tokyo University of Marine Science and Technology (1) • Tokyo University of Agriculture and Technology (1) • Tokyo Metropolitan University (1) • Shizuoka University (1) • Japan Advanced Institute of Science and Technology, Hokuriku (1) • Nagoya University (3) • Toyohashi University of Technology (2) • Kyoto University (4) • Osaka University (2) • Osaka City University (1) • Nara Institute of Science and Technology (1) • Okayama University (2) • Shimane University (3) • Kyushu University (2) • Oita University (1)

University Background of Students

Private universities

• Okayama University of Science (1) • Tokyo University of Science (6) • Kyoto Sangyo University (1) • Keio University (7) • Waseda University (8) • Chuo University (7) • Toyo University (1) • Nihon University (2) • Hosei University (7) • Kurume University (1) • Japan Women's University (1) • Shibaura Institute of Technology (1) • Nanzan University (1) • Kansai University (1) • Kitasato University (1)

Foreign universities

• Aston University (1) • University of California, Irvine (1) • Universidade Eatadual of Campians (1) • University of Colorado at Boulder (2) • University of Dhaka (2) • University of Hawaii (1) • Jahangirnagar University (2) • University of Malaya (1) • Northeast Normal University (1) • Ohio University (1) • University of Rahshahi (2) • Stanford University (1) • Center for Analysis and Prediction, China Seismological Bureau (1) • Northeastern University of Technology, China (1) • The Hong Kong University of Science and Technology (1) • University of Science and Technology of China (1) • Chinese Academy of Sciences, Institute of Applied Mathematics (1)

Degrees Awarded

Year	2008	2009	2010	2011	2012	2013
Doctor of Philosophy	4 [1]	5 [1]	7 [1]	4	6 [1]	6

* [ ] Ph.D. on the basis of the dissertation only (included in the total)

Alumni

National and public universities, and public organizations

• Obihiro University of Agriculture and Veterinary Medicine • University of Tsukuba • University of Hyogo • The University of Tokyo • The University of Electro-Communications • Saitama University • Nagoya University • Kyushu University • Kyushu Institute of Technology • University of the Ryukyus • The Institute of Statistical Mathematics • Tohoku University • Yokohama National University • Hokkaido University • Tokyo Institute of Technology • Hiroshima University • Oita University of Nursing and Health Sciences • JAXA's Engineering Digital Innovation Center • Kyoto University • Nara Institute of Science and Technology • Bank of Japan • Japan Broadcasting Corporation • Railway Technical Research Institute • Statistical Information Institute for Consulting and Analysis • Government Pension Investment Fund • Public School

Private universities

• Sapporo Gakuin University • Tokyo Health Care University • Meiji University • Doshisha University • Josai University • Nihon University • Komazawa University • Aichi University of Technology • Tokyo University of Information Science • Shibaura Institute of Technology • Rikkyo University

Foreign universities

• Jahangirnagar University • Victoria University • Massey University • University of Otaga • Statistics New Zealand • University of Rajshahi • University of California, Los Angeles • Asia-Pacific Center for Security Studies Department • Central South University • Hong Kong Baptist University • University of South Carolina • The University of Warwick

Private companies, etc.

• Hitachi, Ltd. Central Research Laboratory • NTT Communication Science Laboratories • Seiwa Kikaku • NLI Research Institute • Mizuho Trust and Banking • Nomura Securities Co., Ltd. • ATR Computational Neuroscience Laboratories • Toyota Motor Corporation, Higashi-Fuji Technical Center • Schlumberger Limited • Macquarie Securities, Japan • Non-Life Insurance Rating Organization of Japan • Barclays Global Investors • Open Technologies Corporation • Yamaha Corporation • Goldman Sachs Asset Management L.P. • CLC bio Japan, Inc. • Bank of Tokyo-Mitsubishi UFJ • Pfizer Japan Inc. • Doctoral Institute for Evidence Based Policy • Sony Corporation • NTTIT Corporation • Sompo Japan Insurance Inc. • Qualicaps Co.,Ltd. • Bridgestone Corporation • Brain Pad Inc. • Sumitomo Chemical Co.,Ltd. • PricewaterhouseCoopers Aarata

Facilities and Equipment

Computational Resources

The computing environment at the Institute of Statistical Mathematics has changed greatly in 2014. The Supercomputer System for Data Assimilation (nicknamed "A") and the Communal Cloud Computing System (nicknamed "C") were newly introduced on April 1. The Supercomputer System for Statistical Science (nicknamed "I") was replaced, from the former Fujitsu system to an SGI system, on July 1. The nicknames of these systems come from the important statistical model selection criterion AIC invented by the former director general, Professor Hirotugu Akaike.

System "A" is the world's largest shared-memory supercomputer system and consists of two SGI UV 2000 (256 10-core Xeon E5-4650v2, 64 TB memory). Half of this system is used as part of the high-performance computing infrastructure (HPCI) of Japan.

System "I" is a large distributed-memory supercomputer that consists of 400 SGI ICE X (two 12-core Xeon E5-2697v2, 128 GB memory). The system also includes a large-scale shared storage system (2.5 PB disk storage), physical random number generator boards, and a visualization system that supports a maximum resolution of 4,096 × 2,160 and has a 200-inch rear projection screen for 3D visualization.

System "C" consists of 64 Dell PowerEdge R620 (two 10-core Xeon E5-2680v2, 256 GB memory). This system provides easy-to-use computing environments, such as distributed-memory statistical computing environments and Web servers, running on Apache CloudStack software.

In the main office, the primary local area network (LAN) consists of an Ethernet network using 10GBASE-SR for the main trunk and 1000Base-T for branches. The personal computers in researchers' offices, and systems "A", "I", and "C" are all connected to this network. A wireless LAN system is also available in the immediate area of the building occupied by the institute. These LAN systems enable distributed processing and allow computing resources and statistical data to be used effectively. Comprehensive network security methods have been implemented, such as a firewall system, anti-virus software, and an intrusion prevention system. To encourage joint research with researchers both in Japan and abroad, as well as the exchange of e-mails, the network is connected to the Internet through SINET4 (10 Gbps).

The Supercomputer System for Data Assimilation (nicknamed "A")

The Supercomputer System for Statistical Science (nicknamed "I")

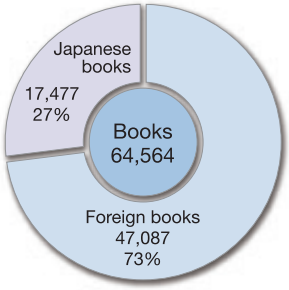
The Communal Cloud Computing System (nicknamed "C")

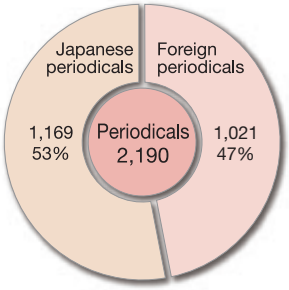
Library and Materials (As of April 1, 2014)

We have a large number of major Japanese/foreign journals covering a wide variety of fields including statistics, mathematics, computer science and informatics. In addition, we also have a large library consisting of books on humanities, social science, biology, medical science, science and engineering.

Besides contributed to Japanese and foreign publications, we also have a collection of journals that we publish ourselves: Annals of the Institute of Statistical Mathematics (English; Springer), Proceedings of the Institute of Statistical Mathematics (Japanese), ISM Survey Research Report (Statistical Researches mainly related to the Japanese National Character), Computer Science Monographs, Cooperative Research Reports (for collaborative research projects), Research Memorandum, ISM Reports on Statistical Computing, and ISM Report on Research and Education.

All materials are properly catalogued and can be searched from the web in order to meet the needs of researchers working in a wide of fields. We also accept photocopy requests.





Finance and Buildings

Administration Subsidy and Others (2013)

Type	Personnel expenses	Non-personnel expenses	Total
Expenditure	604,285	1,004,591	1,608,876

Unit: ¥1,000

Accepted External Funds (2013)

Type	Subcontracted research	Joint research	Contribution for scholarship	Total
Items	12	11	5	28
Income	107,795	26,170	7,800	141,765

Unit: ¥1,000

Grant-in-Aid for Scientific Research "KAKENHI" (2013)

Research Category	Items	Amount Granted
Grant-in-Aid for Scientific Research on Innovation Areas	2	10,010
Grant-in-Aid for Scientific Research (S)	1	33,670
Grant-in-Aid for Scientific Research (A)	3	36,390
Grant-in-Aid for Scientific Research (B)	8	45,760
Grant-in-Aid for Scientific Research (C)	18	25,090
Grant-in-Aid for Challenging Exploratory Research	5	6,110
Grant-in-Aid for Young Scientists (B)	10	10,015
Grant-in-Aid for Research Activity Start-up	3	3,770
Grant-in-Aid for JSPS Fellows	3	2,126
Total	53	172,941

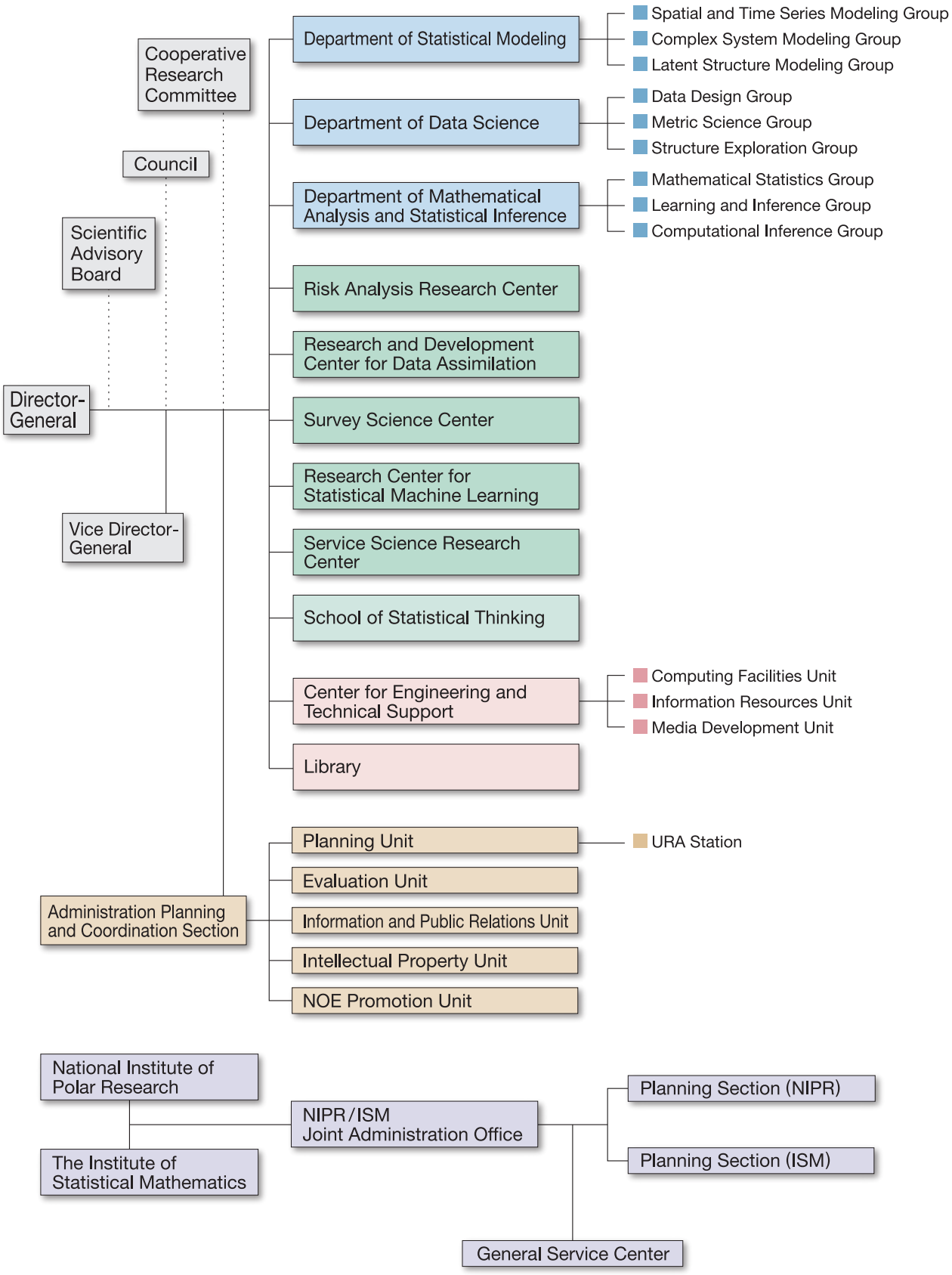
Unit: ¥1,000

Site and Buildings (As of April 1, 2014)

Site Area	62,450m^2
Area for Buildings (total)	16,026m^2

Organization

Organization Diagram (As of August 1, 2014)



Number of Staff (As of April 1, 2014)

Type	Director-General	Professor	Associate Professor	Assistant Professor	Administ-rative Staff	Technical Staff	Total
Director-General	1						1
Department of Statistical Modeling		6	6	2			14
Department of Data Science		5	8	4			17
Department of Mathematical Analysis and Statistical Inference		7	4	3			14
Center for Engineering and Technical Support						10	10
Administration Planning and Coordination Section					1		1
NIPR/ISM Joint Administration Office					12(28)	1(2)	13(30)
Total	1	18	18	9	13(28)	11(2)	70(30)

( ) Total number of staff of NIPR/ISM Joint Administration Office.

The number under Technical Staff at the Center for Engineering and Technical Support includes one staff member who retired because of age but was reemployed in a different position.

Staff (As of September 1, 2014)

Director-General	Tomoyuki HIGUCHI

Vice Director-General	Hiroe TSUBAKI	Vice Director-General	Yoshiyasu TAMURA	Vice Director-General	Hiroshi MARUYAMA

Department of Statistical Modeling

Director Tomoko MATSUI

Spatial and Time Series Modeling Group

Prof.	Nobuhisa KASHIWAGI	Prof.	Tomoyuki HIGUCHI	Assoc. Prof.	Jiancang ZHUANG
Assoc. Prof.	Genta UENO	Assist. Prof.	Shinya NAKANO		

Complex System Modeling Group

Prof.	Yoshiyasu TAMURA	Prof.	Junji NAKANO	Prof.	Yukito IBA
Assoc. Prof.	Yumi TAKIZAWA	Assoc. Prof.	Fumikazu MIWAKEICHI	Assoc. Prof.	Shinsuke KOYAMA
Visiting Prof.	Takehiro FUKUI	Visiting Prof.	Hiroko NAKANISHI	Visiting Assoc. Prof.	Kazuhiro AOYAMA

Latent Structure Modeling Group

Prof.	Hiroshi MARUYAMA	Prof.	Tomoko MATSUI	Assoc. Prof.	Yoshinori KAWASAKI
Assoc. Prof.	Ryo YOSHIDA	Assoc. Prof.	Kazuhiro MINAMI	Project Researcher	Akira TAMAMORI

Department of Data Science

Director Takashi NAKAMURA

Data Design Group

Prof.	Takashi NAKAMURA	Prof.	Ryozo YOSHINO	Assoc. Prof.	Naomasa MARUYAMA
Assoc. Prof.	Tadahiko MAEDA	Assoc. Prof.	Takahiro TSUCHIYA	Assist. Prof.	Toshihiko KAWAMURA

Metric Science Group

Prof.	Satoshi YAMASHITA	Assoc. Prof.	Kenichiro SHIMATANI	Assoc. Prof.	Masayuki HENMI
Assoc. Prof.	Ikuko FUNATOGAWA	Assist. Prof.	Nobuo SHIMIZU	Assist. Prof.	Hisashi NOMA

Structure Exploration Group

Prof.	Hiroe TSUBAKI	Prof.	Koji KANEFUJI	Assoc. Prof.	Jun ADACHI
Assoc. Prof.	Manabu KUROKI	Assist. Prof.	Yoo Sung PARK		

Department of Mathematical Analysis and Statistical Inference

Director Satoshi KURIKI

Mathematical Statistics Group

Prof.	Satoshi KURIKI	Assoc. Prof.	Yoichi NISHIYAMA	Assoc. Prof.	Shuhei MANO
Assoc. Prof.	Shogo KATO	Assist. Prof.	Takaaki SHIMURA	Assist. Prof.	Kei KOBAYASHI
Assist. Prof.	Teppei OGIHARA	Project Researcher	Jo NISHINO		

Learning and Inference Group

Prof.	Shinto EGUCHI	Prof.	Kenji FUKUMIZU	Prof.	Hironori FUJISAWA
Assoc. Prof.	Shiro IKEDA	Assoc. Prof.	Daichi MOCHIHASHI	Project Assist. Prof.	Osamu KOMORI
Visiting Prof.	Ryuei NISHII	Visiting Assoc. Prof.	Yoshiyuki NINOMIYA		

Computational Inference Group

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

Risk Analysis Research Center

Director Satoshi YAMASHITA Vice Director Masayuki HENMI

Prof.	Hiroe TSUBAKI	Prof.	Satoshi YAMASHITA	Prof.	Satoshi KURIKI
Prof.	Shinto EGUCHI	Prof.	Koji KANEFUJI	Prof.	Nobuhisa KASHIWAGI
Prof.	Atsushi YOSHIMOTO	Assoc. Prof.	Masayuki HENMI	Assoc. Prof.	Manabu KUROKI
Assoc. Prof.	Fumikazu MIWAKEICHI	Assoc. Prof.	Yoshinori KAWASAKI	Assoc. Prof.	Yoichi NISHIYAMA
Assoc. Prof.	Jiancang ZHUANG	Assoc. Prof.	Kenichiro SHIMATANI	Assoc. Prof.	Ikuko FUNATOGAWA
Assoc. Prof.	Shogo KATO	Assist. Prof.	Takaaki SHIMURA	Assist. Prof.	Hisashi NOMA
Project Assist. Prof.	Tomoaki IMOTO	Project Assist. Prof.	Buntaro KUSUMOTO	Project Assist. Prof.	Yoshitake TAKEBAYASHI
Visiting Prof.	Rinya TAKAHASHI	Visiting Prof.	Nakahiro YOSHIDA	Visiting Prof.	Toshiya SATO
Visiting Prof.	Yoichi KATO	Visiting Prof.	Masaaki MATSUURA	Visiting Prof.	Satoshi TERAMUKAI
Visiting Prof.	Tatsuhiko TSUNODA	Visiting Prof.	Shigeyuki MATSUI	Visiting Prof.	Mihoko MINAMI
Visiting Prof.	Megu OTAKI	Visiting Prof.	Satoshi TAKIZAWA	Visiting Prof.	Osamu NAGAFUCHI
Visiting Prof.	Katsuhiko TAKATA	Visiting Prof.	Naoto KUNITOMO	Visiting Prof.	Toshio HONDA
Visiting Prof.	Hiroshi TSUDA	Visiting Prof.	Sadaaki MIYAMOTO	Visiting Prof.	Michiko MIYAMOTO
Visiting Prof.	Toshinao YOSHIBA	Visiting Prof.	Tadashi ONO	Visiting Assoc. Prof.	Hideki KATAGIRI
Visiting Assoc. Prof.	Koji OKUHARA	Visiting Assoc. Prof.	Hisateru TACHIMORI	Visiting Assoc. Prof.	Makoto TOMITA
Visiting Assoc. Prof.	Takafumi KUBOTA	Visiting Assoc. Prof.	Toshikazu KITANO	Visiting Assoc. Prof.	Hisayuki HARA

Staff

Risk Analysis Research Center

Visiting Assoc. Prof.	Toshio ONISHI	Visiting Assoc. Prof.	Toshihiro HORIGUCHI	Visiting Assoc. Prof.	Takashi KAMEYA
Visiting Assoc. Prof.	Kenichi KAMO	Visiting Assoc. Prof.	Masashi KONOSHIMA	Visiting Assoc. Prof.	Katsuya TANAKA
Visiting Assoc. Prof.	Masakazu ANDO	Visiting Assoc. Prof.	Seisho SATO	Visiting Assoc. Prof.	Yasutaka SHIMIZU
Visiting Assoc. Prof.	Masaaki FUKASAWA	Visiting Assoc. Prof.	Bogdan Dumitru ENESCU	Visiting Assoc. Prof.	Takaki IWATA
Project Researcher	Yuta KOIKE	Project Researcher	Ryosuke NOMURA	Project Researcher	Min-zhen WANG
Project Researcher	Takao KUMAZAWA				

Research and Development Center for Data Assimilation

Director Tomoyuki HIGUCHI Vice Director Yoshiyasu TAMURA

Prof.	Tomoyuki HIGUCHI	Prof.	Yoshiyasu TAMURA	Prof.	Junji NAKANO
Prof.	Yukito IBA	Assoc. Prof.	Genta UENO	Assoc. Prof.	Ryo YOSHIDA
Assist. Prof.	Shinya NAKANO	Project Assist. Prof.	Masaya SAITO	Project Assist. Prof.	Terumasa TOKUNAGA
Visiting Prof.	Takashi WASHIO	Visiting Assoc. Prof.	Kazuyuki NAKAMURA	Visiting Assoc. Prof.	Hiromichi NAGAO
Visiting Assoc. Prof.	Hiroshi KATO	Visiting Assoc. Prof.	Osamu HIROSE	Project Researcher	Yuya ARIYOSHI
Project Researcher	Kazue SUZUKI				

Survey Science Center

Director Ryozo YOSHINO

Prof.	Ryozo YOSHINO	Prof.	Takashi NAKAMURA	Assoc. Prof.	Tadahiko MAEDA
Assoc. Prof.	Takahiro TSUCHIYA	Assist. Prof.	Yoo Sung PARK	Visiting Prof.	Yoshimichi SATO
Visiting Prof.	Fumi HAYASHI	Visiting Prof.	Masato YONEDA	Visiting Prof.	Shintaro SONO
Visiting Prof.	Toru KIKKAWA	Visiting Prof.	Kazufumi MANABE	Visiting Prof.	Takatoshi IMADA
Visiting Assoc. Prof.	Takahito ABE	Visiting Assoc. Prof.	Wataru MATSUMOTO	Visiting Assoc. Prof.	Koken OZAKI
Visiting Assoc. Prof.	Hiroko TSUNODA	Visiting Assoc. Prof.	Tadayoshi FUSHIKI	Project Researcher	Yusuke INAGAKI
Project Researcher	Kiyohisa SHIBAI	Project Researcher	Kosuke NIKAIDO		

Research Center for Statistical Machine Learning

Director Kenji FUKUMIZU Vice Director Tomoko MATSUI

Prof.	Kenji FUKUMIZU	Prof.	Tomoko MATSUI	Prof.	Shinto EGUCHI
Prof.	Yoshihiko MIYASATO	Prof.	Satoshi ITO	Assoc. Prof.	Shiro IKEDA
Assoc. Prof.	Daichi MOCHIHASHI	Assoc. Prof.	Shinsuke KOYAMA	Assist. Prof.	Kei KOBAYASHI
Project Assist. Prof.	Yu NISHIYAMA	Visiting. Prof.	Atsuko IKEGAMI	Visiting. Prof.	Takashi TSUCHIYA
Visiting. Prof.	Tadashi WADAYAMA	Visiting. Prof.	Masataka GOTO	Visiting. Prof.	Koji TSUDA
Visiting Assoc. Prof.	Yuji SHINANO	Visiting Assoc. Prof.	Shaogao LU		

Service Science Research Center

Director Hiroshi MARUYAMA

Prof.	Hiroshi MARUYAMA	Prof.	Tomoyuki HIGUCHI	Prof.	Hiroe TSUBAKI
Prof.	Tomoko MATSUI	Prof.	Junji NAKANO	Assoc. Prof.	Manabu KUROKI

Service Science Research Center

Assoc. Prof.	Kazuhiro MINAMI	Assist. Prof.	Toshihiko KAWAMURA	Assist. Prof.	Nobuo SHIMIZU
Visiting Prof.	Yoichi MOTOMURA	Visiting Prof.	Shusaku TSUMOTO	Visiting Prof.	Nobuhiko TERUI
Visiting Prof.	Yoshiki YAMAGATA	Visiting Assoc. Prof.	Tsukasa ISHIGAKI	Visiting Assoc. Prof.	Tadahiko SATO
Visiting Assoc. Prof.	Yukihiko OKADA	Visiting Assoc. Prof.	Haruhisa FUKUDA	Visiting Assoc. Prof.	Eiji MOTOHASHI

School of Statistical Thinking

Director Junji NAKANO Vice Director Yoshinori KAWASAKI

Prof.	Hiroshi MARUYAMA	Prof.	Satoshi ITO	Prof.	Yukito IBA
Assoc. Prof.	Naomasa MARUYAMA	Assist. Prof.	Teppei OGIHARA	Adjunct Professor	Yasumasa BABA
Adjunct Professor	Makio ISHIGURO	Adjunct Professor	Kunio SHIMIZU	Project Assist. Prof.	Kei TAKAHASHI
Project Assist. Prof.	Keiichi FUKAYA	Project Assist. Prof.	Kaname MATSUE	Project Assist. Prof.	Toshiya KAZAMA
Project Researcher	Naoki KAMIYA				

Project Researchers

Project Assoc. Prof.	Roberto Sebastian LEGASPI	Project Assist. Prof.	Kazuhiko SHIBUYA	Project Assist. Prof.	Hei CHAN
Project Researcher	Nana ARIZUMI	Project Researcher	Satoko SAITA	Project Researcher	Hisanao TAKAHASHI

Center for Engineering and Technical Support

Director Junji NAKANO Vice Director Yoshinori KAWASAKI
Deputy Manager Yuriko WATANABE Senior Specialist Saeko TANAKA

Head of Computing Facilities Unit	Kazuhiro NAKAMURA	Head of Information Resources Unit	Saeko TANAKA
Head of Media Development Unit	Akiko NAGASHIMA		

Library

Head Junji NAKANO

Administration Planning and Coordination Section

Director Tomoyuki HIGUCHI

Head of Planning Unit	Hiroe TSUBAKI	Head of Evaluation Unit	Yoshiyasu TAMURA
Head of Information and Public Relations Unit	Hiroshi MARUYAMA	Head of Intellectual Property Unit	Hiroshi MARUYAMA
Head of NOE Promotion Unit	Hiroe TSUBAKI		
Leader of URA Station	Kozo KITAMURA	Subleader of URA Station	Motoi OKAMOTO
Research Administrator	Keisuke HONDA	Research Administrator	Shigeru FUJITA
Research Administrator	Yoko OGAWA		

Staff

NIPR/ISM Joint Administration Office

Director of NIPR/ISM Joint Administration Office Tomoyoshi SHIBUSAWA

Director of General Service Center Kazuhiko HASEGAWA

Planning Section (ISM)

Head of Planning Section Kenichi TADA

Deputy Head	Kazuhiko GOTO	Deputy Head	Yutaka ONO	Specialist	Fumio SUTO
Team Leader	Mitsuo ENDO	Team Leader	Hiroaki ARAI	Team Leader	Ichiro KAWAJI

Planning Section (NIPR)

Head of Planning Section Michiaki NAKANO

Deputy Head	Koji SAKAMOTO	Team Leader	Kazuhisa OSHITA	Team Leader	Norihito SETO
Team Leader	Yoji ISHII	Specialist	Hiroyasu KUMAGAI		

General Service Center

Deputy Head	Motokazu TOYODA	Deputy Head	Takashi KUBOTA	Deputy Head	Tomohiko MIYAUCHI
Team Leader	Yumiko OKAWA	Team Leader	Susumu YAMAGUCHI	Team Leader	Kenichi SHIOBARA
Specialist	Yoshihiro YAMADA	Specialist	Michihito SAKURAI		

Council of The Institute of Statistical Mathematics (As of April 1, 2014)

Yasushi AKIYAMA	Professor, Graduate School of Information Science and Engineering , Tokyo Institute of Technology
Masahiro MIZUTA	Professor, Information Initiative Center, and Graduate School of Information Science and Technology, Hokkaido University
Shigeru OBAYASHI	Director Institute of Fluid Science Tohoku University
Nakahiro YOSHIDA	Professor , Graduate School of Mathematical Sciences, University of Tokyo
Nobuhiko TERUI	Professor, Graduate School of Economics and Management, Tohoku University
Ryuei NISHII	Professor, Institute of Mathematics for Industry, Kyushu University
Yoshihiro YAJIMA	Professor, Graduate School of Economics, The University of Tokyo
Shoichi YOKOYAMA	Professor, Department of Linguistic Theory and Structure, National Institute for Japanese Language and Linguistics
Masato OKADA	Professor, Graduate School of Frontier Sciences, The University of Tokyo
Michiko WATANABE	Professor, The Graduate School of Health Management, Keio University
Hiroe TSUBAKI	Professor (Vice Director-General, ISM)
Yoshiyasu TAMURA	Professor (Vice Director-General, ISM)
Hiroshi MARUYAMA	Professor (Vice Director-General, ISM)
Tomoko MATSUI	Professor (Director of Department of Statistical Modeling, ISM)
Takashi NAKAMURA	Professor (Director of Department of Data Science, ISM)
Satoshi KURIKI	Professor (Director of Department of Mathematical Analysis and Statistical Inference, ISM)
Junji NAKANO	Professor (Director of Center for Engineering and Technical Support, ISM)
Nobuhisa KASHIWAGI	Professor (Department of Statistical Modeling, ISM)
Ryozo YOSHINO	Professor (Department of Data Science, ISM)
Kenji FUKUMIZU	Professor (Department of Mathematical Analysis and Statistical Inference, ISM)
Satoshi ITO	Professor (Department of Mathematical Analysis and Statistical Inference, ISM)

Cooperative Research Committee (As of April 1, 2014)

Masayuki UCHIDA	Professor, Graduate School of Engineering Science, Osaka University
Yoshinori FUJII	Professor, Faculty of Education and Culture, University of Miyazaki
Shigeyuki MATSUI	Professor, Graduate School of Medicine, Nagoya University
Hiroshi YADOHISA	Professor, Faculty of Culture and Information Science, Doshisha University
Kazue YAMAOKA	Professor, Graduate School of Public Health, Teikyo University
Tomoko MATSUI	Professor (Director of Department of Statistical Modeling, ISM)
Satoshi YAMASHITA	Professor (Department of Data Science, ISM)
Satoshi ITO	Professor (Department of Mathematical Analysis and Statistical Inference, ISM)
Yoshihiko MIYASATO	Professor (Department of Mathematical Analysis and Statistical Inference, ISM)

Research Ethics Review Committee (As of April 1, 2014)

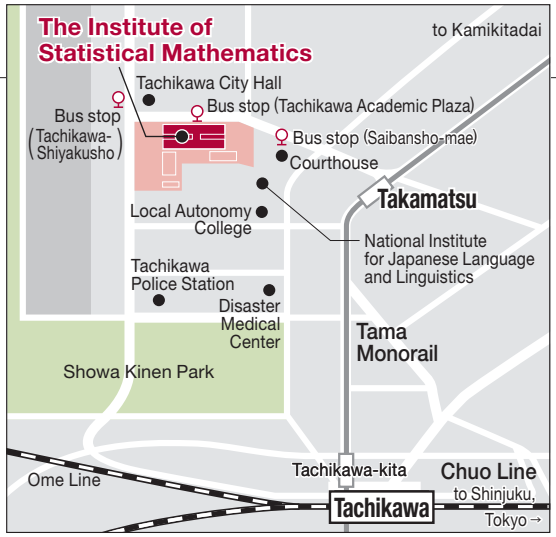
Specialist on epidemiology and social research	Kazuo SEIYAMA	Professor, Kwansei Gakuin University
Specialist on epidemiology and social research	Keiko SATO	Associate professor, Kyoto Unit Center Japan Environment & Children's Study, Graduate School of Medicine, Kyoto University
Specialist in the field of ethics and law	Hitomi NAKAYAMA	Lawyer, Kasumigaseki-Sogo Law Offices
Person in citizen's position	Yutaka KURIKI	Kindergarten Director, Nishikokubunji Nursery School
Research education staff of ISM	Takashi NAKAMURA	Professor (Director of Department of Data Science, ISM)
Research education staff of ISM	Hiroe TSUBAKI	Professor (Vice Director-General, ISM)
Research education staff of ISM	Ikuko FUNATOGAWA	Associate Professor (Department of Data Science, ISM)
Research education staff of ISM	Shuhei MANO	Associate Professor (Department of Mathematical Analysis and Statistical Inference, ISM)

Professor Emeritus (As of April 1, 2014)

Kameo MATUSITA	Sigeki NISIHIRA	Tatsuzo SUZUKI
Giitiro SUZUKI	Ryoichi SHIMIZU	Noboru OHSUMI
Masakatsu MURAKAMI	Kunio TANABE	Tadashi MATSUNAWA
Masami HASEGAWA	Yoshiyuki SAKAMOTO	Takemi YANAGIMOTO
Yoshiaki ITOH	Yasumasa BABA	Katsuomi HIRANO
Masaharu TANEMURA	Makio ISHIGURO	Yosihiko OGATA

History

1944	June	Based on a proposal submitted at an academic study conference in December 1943, the organization was founded as an institute under the direct control of the Ministry of Education. This proposal aimed to provide supervision for studies looking into the mathematical principles of probability and their application, and was also intended to facilitate, unify and promote the publication of research results.
1947	April	The affiliated statistical specialists' school was opened.
	May	The Institute was divided into the 1st Research Dept. (fundamental theories), the 2nd Research Dept. (statistical theories for the natural sciences), and the 3rd Research Dept. (statistical theories for the social sciences).
1949	June	The Institute was placed under the control of the Ministry of Education because of the enforcement of the Ministry of Education Establishment Law.
1955	September	Reorganized into the 1st Research Dept. (fundamental theories), the 2nd Research Dept. (natural and social science theories), and the 3rd Research Dept. (operations, research, statistical analysis theories). The laboratory system, comprising 9 laboratories and the research guidance promotion room, was adopted.
1969	October	A new office building was constructed in Minato Ward.
1971	April	The 4th Research Dept. (informatics theories) was instituted.
1973	April	The 5th Research Dept. (prediction and control theories) was instituted.
1975	October	The 6th Research Dept. (statistical theories of human behavior) was instituted.
1979	November	The Information Research Building was constructed.
1985	April	Repositioned as an Inter-University Research Institute due to the regulation change. The new mission includes providing facilities and skills to other universities, in addition to conducting cutting-edge research on statistical mathematics. Accordingly, the institute was reorganized into our basic research departments (Fundamental Statistical Theory, Statistical Methodology, Prediction & Control, and Interdisciplinary Statistics) and two strategic centers (Statistical Data Analysis Center and Statistical Education & Information Center). The Statistical Technical Training Center was terminated.
1988	October	The Dept. of Statistical Science was instituted in the School of Mathematical and Physical Science, part of the Graduate University for Advanced Studies (SOKENDAI).
1989	June	The Institute was reorganized as an Inter-University Research Institute based on the National School Establishment Law.
1993	April	The Planning Coordination Chief System was instituted.
1997	April	The affiliated Statistical Data Analysis Center was reorganized into the Center for Development of Statistical Computing, and the Statistical Education and Information Center was reorganized into the Center for Information on Statistical Sciences.
2003	September	The Prediction and Knowledge Discovery Research Center was instituted.
2004	April	The Institute was reorganized into the Institute of Statistical Mathematics, part of the Research Organization of Information and Systems of the Inter-University Research Institute based on the National University Corporation Law. The Planning Coordination Chief System was abolished and the position of Vice Director-General was instituted instead. The Dept. of Statistical Science in the School of Mathematical and Physical Science, SOKENDAI, was reorganized. In addition, the Dept. of Statistical Science and the School of Multidisciplinary Sciences were instituted.
2005	April	The research organization was reorganized into three research departments (the Department of Statistical Modeling, the Department of Data Science, and the Department of Mathematical Analysis and Statistical Inference). The affiliated Center for Development of Statistical Computing, the Center for Information on Statistical Sciences, and the Engineering and Technical Services Section were integrated into the Center for Engineering and Technical Support. The Risk Analysis Research Center was instituted.
2008	April	The Research Innovation Center was instituted. The Intellectual Property Unit was instituted.
2009	October	The Institute was moved to 10-3 Midori-cho, Tachikawa, Tokyo.
2010	June	Officially opened the Akaike Guest House.
	July	Reorganized the Administration Office to create the NIPR/ISM Joint Administration Office and launch the General Service Center. The NOE Forwarding Unit (now we call "NOE Promotion Unit") was instituted within the Administration Planning and Coordination Section.
2011	January	Research and Development Center for Data Assimilation was instituted. Survey Science Center was instituted.
2012	January	Research Center for Statistical Machine Learning, Service Science Research Center and School of Statistical Thinking were instituted.
2014	February	A new team, the University Research Administrators (URAs), is formed and made a subsection of the Administration Planning and Coordination Section.



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

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