

Micro-Regional Statistical Surveys In British India: A Critical Review

India has a long history of keeping records on statistical information on land and people even at the village and town levels from the ancient period. The East India Company proceeded concurrently with micro level regional surveys divided under three heads of (i) revenue surveys (ii) topographical surveys and (iii) trigonometrical surveys. With other objectives, quantitative statistical information was also collected by the great surveyors on land and people at the micro-regional level of villages and towns. Present study is an attempt for critical evaluation of this voluminous micro-regional statistical information of the earlier period as sources for the socio-economic and demographic history of the past. To do this, some of these past surveys that constituted in different places of the Indian sub-continent at different time periods of British regime are considered to get an idea about the nature and quality of data presented by them. Then an analytical study has been discussed to investigate how far these village level statistics are useful to the social researchers in formulating the growth pattern of the village societies in India.

Partha De

Psychological Research Unit

Ego-Identity Status during Adolescence and Early Adulthood

The objective of the project is to study the pattern of Ego-Identity status during adolescence and early adulthood. During late adolescence, many individuals are faced by a particular life crisis called "identity crisis" which includes deciding upon and committing oneself to what one is "to be" in terms of an occupation as well as formulating and taking action on what one "believes" in terms of an ideology. This becomes more important in this period of globalization and liberalization. Literature review have been done and scales and instruments have been selected. Data so far collected indicate that students with high identity achievement status have high self-esteem and have positive relationship with benevolence, self-direction, stimulation and achievement dimensions of values.

Anjali Ghosh

Team Efficiency in Work Settings

The objective of the present study is to identify important factors of team behaviour and teamwork which affects team efficiency of different work teams. Here team efficiency is defined in terms of individual and team performance. Emphasis is given on to explore the variables, which are, crucial for team performance in different work situations. The data for this study are being collected from the information and technology (IT) industry of Eastern, Western, Northern and Southern zones of India. Variables studied here are personality, self-efficacy, transactive memory system, collective efficacy, team climate, satisfaction, and team efficiency. Results indicate that team performance and individual performance are positively correlated with some of the input and process variables, which lead to efficiency of the teams.

Monika Sharma and Anjali Ghosh

Pattern of Distributive Justice In Students of Different Age Groups

Cognitive-moral development is seen as major determinant of distributive justice and justice rule preferences. Contemporary researches on distributive justice in the context of reward allocation mainly deal with various determinants of preference for specific justice rules such as equality, equity (merit), and needs. There is very little evidence regarding the effects of maturity, parenting styles and aggression on justice rule preference of children and the relationship between altruistic behaviour and distributive justice. The objective of the present research work is to determine the pattern of justice rule preferences and its correlates in students of different age groups. Data collection from students of Kolkata are in progress.

Rita Karmakar and Anjali Ghosh

Mapping Psychological Complaints of School going Adolescents

Objectives of the study are (a) to explore various psychological complaints of school going adolescent boys and (b) to map out the overall associations amongst them. Data were collected from 136 adolescent schoolboys. Results revealed cognitive difficulties to be the most prevalent complaint followed by socialization problems, emotional disturbances, adjustment difficulties, academic difficulties, physical anxiety and low self-concept. By using multiple correspondence analysis, two clusters of complaints were obtained. One included socialization problems, emotional disturbances, adjustment difficulties and low self-concept while the other included academic and cognitive difficulties. Results highlight the complex and multifaceted nature of today's adolescents.

Fouzia Alsabah Shaikh and D. Dutta Roy

Assessing Validity of Web-Based Computer Adaptive Training Modules

With rapid change in web technology, training method gradually shifts from manual to computer adaptive training. Aim of the current research is to examine the criterion related validity of one web based computer adaptive training program. 25 randomly selected students of grades four and five were trained with Fast ForWord program for more than 20 days. In considering typical data structure, several parameters of box plots (Outliers, box size, location of median in the box, location of upper and lower whisker, location of hinges, and fluctuation of box size after achieving the target) were explored as estimates of criterion related validity. Results identified very poor validity in two modules out of seven.

D. Dutta Roy

Evaluation of the Social Safety Net Programme and Tracer Study on Impact of Job Separation

This study is in collaboration with the study team of the Institute of Public Enterprise, Hyderabad. Objective of the study was to determine effect of attitude towards training, counseling and medical insurance benefits on the mental health. Data were collected from 1265 trainees under SSNP by the members of study team. Psychometric properties of the questionnaires were examined. Finally, results revealed that mental health was more predicted by attitude towards training and counseling than the same towards medical benefits.

D. Dutta Roy, P. Venkataramana and R.K.Mishra

CBWE-ISI Impact Study on Rural Workers Education

This study is in collaboration with Central Board for Workers Education. Objectives of the study are to examine difference in (a) different areas of rural workers education as organization building, legal rights and various social welfare and security schemes and (b) in personality traits between trainees and non-trainees. One questionnaire was developed to assess their attitude towards the training program. One semi projective test was developed to assess need achievement, self confidence, honesty and experimental mind. It is in process.

Anjali Ghosh, D. Dutta Roy, Rumki Gupta and Aditya Bhattacharya

Sociological Research Unit

SRU has carried out the following internal and external research projects, which have relevance for understanding various processes of social transformation and comparative development in the country.

Social Discrimination and the Rural Labour Market

The internal project has sought to consolidate the research work undertaken in the earlier year on the nature of market and non-market discrimination against the Dalits in rural India, particularly with respect to the labour market. A national-level workshop was organized on 22-23 February 2007, ensuring participation of the senior social scientists in the field from different parts of the country and from abroad.

V. K. Ramachandran and Madhura Swaminathan

Techno-economic Adaptation of the Mizos of Hill Forest Ecology of Mizoram

The State Government of Mizoram has tried, since 1990-91, to move away the humias from hum or shifting cultivation, which has still remained the major occupation of the tribals, by launching new land-use policy in order to tide over the problems inherent in shifting cultivation. The internal project has sought to bring into focus the adaptive strategy and cultural responses of the Mizo tribals in building up a viable communal life in the steep hill ranges and forests which constitute 70% of the total land area of the state. An interim report, based on the analysis of the field data, has been submitted.

Aniruddha Chakraborty

Spread of Literacy among the Muslim Women In Bihar: Causative Factors

Contrary to general perception, literacy status has tended to improve in Bihar over the last five years, particularly among the deprived section like the Muslim women in the district of Kishanganj, where Accelerated Female Literacy Programme of the National Literacy Mission has been undertaken. The internal project has tried to carry out an empirical study on the causative factors for this improvement. An interim report on certain aspects of the findings has already been submitted, which will be followed up by a final report.

Atis Dasgupta

Socio-economic Conditions of Five Minority Communities in West Bengal

The external project, funded by West Bengal Minorities' Commission (Government of West Bengal), was undertaken for an in-depth study in respect of socio-economic conditions of the Muslims, the Christians, the Buddhists, the Sikhs and the Parsees in West Bengal. This study was innovative, as such a research work, which relied on official statistics as well as on field data, has not been carried out before either by the Central Government or the State Government or any other organization. An interim report was already submitted.

Atis Dasgupta

Development of Data Base for Decentralized Planning in West Bengal: A Case Study in Howrah District, West Bengal

The external project, funded by Zilla Parishad of Howrah district, West Bengal, has envisaged a sample survey, for which the phase of data collection has been completed. This is being followed up by the scrutiny and analysis of the collected data and the report writing.

Atis Dasgupta

New Research Thrusts in Giridih Branch of SRU

During the visit of Section 8(i) Committee to Giridih Branch on 31 July-1 August 2006, special emphasis was devoted to revitalize the research activities in Giridih branch of SRU by submitting new project proposals on empowerment of women, social network analysis of agrarian movement, literacy programme, and sustainable development.

Statistical Quality Control and Operations Research Division

The Division now comprises of nine units located at different places like Bangalore, Chennai, Coimbatore, Delhi, Hyderabad, Kolkata, Mumbai, Pune, and Vadodara and a Central SQC (CSQC) office located in the main campus at Baranagar. The CSQC office functions as an office of the elected Head of the Division and coordinates various activities of the Division.

Supervising thesis, dissertation and project work by research scholars, M.Tech. (QROR) and M.Stat. students is also another aspect of the responsibilities of the Divisional members.

During the one-year period the Division organized about 200 In-plant and general training programmes tailor-made for the organisations' requirements. About 2000 managers and other senior level executives and several operators and technicians have been trained on various topics of quality management. The division also expanded its activities in providing its expertise to Iran. Majority of the nine units mentioned above were primarily engaged in providing consultancy to various organizations, though there are a couple of units which also carried out both theoretical as well as applied research in the areas as detailed below.

The Division has been accredited by the Quality Council of India to offer certificate course in Six Sigma Green Belt.

SQC & OR Unit, Hyderabad

Estimation and Verification of Agricultural Power Consumption by the Distribution Companies in Andhra Pradesh.

An estimate of the agricultural power consumptions by the consumers of the four distribution companies for a period of twelve consecutive months in the recent past is obtained using survey methodology. Also verification of the proportion of consumption estimates derived using the existing stipulated estimation procedure that can be truly attributed to agricultural purposes was carried out.

A. L. N. Murthy and G. S. R. Murthy

Development of Decision Support System for Wood Inventory Management (Raw material for Paper board manufacturing) for ITC Limited, PSPD, Bhadrachalam.

ITC Limited, PSPD, Bhadrachalam, is engaged in manufacture of paper boards and specialty papers. The main raw material used is wood of different species in large quantities. One of the major problems of decision making is the planning of procurement and consumption of wood. The availabilities and the shelf life problems of wood pose several constraints. The problem is a complex optimization problem involving thousands of variables and hundreds of constraints. The stakes in the problem are high as the cost of wood and operational costs such as inventory and handling charges run into several crores of rupees. This project was undertaken to model the problem and develop a software solution to aid the decision making process. The problem was formulated as a network flow problem. An user-friendly interface software using excel has been developed to formulate and solve the instances of the decision making problem (on monthly basis). The software uses a professional OR solver at the backend to solve the instances.

A. L. N. Murthy and G. S. R. Murthy

SQC & OR Unit, Kolkata

Some Implementation Issues of Six Sigma in Quality Management

Research work has been carried out to build on improvement methods that have been proven to be effective and to integrate the human and process elements of improvement through development of a model. The purpose of this integration is to make Six Sigma a holistic approach to enable it to produce proactive and reactive results by considering both breakthrough and incremental improvements. The human elements take into account identifying and quantifying the parameters which are important for customer satisfaction and employee satisfaction along with the aspects of leadership, teamwork and culture change. The process elements of improvement consist of sequencing and linking statistical process control design of experiments with tremendous emphasis on control of costs by identifying, quantifying and driving cut costs of poor quality for achieving continual process improvement.

Arup Ranjan Mukhopadhyay

Some Statistical Aspects of Multivariate Process Capability Indices

Process capability indices (PCIs) are used to find the status of a process by taking a sample from the process. Obviously, the sampling error is ignored while taking a decision based on one sample. For

the univariate cases some studies have been made to find out how the PCIs behave when sampling errors are taken into account. There are a few literatures available on the effects of measurement errors on the performance of the PCIs even in the univariate cases. However, in many cases it is actually observed that quality of a particular item depends not on one characteristic but quite often more than one. It is proposed, first to construct a generalized multivariate process capability index based on its univariate counterpart, and then study the statistical properties of multivariate process capability indices. It is interesting to observe that the bias and the sampling error factor values behave similarly as in the univariate case. Some insights into some of the multivariate PCIs have been provided.

Ashis K. Chakraborty

Predictability of Software Reliability Growth Models

Software reliability growth models are generally compared for their predictive validity. Predictive validity of a model is measured using two components namely, Average Error (AE) and Average Bias (AB). While calculating AE and AB, the difference is calculated from the total number of faults encountered. Investigation is carried out to find what happens if the total number of faults in the calculation of AE and AB is replaced by the number of faults observed at the time of calculation and the time of the last fault observed is replaced by the time to k^{th} fault, where k is the largest number of faults observed till the time. Also a measure of consistency of the model is introduced which, in at least some cases, could differentiate between competing models well. Various data sets available in the literature are used to employ the methodology with interesting results.

Ashis K. Chakraborty

Establishing Process Parameter Levels for Double Sided PCBs

An applied research on establishing an initial manufacturing process for a denser printed circuit board (PCB) compared to the existing ones was undertaken. All attempts to increase the density in the existing process resulted in an increased level of rejection due to short and open circuits. An irregular and asymmetric fractional factorial plan in eighteen runs, involving a two level factor and seven three level factors, was used to design an experiment to maximize the proportion of non-defective circuits. The response could be adequately represented over the zone of exploration using a second-order linear logistic model. A constrained nonlinear optimization of the surface yielded an optimum process parameter setting that resulted in about 82% circuits being free from shorts and opens. A joint paper based on the work has been sent for publication.

Biswabrata Pradhan and Tridib K. Dutta

Estimation of Quality Adjusted Lifetime (QAL) Distribution

In many clinical trials, patients may experience several health states which differ in their quality of life measured by a utility coefficient ranging from zero to unity. Quality adjusted lifetime is defined as the weighted integral of the time spent in successive health states, where weights are the utility coefficients. Similar concept can be considered in the context of reliability dealing with life or service times of items. The objective is to estimate the distribution of quality adjusted lifetime (QAL). The study on parametric estimation of quality adjusted lifetime (QAL) distribution in illness-death models has been completed. Consistency and asymptotic normality of the proposed non-parametric estimate have been established. Both the methods (parametric and non-parametric) can estimate the distribution even when some of the transitions are not observable.

Biswabrata Pradhan, Anup Dewanji and Debasis Sengupta

Inference for the Lifetime Distribution Based on Progressively Type-II Censored Data

This work considers the inference for the parameters of generalized exponential distribution based on progressively Type-II censored data. The maximum likelihood estimate of the parameters is obtained using EM algorithm. The method of obtaining optimal censoring scheme has been proposed. Simulation study and data analysis is in progress.

Biswabrata Pradhan

Hybridization of Statistical Methods and Neural Networks In Material Science

Research in the areas of hybridization of statistical methods and neural networks in the field of materials science along with looking at classical mathematical programming problems based on complementarity theory and solving through neural network techniques has been pursued.

Prasun Das

Recognition of Control Chart Patterns through Artificial Neural Network

Control charts predominantly in the form of \bar{X} chart are recognized as one of the most important tools for statistical process control. Identification of unnatural patterns that are commonly exhibited in the control chart can greatly narrow the set of possible causes that must be investigated and thus the diagnostic search can be reduced in length. Since extracted shape features represent the main characteristics of the patterns in a condensed form, feature-based approaches facilitate efficient recognition of control chart patterns. However, one limitation of this approach is the difficulty in discrimination between stratification and normal patterns. In the present research work, a set of six shape features has been proposed and all the eight basic control chart patterns including stratification pattern have been recognized based on these features using heuristic and artificial neural network techniques. A new approach for generalization of shape features has been proposed so that a developed control chart pattern recognizer can be applicable to any general process. Test results reveal that the proposed feature-based approach is promising for automated process control.

Susanta Kr. Gauri

Stochastic Games

A class of zero-sum stochastic game is considered in which the set of states are partitioned into sets S_1 , S_2 and S_3 so that the law of motion is controlled by Player I alone when the game is played in S_1 , Player II alone when the game is played in S_2 , and in S_3 the reward and transition probabilities are additive. We show that the problem of solving the value vector v_i^{β} and optimal stationary strategies f_i^{β} for Player I and g_i^{β} for Player II for such a mixture type of game can be formulated as a linear complementarity problem. This gives an alternative proof of the order field property that holds for such a mixture type of game. We also explore the possibility of using pivotal algorithms for solving such games.

Anup Kumar Das

Linear Fractional Programming and Its Neural Network Model

Linear fractional programming problem and its linear complementarity formulation is considered. In the literature, uniqueness of a solution of linear fractional programming problem is characterized through strong quasiconvexity. Another characterization of uniqueness through complementarity approach is presented and it is shown that the solution set of a fractional programming problem is convex. Finally a formulation of the complementarity condition as a set of dynamical equations using neural network approach is considered and certain results involving the neural network model are proved. A computational experience is also explored.

Anup Kumar Das

Vertical Linear Complementarity Problem and Its Neural Network Model

Several classes of vertical block matrices and characterization of these matrix classes in the context of vertical linear complementarity problem (VLCP) are considered. A formulation of the complementarity condition as a set of dynamical equations using neural network approach is developed and certain results involving the neural network model are proved.

Anup Kr. Das

Library, Documentation and Information Sciences Division

Documentation, Research and Training Centre (DRTC), Bangalore

The Documentation Research and Training Centre was established as an integral part of the Indian Statistical Institute in 1962. The primary objectives of DRTC are to promote research in the area of Library, Documentation and Information Science.

The main areas of research in which the different members of the DRTC Faculty were engaged during the period, are furnished below:

The study of various methods of knowledge representation, such as, semantic nets, frames, and predicate calculus, etc.

The application of the "Modern scientific management techniques to the planning and management of information system, centers and services.

The study of Internet technology and its applications.

The development of bibliometric and scientometric measures for evaluating the use of library and information services and scientific output respectively

The development of guidelines and software for library house keeping operations, such as, circulation control, service control and acquisition control, etc.

Library, Kolkata

The Central Library of ISI is located in Kolkata with a network extending to other locations. Over the years, the Library has provided exhaustive information sources for academic and research activities of the Institute and has attained the distinction of being one of the richest libraries of the country, particularly in the field of Statistics, Mathematics, Economics, Computer Science and related disciplines. The Library also acts as the Eastern Regional Center Library of National Board for Higher Mathematics (NBHM) since 1989 for which it receives a grant from the NBHM, Department of Atomic Energy, Government of India.

It is an automated library having an excellent collection of books, journals, reports and large number of electronic journals and databases. The Library open seven days a week throughout the year (except on national holidays) and the library staff aims to provide optimum services to the faculty members, scholars, students, visiting scientists and Institute Members as also to scholars from outside.

To enhance the security of the central library, a radio frequency (RF) based Electronic Article Surveillance (EAS) system has been installed and about 35500 tags were pasted to the books in selected subject areas.

To achieve the goals of the Library, following activities were undertaken during the year under report :

Collection Development: The Library maintains an excellent collection of books, journals, reports, rare and special collection, government publications, data-books, theses and other documents/ materials in print and electronic formats. During the year under report, the library accessioned 1112 books out of which 963 were purchased from ISI budget and 94 from NBHM grant, while 55 books were received on complimentary basis. The Library also accessioned 1288 bound volumes of journals and subscribed to 480 scholarly journal titles in print. More than 50 journal titles were received as complimentary. The library received and processed more than 9000 loose issues of journals. It classified and catalogued 1793 new books and filed 5698 computer printed catalogue cards. It also

processed 1327 titles on government reports/data-books etc. Beside this, the library has added a collection of 148 books, mainly in English and Bengali, on literature, humanities, travel, health and recreation in its statistical workers' circulating library totaling its collection to 38100.

In addition to this, the library has about 32000 reprints. Thus the total collection of the library stands at around 310000.

The library has a good collection of electronic resources on different media and has access to several online journals/databases. During the year under report, the library has added 65 CDs & floppies containing books and 32 CDs on statistical data. Thus, the total collection of CDs has risen to 880. The library has provided the online access to about 380 full-text journals. It has renewed the online database like MathSciNet, ScienceDirect, Springer Link through consortia. It has also subscribed to the IEL online of the IEEE/IEE publications, ACM Digital Library and Current Index to Statistics (CIS) on Web. The library has also subscribed to few statistical data sources available on CDs such as Census of India National Sample Survey (NSS) data, Central Statistical Organization (CSO) data, etc.

Publications Exchange Programme : The library maintains the publication exchange programme of 'Sankhya - the Indian Journal of Statistics' with 57 national and 23 international institutions/organizations. The 23 international agencies are from various countries of the world such as Bangladesh, Belgium, Brazil, Canada, China, Taiwan, Croatia, Czech Republic, Denmark, France, Hungary, Italy, Japan, Pakistan, Poland, Romania, Russia, Slovakia, Spain, Switzerland, Thailand, UK, USA. In exchange Library has received 99 titles during the reporting period.

Membership: Membership of the ISI-Library is restricted to persons with post-graduate or equivalent academic qualification, interested in the objectives of the Institute. Faculty members, research scholars, students, research associates, visiting scientists, ISEC trainees, project-linked staff, project assistants, ISI-employees, outside students and the Institute members are eligible for the membership of the Institute Library. However, they have to apply for the membership of the library and receive a bar-coded Library Card. During this period, library membership was given to 325 persons and 980 readers were given special permission to use the library for a short period. Currently the total number of library member rose to 3517. Total number of members including staff, students and research scholars of the Institute rose to 888 in its workers' circulating library.

Services: The ISI-Library, since its inception has been providing a variety of library and information services to its users. The services presently being provided include;

Web-OPAC- Members use this facility to browse and search the database to see the status of a document including their own transactions.

(i) **Lending/Document Delivery Service:** During this period, 140000 books and other documents were issued to the user on loan and reference. Publications from Government of India and other International Organization and data CDs, were issued to users for reference purpose. The library supported 2500 reprint requests for journal articles. It provided email-based reminder services like 7-day advance alert, long overdue notice and check-in information. 20000 books from the workers' circulating library were issued for lending and reference during this period.

(ii) **Inter-library loan:** 7 books and journals were borrowed from other libraries, while 90 books and journals were lent to other libraries.

(iii) **Current Awareness Service:** 12 monthly lists of current additions to the library were made available online.

(iv) **Self-Photocopying Service:** The library provides the Self-photocopying service in its periodical section which is available everyday throughout the library hours. During this period 28500 pages were photocopied from the journals.

Research Activities

(v) **Electronic Document Delivery Service:** Full-text articles and/or bibliographical data were provided through email from online resources. Besides electronic document delivery, 1282 pages of printouts were also supplied against demand.

(vi) **Online Full-Text Access to Journals/ Database:** During the period under review, the library has provided services from more than 400 online journals and major databases like MathSciNet, Econlit, ScienceDirect, Springer Link, IEL Online (IEEE/IEE Electronic Library), ACM Digital Library, CIS on WEB. The online access is available through campus-wide network.

(vii) **Reprographic & Photographic Service:** During the year, it produced more than 4.09 lakhs photocopies of research and academic materials, 32,800 digital copy prints, 9010 photographs (analogue and digital), 9227 graphic designs, 2332 items of computer output (color and B&W), 223 digital scan photos, documents and data capturing on CD. The Division facilitates such services on demand.

(viii) **Documentation Service:** A searchable bibliographic database has been prepared on scientific contributions made by the ISI scientists on all subject fields since 1934. The entries are currently being subjected to editing.

(ix) **General Enquiry Assistance & Consultation Service.**

Special Initiatives:

(i) **Consortia arrangements:** During the reporting year, the Library has further strengthened the consortia initiative to enhance the electronic collection and online access to scholarly resources to cope up with the increasing subscription cost and diminishing budget.

(ii) **Preservation and conservation:** Total 894 books, 300 journals were bound. Lamination and de-acidification of 8 rare books and 3072 pages, fumigation of 578 books, photocopying of 4 rare and out-of-print books were executed during this period.

(iii) **Digitization of ISI Ph.D. Theses:** During this period, a few theses have been digitized and are currently available on compact Disks. These will be made available on the Web after the completion of the work.

Prasanta Chandra Mahalanobis Memorial Museum and Archives

The Museum and Archives carried out regular maintenance programme for the large number of collections of original source materials in respect of life and work of Professor P.C. Mahalanobis and the growth of Indian Statistical Institute. The renovation and repairing of the museum area on the ground floor (eastern side) of Amrapali had been completed and the display of all the exhibits (752 in nos.) through 91 panels had been reinstated with necessary changes and modifications and the museum was again set open for public viewing.

The renovation work on the western side of the building, which was also been undertaken last year, is now complete. A large number of items from the personal belongings of Professor and Mrs. Mahalanobis had been recovered from their residential rooms. A portion of these items had been cleaned, recorded in specified format and stored.

The interior set up of the residential portion of Professor and Mrs. Mahalanobis had been restored and the ground floor on the western side of Amrapali had been converted into a seminar room-cum-exhibition hall. Computerized security system is also being installed in the existing galleries.

Among the archival collections, miscellaneous documents were sorted, listed and recorded. About 16,00 sheets including letters, files, paper cuttings etc., were treated for preservation. The ongoing project for 'Developing Archival Record Management System' completed to implement the

Research Activities

documentation programme of archival collection. About 5000 items have been recorded so far. All the data sheets will soon be transferred to computerized format and archived with network link. The scanning of the original documents also started this year and 1,800 documents had been scanned the year. A suitable web page for museum and archives had been designed and would soon be linked with the library web site of the institute.

Besides the above-mentioned programmes the regular conservation work and CD conversion programme for old audio spools (6 Nos.) and film rolls (3 nos.) has also been carried out.

This year, on the occasion of Platinum Jubilee Celebration of the Institute, the museum had been visited by the Hon'ble Prime Minister of India Dr. Manmohan Singh, Hon'ble Governor of West Bengal Shri Gopal Krishna Gandhi, Hon'ble Chief Minister of West Bengal Shri Buddhadev Bhattacharjee, Hon'ble Union Minister for information and broadcasting Sri Priya Ranjan Das Munshi, Hon'ble Union Minister for Statistics and P.I. Shri G.K.Vasan, eminent historian Dr. Tapan Roy Chowdhuri, Dr. Robert J. Aumann, winner of Nobel Memorial Prize in Economic sciences of 2005 and other distinguished scientists also of national and international repute.

Library, Delhi

Indian Statistical Institute, Delhi Centre, maintains an academic library, which aims to be a leading library in the fields of Mathematics, Statistics, Economics, Econometrics, Operations Research and Statistical Quality Control. An automated library, having an excellent collection of books, journals, CDs, reports, govt. publications and other documents in print and electronic formats. The library caters, mainly to the needs of bonafide students, scholars and staff of the Institute. However, it is also open for reference to academic and research users of other educational and scientific institutions of the city and its neighboring regions. Some of the main activities of the library during the period under review were as under :

Collections : The library purchased 297 books, during the period April 01, 2006 to March 31, 2007 both from the regular and NBHM funds. Received 76 books as gift. Thus raising the stock to 43929 volumes (Books + Journals). During the period under review. 251 titles of journals, both foreign as well as Indian have been approved for renewal.

The library renewed online access to the Elsevier Science journals and Springer-Kluwer journals through the Consortium programme among the three centers of ISI. It has also renewed the Consortium for MathSciNet with the American Mathematical Society and Academic Membership with SIAM. Access to Online databases such as "Current Index to Statistics"(CIS) and "EconLit" has also been renewed.

ISI, Delhi Centre Library acts as NBHM Regional Library. Being the regional library to serve the Northern Region, the library received an additional grant of Rs. 20.00 lakhs from the National Board for Higher Mathematics (NBHM) for strengthening the resources in Mathematics and Statistics.

514 sets of loose issues of periodicals have been bound and added to the stock. Approximately 175 Technical Reports/Discussion Papers in Economics, Mathematics and Statistics have been received in the library from various sources.

Publication Exchange Programme : Exchange program has been established with some of the Scientific Institutions in the Netherlands, China, Korea, Poland, Spain and Vietnam for getting their publications in exchange for our journal "Sankhya"-Indian Journal of Statistics ; "Texts and Readings in Mathematics series" and "Journal of Maulana Azad College of Technology".

Twenty journals, both foreign as well as Indian are being received in the library in exchange as well as gift from various sources.

Research Activities

Membership : During the period, 92 members availed of the lending facilities as permanent members of the library and 550 members were provided reference facilities as temporary members of the library.

Services:

Circulation : More than 3810 books and other documents have been circulated among the members. During the period under review, 10 publications were borrowed on Inter-library loan from the neighboring Institute libraries, 16 books were lent out to other Institutes under the same program.

Reprographic Services : More than 52953 pages have been Xeroxed and made available to both the permanent and temporary members of the library and outsiders. Xerox facilities were also provided to the research scholars of neighboring Institutes under NBHM programme.

Online Full-Text Access to Journals: During the period under review, the library has provided Online services from more than 250 Online journals. These Online journals have been listed on the web with direct access to the publishers web page under the heading "Electronic Journals"

Electronic Document Delivery Service : In addition to Xerox facilities, 76 Full texts articles were provided through email from Online journals under NBHM.

Current Awareness Service : The following lists were brought out regularly from the library :

- (i) Monthly list of current periodicals (Online)
- (ii) New additions (books) Online
- (iii) Current Contents of journals (print form)

Brought out 11 monthly issues of the "Current Contents of Journals", by photocopying the contents page of each journal received at ISI, Delhi Centre library, during a specified period and distributed to 32 departments of Statistics and Mathematics of Universities in the Northern region.

WEB-OPAC : The Users have been given an access to the complete Catalogue of the library holdings through the CATALOG-OPAC. A Web search engine has been provided in the library Home page. Users can use this facility to search the books from the collection of the library book database. The search engine has 3 access points, i.e. Author, Title and Subject.

Library, Bangalore

The Bangalore center library is one of the distinguished libraries in the fields of mathematics, economics, statistical quality control and library and information science. The library caters to the information needs of users including students, teachers, research scholars, visiting scientists, researchers from other institution and employees of the institute.

Recently, the library installed an Electronic Article Surveillance (EAS) system to enhance the security of the library.

The activities of the library during this period are :

Collection : 313 books were purchased and added to the library collection totalling it to 27454. It has received 170 books as complimentary. The total collection of complimentary books in the library is 1851. The library has subscribed to 270 journal titles in this period and received 80 journals as complimentary. The library has 13222 bound volumes of journals in its collection. About 600 books were classified and catalogued during this period.

Consortia Arrangement: The library facilitated access to JSTOR, Spring Link and Science Direct during the period under revised consortium agreement.

Research Activities

Membership : 850 registered user availed of the library facilities during this period.

Circulation: Around 21400 books and periodicals, including loose issues were circulated and around 5400 in house use of books and periodicals were recorded.

Inter Library Loan (ILL): About 63 inter library loan transactions were registered.

Reprographic Service: The library provided 127000 photocopies to the users during the reporting period.

Current Awareness Service : The library has issued a bimonthly list of books, monthly list of current periodicals and current contents of journals.

Special Service

Electronic Access Portal : Dr.S.R.Ranganathan Access Portal to works by and on him has been set up and is available at (<http://www.isibang.ac.in/library/portal/index.htm>)

Center for Soft Computing Research: A National Facility

The Department of Science and Technology (DST), New Delhi has approved the formation of the Center for Soft Computing Research (CSCR): A National Facility under its IRHPA (Intensification of Research in High Priority Areas) scheme in Indian Statistical Institute, Kolkata for an initial period of three years. The center is aimed at conducting research both theoretical and applied, of international standard, in the fields of soft computing.

The objective of the Center (CSCR) is to conduct basic research in pattern recognition, image processing, computer vision, artificial neural networks, genetic algorithms, wavelets, support vector machines, data mining, hybrid techniques, rough sets, video image processing, fractals, etc., and to demonstrate applications to some focused areas like web mining (e.g., page ranking, personalization etc.), bioinformatics (e.g., protein structure analysis), medical image (e.g., ultrasonographic and MRI) analysis, and VLSI layout design.

Research work that has been carried out in the aforesaid line is categorized and described as follows.

Image Processing

A novel histogram thresholding technique based on the beam theory of solid mechanics and the minimization of ambiguity in information is proposed. First, a beam theory based histogram modification process is carried out. This beam theory based process considers a distance measure in order to modify the shape of the histogram. The ambiguity in the overall information given by the modified histogram is then minimized to obtain the threshold value. The ambiguity minimization is carried out using the theories of fuzzy and rough sets, where a new definition of rough entropy is presented. The applications of the proposed scheme in performing object and edge extraction in images are reported and compared with those of a few existing classical and ambiguity minimization based schemes for thresholding. Experimental results are given to demonstrate the effectiveness of the proposed method in terms of both qualitative and quantitative measures.

Sankar K. Pal, Debasis Sen, Pradipta Maji, Ashish Ghosh, B. B. Bhattacharya and Malay K. Kundu

Neural Computation

Developing supervised learning algorithms for spiking neural networks using actual spike trains would go a long way in the realm of machine learning. Actual neuro-biological findings increasingly point towards the mechanism of Synaptic Time dependant plasticity (STDP) for modification of network

Research Activities

weights. Attempts are being made to introduce the STDP mechanism in the supervised learning of spiking neural networks.

Aloke K. Deb and Sushmita Mitra

Bio-informatics

In order to determine functional relationships between groups of genes that are often co-regulated and involved in the same cellular process, gene ordering is necessary. Gene grouping (clustering or ordering or both) provides groups/sequence of genes, where the genes those are functionally related are nearer in the grouping. Application of genetic algorithms for combinatorial optimization of microarray gene order has been addressed. A new nearest neighbor based heuristic has also been developed in this regard. A new similarity measure involving local and global similarity between genes is being investigated for better classification and ordering of genes.

Biclustering or simultaneous clustering of both genes and conditions have generated considerable interest over the past few decades, particularly related to the analysis of high-dimensional gene expression data in information retrieval, knowledge discovery, and data mining. The objective is to find maximal subgroups of genes and subgroups of conditions where the genes exhibit highly correlated activities over a range of conditions. Since these two objectives are mutually conflicting, they become suitable candidates for multi-objective modeling. A novel multi-objective evolutionary biclustering framework has been developed by incorporating local search strategies. A new quantitative measure to evaluate the goodness of the biclusters is designed. The experimental results on benchmark datasets demonstrate better performance as compared to existing algorithms available in literature.

Md. Abdul H. Zahid, Pradipta Maji, Sankar K. Pal, Sushmita Mitra, Haider Banka and Subhra S. Ray

Medical Image Processing

During MR imaging, the image of the object may get deformed due to the slope between the MR probe and the object. It is in general undesirable, particularly for 3D imaging. A novel method is designed to reconstruct the undeformed image of the object by measuring the deformation at the time of the MR scan. The image registration technique coupled with genetic algorithm is used to predict the deformation of the object. The inverse of this deformation is then applied to the image, generating the image that would have been seen had there been no slope with the probe. The proposed algorithm has been tested on a set of brain MR images and shown to remove the deformation and so give improved 3D reconstructions. An attempt is being made for measuring haemoglobin of human blood from its iron stained images using image processing techniques.

Pradipta Maji, Malay K. Kundu and Bhabatosh Chanda

Web Mining

A rough set based ensemble classifier has been introduced to classify web pages. The method considers output of the multiple classifiers and constructs a decision table. It classifies web pages based on rough set attribute reduction and rule generation processes in the meta classifier label. Experimental studies show that it improves classifiers accuracy uniformly over some benchmark corpora. Apart from this by removing redundant classifiers from combination it reduces the CPU load compared to other ensemble classification techniques.

C. A. Murthy, Sankar K. Pal and Suman Saha

Computer and Statistical Services Centre

CSSC manages the central computing facilities of ISI, Kolkata. It serves approximately 700 users. Software packages available at the centre are Oracle, Arc GIS, BMDP, Mathematica, SAS, SHAZAM, S-Plus and TSP. The centre manages the campus-wide network and internet facilities at ISI, Kolkata. The centre also manages the inventory of computers in consultation with the Computer Purchase Committee. The centre provides statistical and numerical consultancy services to scientists and research scholars, including non-ISI scientists. The centre occasionally conducts workshops for training ISI officials on use of computers. The centre organizes courses for North-eastern states of India. Members of CSSC take part in teaching different courses of the institute. They supervise project work of non-ISI students studying MCA, B-Tech.

3. PROJECTS

Internally Funded Projects

Ongoing Projects

Sl. No.	Name of the project	Principal Investigator(s)	Unit(s) involved
Computer and Communication Sciences Division			
1.	Communication Issues in Mobile Networks: (CIM)	B. P. Sinha	ACMU
2.	Power-aware Placement	S. Sur-Kolay	ACMU
3.	Physical Layout of Nonlinear Scan-Path Architecture	B. B. Bhattacharya	ACMU
4.	Sensor Network Management: A Geometric Approach	S. C. Nandy	ACMU
5.	Application of Computational Geometry to Terrain Analysis	S. Das	ACMU
6.	Developing Query Processing Algorithm for Efficient Content Based Image Retrieval	P. Pal	ECSU
7.	Granular Computing for Knowledge Discovery in Bioinformatics	S. Mitra	MIU
8.	Computational Analysis of Biochemical Pathways Related to Gene Activity	R. K. De	MIU
9.	Soft Computing Approach to Protein Folding	A. Ghosh	MIU
Physics and Earth Sciences Division			
1.	Sedimentology and Palaeoclimatology of the Upper Gondwana Succession in the Satpura Basin	S. N. Sarkar	GSU
2.	Sediment Transportation and Deposition under Combined Wave and Unidirectional Currents: Experiments and Theoretical Studies	B. S. Mazumder	PAMU
Biological Sciences Division			
1.	Land use pattern, natural resource inventoring using satellite imagery and technology intervention at eastern plateau and coastal areas of West Bengal	P. Banik	AERU
2.	Study of the microbial succession and changing microbial molecular diversity of a bio-organic composting system	S. Chanda	AERU
3.	Ponds, aquatic weeds and water quality: an investigative study	A. Dewanji	AERU
4.	Adaptability and yield performance of sugar beet (<i>Beta vulgaris</i> L.) varieties in lower Gangetic plains of West Bengal	S. Barik	AERU
5.	Allelopathy in Natural and Manipulated Ecosystems – with reference to root exudates, leaf leachates and fruit pulp	S. Mandal	AERU
6.	Innovative biopesticidal efficacy of some indigenous plants on insect pests	A. Goswami	AERU
7.	Ecology and Physiological studies on the mangroves of Sundarbans	M. Ghosh	AERU

8.	Health and Disease among populations inhabiting contrasting ecological niches	B. Mukhopadhyay, R. Gupta, P. Bharati, S. K. Roy and S. Mukhopadhyay	BAU
9.	A Molecular genetic study of couples with recurrent spontaneous abortions	B. M. Reddy	BAU
10.	Studies on Genetic Epidemiology and Diversity in Indian Populations	P. P. Majumder	HGU
11.	Genetic and epigenetic changes associated with epithelial cell transformation and invasion	B. Roy and S. Sengupta	HGU
12.	Studies on Genomic Diversity and Affinities in Ethnic Populations of Northeast India	P. P. Majumder	HGU
Social Sciences Division			
1.	Combinatorial Auctions and Resource Allocation by the Indian Government	Debasis Mishra and Arunava Sen	Planning Unit, Delhi
2.	Micro Finance in India: Constraints and Possibilities	Prabal Roy Chowdhury and Indrani Roy Chowdhury	Planning Unit, Delhi
3.	Ego-Identity Status During Adolescence & Early Adulthood	Anjali Ghosh	PRU
4.	Spread of Literacy Among The Muslim Women in Bihar: Causative Factors	Atis Dasgupta	SRU
5.	Social Discrimination and The Rural Labour Market	V. K. Ramchandran and Madhura Swaminathan	SRU
SQC & OR Division			
1.	A Survey of approaches to quality improvement in manufacturing organizations	A. K. Chaudhuri	SQC & OR Unit Bangalore
Library, Documentation and Information Sciences Division			
1.	Digitization of Seminar Volumes	Devika P Madalli	DRTC Bangalore

Completed Projects

Sl. No.	Name of the project	Principal Investigator(s)	Unit(s) involved
Applied Statistics Division			
1.	Inferences about Inter-Observer agreement based on the power divergence statistics	Ayanendranath Basu	ASU/BIRU
Computer and Communication Sciences Division			
1.	Parallel Algorithms Related to Fragment Assembly in DNA Sequencing (2004 – 2007)	S. Sur-Kolay	ACMU
2.	Document Analysis	U. Pal	CVPRU
3.	Handwritten Character Recognition	U. Bhattacharya	CVPRU
4.	Natural Language Processing	B. B. Chaudhuri	CVPRU
5.	Speech Analysis and Synthesis	B. B. Chaudhuri	CVPRU
6.	Digital Data Compression and Security	U. Garain	CVPRU
7.	Information Retrieval	M. Mitra	CVPRU

Projects

8.	Image Compression Using BTC-VQ	B. Chanda	ECSU
9.	Discovering Patterns from Large, Complex Data with Applications to Bio-informatics	S. Bandyopadhyay	MIU
10.	Support Vector Machines and Web Page Ranking for Data Mining	C. A. Murthy	MIU
Physics and Earth Sciences Division			
1.	Evolution of the Nallamall Fold Belt – Fault Reactivation and Kinematics in an Intracratonic Fold Belt	D. Saha	GSU
2.	Precambrian Geodynamics in the East Indian Shield: Structural, Petrological and Geochronological Constraints	S. Bhattacharya	GSU
3.	Mesozoic Tetrapod Faunas from the Satpura Basin and Pranhita – Godavari Basin	D. P. Sengupta and S. Bandyopadhyay	GSU
4.	Physicochemical Studies of Self – organized Systems using Surfactant(s)/Co-surfactant(s)/Oil(s) Polar Solvents (Aqueous and Non – aqueous)	B. K. Paul	GSU
5.	Waves on Thin Flowing Film	B. S. Dandapat	PAMU
Biological Sciences Division			
1.	Mathematical Ecology and Epidemiology	J. Chattopadhyay	AERU
Statistical Quality Control and Operations Research Division			
1.	Statistical Modeling and Analysis of Product Warranty	D. K. Manna	SOC & OR Unit Chennai
2.	Quality Seminar at North East	I. Islam	SOC & OR Unit Bangalore
3.	Annual Six sigma Conference and case study presentation	A. K. Chaudhuri	SOC & OR Unit Bangalore
Library, Documentation and Information Sciences Division			
1.	Development of Archival Record Management System	Krishna Bhattacharyya	PCM Museum & Archives, Kolkata

Externally Funded Projects

Ongoing Projects

Sl. No.	Name of the project	Principal Investigator(s)	Unit(s) involved	Funded by
Applied Statistics Division				
1.	Research and Development of some Cryptographic Primitives	Bimal K. Roy	ASU, Kolkata	DIT, Govt. of India
2.	Development of Algorithms for Robust Speaker Identification by Statistical Methodology	Amita Pal	ASU, Kolkata	DIT, Govt. of India

Projects

3.	Visual Cryptographic Schemes	Bimal K. Roy	ASU, Kolkata	ISRO, Govt. of India
4.	Exploratory Paradigms in Visual Cryptography	Bimal K. Roy	ASU, Kolkata	Ministry of Defense, Govt. of India
5.	Accountability of some Traditionally Managed Natural Resources In the Practice of Ethnodietetics and Ethnomedicine	Tapas Samanta	ASU, Kolkata	National Innovation Foundation
6.	Modelling and Prediction of Pressure Time Characteristic of a Solid Rocket Motor	Debasis Sengupta	ASU, Kolkata	Vikram Sarabhai Space Centre
7.	Robust implementation of a variant of the Rijndael (AES)	Palash Sarkar	ASU, Kolkata	Ministry of Defense, Govt. of India
8.	Impact of JPMA, 1987 on Jute Industry, Farmers and Workers	G. M. Saha	BIRU/SQC OR, Kolkata	CPMA
Theoretical Statistics and Mathematics Division				
1.	Improved Genome Annotation through a Combination of Machine Learning and Experimental Methods	Probal Chaudhuri	SMU, Kolkata	CSIR
2.	Development of Bioinformatics Tools and Methods	Probal Chaudhuri	SMU, Kolkata	DBT Govt. of India
3.	Non-Commutative Geometry and Quantum Groups	Debashish Goswami	SMU, Kolkata	INSA
4.	Improved Genome Annotation through a Combination of Machine Learning and Experimental Methods: Plasmodium falciparum as a Case Study	Probal Chaudhuri	SMU, Kolkata, SMU, Delhi	NMITLI Project funded by CSIR
5.	Random geometric graphs	Rahul Roy	SMU, Delhi	DST
6.	Homogeneous Operators	G. Misra	SMU, Bangalore	DST
7.	Extremal structures in Banach spaces	T. S. R. K. Rao, V. Indumathi and B. L. Lin	SMU, Bangalore, Pondicherry University and University of Iowa	DST and NSF
8.	Swarnajayanti fellowship project	B.V. Rajarama Bhat	SMU, Bangalore	DST

Projects

Computer and Communication Sciences Division				
1.	New Techniques of Fast Image Compression Based on Human Vision Systems and Geometric Data Structures	B. B. Bhattacharya and M. K. Kundu	ACMU and MIU	Intel Corporation, USA
2.	Delay Fault Modeling and Test Generation for Power Supply Noise	S. Sur-Kolay	ACMU	Intel Corporation, USA
3.	Development of Robust Document Analysis and Recognition System for Printed Devanagari and Bangla Scripts	B. B. Chaudhuri	CVPRU	DIT, Govt. of India
4.	Cross-Language Information Access System (CLIA)	M. Mitra	CVPRU	DIT, Govt. of India
5.	Online Handwriting Recognition (OHWR) – Bangla	S. K. Parui	CVPRU	DIT, Govt. of India
6.	Computational Intelligence Based Remote Welding System	N. R. Pal	ECSU	BRNS, Govt. of India
7.	Advanced Techniques for Remote Sensing Image Processing	A. Ghosh	MIU	DST, Govt. of India and Govt. of Italy (Ministry of Foreign Affairs and Autonomas Province of Toronto). under India-Toronto programme for advanced research (IPAR)
Physics and Earth Sciences Division				
1.	Mafic Crustal Xenoliths in the Eastern Ghats Belt	S. Bhattacharya	GSU	DST, Govt. of India
2.	Image Processing Technique to study the Particle Behaviour in the Near – Wall Region of Turbulent Open Channel Flow	B. S. Mazumder	PAMU	CSIR, Govt. of India
Biological Sciences Division				
1.	Studies on Environmental and Ecological Aspects of Mangrove Biology	M. Ghosh	AERU	University of Western Sydney, Australia

Projects

2.	Farm household survey (Purulia District) for study of Agricultural Development and Poverty in remote rural villages in Eastern India	P. Banik	AERU	East-West Center, USA
3.	Physical Growth, Body Composition and Nutritional Status of the Bengali School aged children, Adolescents and Young adults of Calcutta, India. Effects of Socioeconomic factors on secular trends.	P. Dasgupta	BAU	NHF, The Netherlands
4.	Single nucleotide polymorphisms: Validation and identification in ethnic populations of India	P. P. Majumder	HGU	Department of Biotechnology, Govt. of India
5.	Molecular genetic studies on Type-2 diabetes and diabetic retinopathy	P. P. Majumder	HGU	Department of Biotechnology, Govt. of India
6.	DNA sequence variation in human populations of India: Assessing the roles of evolutionary history and gene function, with special reference to complex diseases	P. P. Majumder	HGU	Department of Biotechnology, Govt. of India
7.	Polymorphisms in CYP1A1, CYP2E1, NAT drug-metabolizing genes and risk of tobacco-related oral cavity pre-cancer and cancer in India.	B. Roy	HGU	Department of Science and Technology, Govt. of India
8.	Chronic exposure to environmental toxins and risk to human health	S. Sengupta	HGU	Ministry of Environment and Forests, Govt. of India

Projects

9.	Statistical methods for mapping multivariate phenotypes	S. Ghose	HGU	Fogarty International Center, NIH
10.	Statistics in genetic medicine: Developing methods for quantitative trait locus mapping and estimating genotype-environment interactions	S. Ghose	HGU	ICMR
Social Sciences Division				
1.	Valuation of Ecological Services of Wetlands in India	Krishna Mazumdar	ERU	Ministry of Environment and Forests, Govt. of India
2.	Construction and Analysis of Regional Variations of Social Development Indices in India	Buddhadeb Ghosh	ERU	Ministry of Statistics and Programme Implementation, Govt. of India.
3.	Development of Methodology Towards Measurement of Poverty	Manoranjan Pal	ERU	Ministry of Statistics and Programme Implementation, Govt. of India.
4.	Estimating Poverty at District Level – A Methodological Study	Dipankor Coondoo	ERU	United Nations Development Programme
5.	Study on Developing a Methodology for Indexing Railway Fare and Freight Structure to its Operating Cost – Fuel Price	Chiranjib Neogi	ERU	Indian Railways
6.	The Long Term Economic impact of HIV/AIDS Epidemic in India	Sanghamitra Das Abhiroop Mukhopadhyay Tridip Ray	Planning Unit, Delhi	World Bank
7.	Improvement upon Entrance Test using Item Response Theory (IRT)	Anjali Ghosh	PRU and ASU	Indian Institute of Management (IIM), Bangalore
8.	Socio-Economic Conditions of Five Minority Communities in West Bengal	Atis Dasgupta	SRU and BIRU	West Bengal Minorities' Commission, Government of West Bengal

Projects

9.	Development of Data Base for Decentralized Planning in West Bengal : A Case Study in Howrah District, West Bengal	Atis Dasgupta	SRU and ERU	Zilla Parishad of Howrah District, West Bengal
SQC & OR Division				
1.	Improving Quality of Irradiated Cables – A Six Sigma Approach	A. R. Mukherjee	SQC & OR Unit, Kolkata	Nicco Cable, Shyamnagar
2.	Assessing the impact of Jute Packaging Materials Act (JPMA) –1987 on Jute Industry, Workers and Farmers	G. M. Saha	BIRU	Chemicals & Petrochemicals Manufacturers' Association
3.	Supply Chain Management and Operations Research	P. Das	SQC & OR Unit, Kolkata	Khadim's India Limited
4.	SPC & DOE Implementation and Training	V. V. Iyer	SQC & OR Unit, Chennai	Rane Engine Valves Limited, Chennai
5.	Six Sigma Consultancy & Training	D. Sampangi Raman	SQC & OR Unit, Chennai	Hinduja TMT Limited, Bangalore
6.	Design of Experiment Project	D. Sampangi Raman	SQC & OR Unit, Chennai	Centre for Fuel Cell Technology, Chennai
7.	Training on Statistical Methods	Sugata Adhikari	SQC & OR Unit, Kolkata	VSNL
8.	Six Sigma Consultancy and Training	S. M. Subhani	SQC & OR Unit, Hyderabad	Nuclear Fuel Complex, Hyderabad
9.	Consultancy and training, improvement Projects using Six Sigma Methodology, Statistical and Operations Research Methods	A. L. N. Murthy	SQC & OR Unit, Hyderabad	ITC Limited, Paper Boards and Speciality Paper Division, Bhadrachalam
10.	ISO 9000:2000 QMS certification consultancy and training; SPC implementation	S. M. Subhani	SQC & OR Unit, Hyderabad	A.P Foods Limited, Hyderabad
11.	Training and consultancy in discovery research	A. L. N. Murthy	SQC & OR Unit, Hyderabad	Dr Freddy's Laboratories, Research Foundation, Hyderabad

Projects

12.	Estimation of power consumption by the agricultural consumers in Andhra Pradesh	A. L. N. Murthy	SQC & OR Unit, Hyderabad	Andhra Pradesh Electricity Regulatory Commission (APEREC)
13.	SPC Training and implementation	G. Murali Rao	SQC & OR Unit, Hyderabad	ACE Tyres Ltd.
14.	Training and consultancy on TQM deployment	G. Murali Rao	SQC & OR Unit, Hyderabad	Navionics Technologies Pvt. Ltd.
15.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	ACN-ORG MARG, Baroda
16.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	BEML, KGF
17.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	BEML, Mysore
18.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	BEML, Bangalore
19.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	BHEL – Bhopal
20.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Ashok Leyland, Ennore, Chennai
21.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Ashok Leyland, Hosur
22.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Ashok Leyland, Bhandara
23.	Six Sigma training & Implementation	A.K. Chaudhuri	SQC & OR Unit, Bangalore	Ashok Leyland, Alwar
24.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Iran Khodro Company, Iran
25.	Six Sigma Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Ashok Leyland, AEG
26.	Six Sigma Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Ashok Leyland, PD
27.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	L&T, Mysore

Projects

28.	Six Sigma training	A. K. Chaudhuri	SQC & OR Unit, Bangalore	L&T,EmSys, Mysore
29.	Six Sigma training & Implementation	U. H. Acharya	SQC & OR Unit, Bangalore	L G Balakrishnan & Brothers, Coimbatore
30.	Six Sigma Awareness training & ISO 9001:2000 Training	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Macmillan, Bangalore
31.	Six Sigma Awareness training & ISO 9001:2000 Training	E. V. Gijo	SQC & OR Unit, Bangalore	Macmillan, Chennai
32.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	MICO- Bangalore (Adugod)
33.	Six Sigma Implementation	A. R. Chowdhury	SQC & OR Unit, Bangalore	MICO – Nagnathapura
34.	Six Sigma training & Implementation	E. V. Gijo	SQC & OR Unit, Bangalore	MICO – Nasik
35.	Six Sigma training & Implementation	T. S. Rao	SQC & OR Unit, Bangalore	MICO – Jaipur
36.	Six Sigma training & Implementation	A.K. Chaudhuri	SQC & OR Unit, Bangalore	Saint Gobain Coated Abrasives, Bangalore
37.	Six Sigma training & Implementation	A.K. Chaudhuri	SQC & OR Unit, Bangalore	Triveni Engineering, Bangalore
38.	Quality Improvement	S. Roy	SQC & OR Unit, Bangalore	Vikrant Tyres, Mysore
39.	Quality Improvement	B. John	SQC & OR Unit, Bangalore	Progeon, Bangalore
40.	Quality Improvement	B. John	SQC & OR Unit, Bangalore	WIPRO, Bangalore
41.	Quality Improvement	B. John	SQC & OR Unit, Bangalore	ITC, Bangalore
42.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Infosys BPO, Bangalore
43.	Statistical Application in Software Engineering	B. John	SQC & OR Unit, Bangalore	SIEMENS
44.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Nielsen ORG Marg
45.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Nielsen ORG Marg- Eureka
46.	Six Sigma training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	Sasken Technologies
47.	ISO 9001/ QS/ TS 16949- 2002 Audit	A. K. Chaudhuri	SQC & OR Unit, Bangalore	NVT-OC, Bangalore

Projects

48.	QS 9000/ TS 16949-2002 Audit	P. K. Perumallu	SQC & OR Unit, Bangalore	AQA, Bangalore
49.	Six Sigma training	A. K. Chaudhuri	SQC & OR Unit, Bangalore	FAMOR,Iran
50.	Six Sigma Training & Implementation	A. K. Chaudhuri	SQC & OR Unit, Bangalore	TUV academy, Iran-Germany
51.	Six Sigma Training & Implementation	T. S. Rao	SQC & OR Unit, Bangalore	MSKCO, Iran
52.	Statistical Process Control	G. Rabindran	SQC & OR Unit, Bangalore	SKF Bearings
53.	1. Determining Optimal Retailer Compensation norm 2. Estimating pipeline length based on audit estimates of sales and company shipment data 3. Media modeling _ Studying the impact of GRP rating, price, promotion and distribution on sales	P. Mondal	SQC & OR Unit, Bangalore	AC Nielsen, Baroda
54.	Six Sigma Implementation	S. Rath	SQC & OR Unit, Pune	Reliance Industries Limited, Hazira
55.	Six Sigma Implementation	S. Rath	SQC & OR Unit, Pune	Maral Overseas Limited, Indore
56.	Implementation of ISO 14001:2004 Environmental Management Systems standard	S. Rath	SQC & OR Unit, Pune	Technova Imaging Systems Limited
Library, Documentation and Information Sciences Division				
1	NGO Network Gateway for HIV and Health Related Resources	A.R.D. Prasad and Dr. Devika P Madali	DRTC, Bangalore	UNAIDS New Delhi

Completed Projects

Sl. No.	Name of the project	Principal Investigator(s)	Unit(s) involved	Funded by
Applied Statistics Division				
1.	Development of Indigenous Algorithms	Bimal Roy	ASU, Kolkata	SUTECH Security Product services PVT. Ltd.

Projects

2.	Research & Development of Cryptographic Protocols based on Weil and Tate Pairing on Elliptic Curves	Bimal Roy	ASU, Kolkata	DIT, Govt. of India
3.	Universal one-way Hash Family (UOWHF)	Bimal Roy	ASU, Kolkata	Ministry of Defense, Govt. of India
4.	Statistical Classifiers for Encryption Algorithms	Ayanendranath Basu	ASU/BIRU/MIU, Kolkata	DRDO, Govt. of India
Physics and Earth Sciences Division				
1.	Stratigraphic Analysis of the Proterozoic Sequences in the Pranhita – Godavari Valley, South India: Bearing on Proterozoic Evolutionary History of the South Indian Craton	A. K. Chaudhuri	GSU	CSIR Govt. of India
2.	Water Wave Diffraction by Floating and Submerged Bodies	B. N. Mandal	PAMU	CSIR Govt. of India
Biological Sciences Division				
1.	Rice Based Cropping System and Micro Level Studies on Sustainability	P. Banik	AERU	International Rice Research Institute
2.	People's Use of Forest Resources vis-à-vis Impact of Forest Depletion on Livelihood Issues of Local People in the Sikkim Himalaya	B. Mukhopadhyay	BAU	Ministry of Environment and Forests(MOE&F), Govt. of India
3.	Genomic Diversity in the Tribal Populations of AP in the Broader Context of the Peopling of India	B. M. Reddy	BAU	CSIR Govt. of India
Statistical Quality Control and Operations Research Division				
1.	Training on SPC and some handholding exercises	A. K. Chakraborty	SQC & OR Unit, Kolkata	Hindustan Motors
2.	Study and implementation of SPC	A. K. Chakraborty	SQC & OR Unit, Kolkata	Dum Dum Ordnance Factory
3.	Improvement of Productivity in Sales, Clinical & Non-Clinical Cases & Strengthening the Rural Network of Janani.	P. R. Lakshmikanthan	SQC & OR Unit, Delhi	Janani, Patna, Bihar
4.	Six Sigma Master Black Belt Training	D. Sampangi Raman	SQC & OR Unit, Chennai	Satyam Computers
5.	Six Sigma Training	D. Sampangi Raman	SQC & OR Unit, Chennai	Rambal Limited, Chennai

Projects

6.	Measurement System Analysis, 3 rd Edition with Minitab	D. Sampangi Raman	SQC & OR Unit, Chennai	Wheels India Limited, Chennai
7.	Acceptance Sampling & Process Control	D. Sampangi Raman	SQC & OR Unit, Chennai	RITES
8.	Training on Basic Statistics	D. Sampangi Raman	SQC & OR Unit, Chennai	Atsec, Chennai
9.	Six Sigma Consultancy and Training	A. L. N. Murthy	SQC & OR Unit, Hyderabad	Reliance Infocomm Limited, Mumbai
11.	Consultancy on Industrial Experimentation	S. M. Subhani	SQC & OR Unit, Hyderabad	Assam Carbon Products Limited, Hyderabad
12.	ISO 9000:2000 QMS certification consultancy and training; SPC implementation	S. M. Subhani	SQC & OR Unit, Hyderabad	Suryalata Spinning Mills Limited, Kalwakurty
13.	Intensive training on Statistical Methods	A. L. N. Murthy	SQC & OR Unit, Hyderabad	Promantra Synergy Solutions Limited, Hyderabad
14.	Training and consultancy for Drug development and manufacturing	A. L. N. Murthy	SQC & OR Unit, Hyderabad	Dr Reddy's Laboratories, Hyderabad
15.	Training on FMECA and QFD	A. L. N. Murthy	SQC & OR Unit, Hyderabad	Vem Technologies Limited, Hyderabad
16.	Training on Statistical Methods	S. M. Subhani	SQC & OR Unit, Hyderabad	Legal Metrology, Hyderabad
17.	Statistical guidance for drug development and clinical trials	G. S. R. Murthy	SQC & OR Unit, Hyderabad	Bharat Biotech Limited, Hyderabad
18.	Six sigma implementation & training	A. Sarkar	SQC & OR Unit, Mumbai	Feseco Ltd.
19.	Six Sigma implementation & training	A. Sarkar	SQC & OR Unit, Mumbai	Crompton Greaves Ltd.
20.	Six Sigma implementation & training	A. Sarkar	SQC & OR Unit, Mumbai	Larsen & Toubro

North East Projects

Ongoing Projects

Sl. No.	Name of the project	Principal Investigator(s)	Unit(s) involved
Biological Sciences Division			
1.	Studies on the ecology, conservation, propagation, and utilization of palms with special reference to rattans	M. Ghose	AERU
2.	Status of Austro-Asiatic Tribes in the Peopling of India	B. M. Reddy	BAU
3.	Adolescent reproductive health : Biocultural dimensions	S. Mukhopadhyay	BAU
4.	Genetic affinity and diversity among the Adi Tribes of Arunachal Pradesh	T. S. Vasulu	BAU
5.	Health and Disease : Comparison between two Ecological Settings	S. K. Roy	BAU

Completed

Sl. No.	Name of the project	Principal Investigator(s)	Unit(s) involved
Physics and Earth Sciences Division			
1.	River dynamics of the Sub-Himalayan Alluvial Plain in NE India	P. Ghosh and T. Chakraborty	GSU
Social Sciences Division			
1.	Poverty And Household Decisions – An Exploration of Possible Interdependence	Dipankor Coondoo	ERU, Kolkata
2.	Agricultural Growth In Assam Since Independence	Manash Ranjan Gupta	ERU, Kolkata
3.	Techno-Economic Adaptation of the Mizos in Hill Forest Ecology of Mizoram	Aniruddha Chakraborty	SRU, Kolkata

4. SYMPOSIA, CONFERENCES, WORKSHOPS, LECTURES AND SEMINARS ORGANISED

Symposia and Conferences

International Conference on "Environmental & Ecological Statistics with Applications" : Stat-Math Unit, Kolkata, March 21–23, 2007.

International Conference on "Multivariate Statistical Methods – The Legacy of Prof. S.N. Roy" : ASU, at EZCC, Salt Lake, Kolkata, January 28–29, 2007.

26th Annual Conference on "Foundation of Software Technology and Theoretical Computer Science (FSTTCS)" : ACMU, December 11–15, 2006

17th Annual (ISAAC) International Symposium on "Algorithms and Computation" : ACMU at Hotel Taj Bengal, Kolkata, December 18–20, 2006.

International Conference on "Advances in Pattern Recognition 2007" : ECSU, January 02-04, 2007.

International Conference "Computing: Theory & Applications" : CCSD, March 05-07, 2007.

International Conference on "Application of Fluid Mechanics in Industry and Environment" : PAMU, Kolkata, August 28-31, 2006.

National Level Seminar on "Gender Issues and Empowerment of Women" : Social Sciences Division and Biological Anthropology Unit, Kolkata, February 01-02, 2007.

3rd Annual Conference on "Economic Growth and Development" : Planning Unit, New Delhi, December 13-14, 2006.

International Conference on "Social Network Analysis : Theory, Methods and Applications" : SRU and Stat-Math Unit, Kolkata, February 14-15, 2007.

International Conference on "Matrices and Statistics" : SQC & OR Unit, Hyderabad, January 06-07, 2007 in memory of Professor Sujit Kumar Mitra, sponsored by the Department of Science and Technology, Government of India.

International Symposium on "Mathematical Programming for Decision Making: Theory and Applications" : SQC & OR Unit, Delhi, January 10-11, 2007. The inaugural talk on Game Engineering was delivered by Robert J. Aumann, Nobel laureate, from the Hebrew university of Jerusalem, Israel.

2nd International Conference on "Information Systems Security" : CSSC, December 17-21, 2006.

Workshops and Training Programmes

Workshop on "Group Theory" : Stat-Math Unit, Bangalore, December 18, 2006–January 05, 2007.

Training programme on "Research Methodology and Statistical Methods" : Stat-Math Unit, Delhi, July 18–21, 2006.

Workshop on "Multivariate Statistical Methods with Recently Emerging Applications" : ASU, January 23-27, 2007.

Conferences and Seminars

Winter School on "Teaching of Statistics at Undergraduate Level" : ASU, January 08-19, 2007.

North East Training Programme on "Statistics using MS-Excel" : ASU, NERIST, November 21-25, 2006, Nirjuli, Arunachal Pradesh.

North East Training Programme on "Statistical Software for Social Sciences" : ASU, March 13-17, 2007, National Institute of Technology, Silchar, Assam.

International Workshop on "Research Issues in Digital Libraries" : CVPRU, C-DAC, Kolkata; IIT, Kharagpur, December 12-15, 2006.

Workshop on "Digital Library" (for the NorthEast) : CVPRU, ISI, Kolkata and Department of Physics, Mizoram University, Aizawl at Mizoram, March 12-16, 2007.

One-Day Tutorial on "Building Digital Library Using GSDL and Dspace" : CVPRU and Library, December 11, 2006.

Workshop on "Computational Information Processing (under NE Program)" : ECSU, March, 26-28, 2007.

ISI-AU Winter School on "Image Processing and Analysis" : MIU, January 18-22, 2007 at Assam University, Silchar.

Workshop on "Statistical and Computing Methods for Life-Science Data Analysis" : BAU, February 09-14, 2007 at Department of Anthropology, Dibrugarh University, Assam.

Workshop on "Quantitative Analysis of North East Indian Economy" : ERU, December 11-16, 2006 at Assam University, Silchar, Assam.

Workshop on "Demography and Population Dynamics with emphasis on Sampling Survey Methodologies" : PSU, SMU and ERU, October 26-29, 2006, at the Department of Mathematical Sciences, Tezpur University, Assam.

Workshop on "Application of Advanced Multivariate Statistical Tools in Psychological and Educational Researches" : PRU, August 10-11, 2006.

Workshop on "Schedule Design For Psychological and Educational Survey Researches" : PRU, December 08, 2006.

Instructional Workshop on "Social Network Analysis": SRU and SMU, Kolkata, February 09-13, 2007.

Workshop on "Dalit Households in Village Economies" : SRU, February 22-23, 2007.

A workshop on "Singular Value Decomposition and its applications" : SQC & OR Unit, Hyderabad, February 19-23, 2007 sponsored by Department of Science and Technology, Government of India.

A Two-week workshop on "Statistical Methods and concepts in drug development for Dr. Reddy's Laboratories Limited" : SQC & OR Unit, Hyderabad, May 2006 .

A Six-month intensive programme on "Statistical Tools and Techniques for Product and Process Improvement – an approach towards Six Sigma excellence" : SQC & OR Unit, Hyderabad at ITC Limited, Paper Boards and Specialty Paper Division, Bhadrachalam, April-September 2006. Another intensive programme on "Statistical Methods to BPO executives at Promantra Synergy Solutions Limited", March-September 2006.

Conferences and Seminars

Two-day workshop on "Failure Mode Effect and Criticality Analysis (FMECA)" to the executives of Vem Technologies Limited : SQC & OR Unit, Hyderabad, June 2006.

Two Master Black Belt training programs were organized by SQC & OR Unit, Bangalore, October 09, 2006 and January 20-31, 2007.

Two Black Belt General programs were organized by SQC & OR Unit, Bangalore, June 05-12, August 21-28, November 20-26, 2006 and January 12-19, 2007.

One Six Sigma Green Belt General Program, March 12-16, 2007 by SQC & OR Unit, Bangalore.

One Six Sigma Green Belt Training Program, April 06-08, 2006 by SQC & OR Unit, Mumbai at SIPL

One Six Sigma Awareness Training Program, April 10, 2006 by the SQC & OR Unit, Mumbai at L&T Faridabad.

One Six Sigma Black Belt General Program – final phase was conducted during April 17-19, 2006 by SQC & OR Unit, Mumbai.

One Six Sigma Black Belt General Program – first phase was conducted during June 12-17, 2006 by SQC & OR Unit, Mumbai.

One Six Sigma Green Belt General Program was conducted during October 09-13, 2006 by the SQC & OR Unit, Mumbai.

One Six Sigma Black Belt General Program was conducted during December 2006-March 2007 by SQC & OR Unit, Mumbai.

One Training Program on SPC was conducted during April 20-22, 2006 by SQC & OR Unit, Mumbai at Feseco, Pondicherry.

Two Six Sigma Green Belt Training Programs were conducted at L&T Mumbai during May 02-06, and July 5-6 and July 17-19, 2006 by SQC & OR Unit, Mumbai.

One Six Sigma Black Belt Training Program was conducted during July 12-13, 2006 by SQC & OR Unit, Mumbai at BHEL.

Four Six Sigma Awareness Training Programs were conducted by SQC & OR Unit Mumbai on July 14, 2006 at L&T Chennai during September, 2006 at L&T Sales, Calcutta during December, 2006 at L&T Sales, Delhi and Enercon India Ltd.

Two Six Sigma Green Belt Training Programs were conducted during September, 2006 at L&T EBG and February, 2007 at L&T Mumbai by SQC & OR Unit, Mumbai.

One training programme on Data Analysis for service sector at Enercon India Ltd. was organized by SQC & OR Unit, Mumbai during December, 2006.

One training programme on Design of Experiments at HCC Ltd. was organized by SQC & OR Unit, Mumbai during March, 2007.

One training programme on Applications of Statistical Techniques in Textile Industry at Nagajyoti university, Guntur was organized by SQC & OR Unit, Coimbatore during December 18-20, 2006.

One training programme on Statistics in Industrial Applications at Department of Statistics, Bharathiar University was organized by SQC & OR Unit, Coimbatore during December, 2006.

Conferences and Seminars

One-Day Awareness Programme on Six Sigma was conducted at M/s Salzer Electronics at Coimbatore on August 26, 2006 by the SQC & OR Unit, Coimbatore.

A Promotional programme on FMEA was conducted at Coimbatore Productivity Council for the Top level and Middle management on July 26, 2006 by the SQC & OR Unit, Coimbatore.

One Six Sigma Black Belt training programme in four modules was conducted for the executives of Reliance Infocomm Limited, Mumbai during April-October 2006 by the SQC & OR Unit, Hyderabad.

One Training programme on Measurement Systems Analysis was conducted by the SQC & OR Unit, Hyderabad at Legal Metrology during April 21-22, 2006.

Two-day In-house training on Six Sigma Black Belt was conducted at Nuclear Fuel Complex during December 21-22, 2006 by the SQC & OR Unit, Hyderabad.

One-day training on Six Sigma was conducted at Bharat Dynamics Ltd. on September 20, 2006 by the SQC & OR Unit, Hyderabad.

One-day training on Quality improvement Tools was organised at Engineering Staff College of India on September 25, 2006 by the SQC & OR Unit, Hyderabad.

Training was provided for the executives and staff of VSNL from different regions across the country on Statistical tools & Techniques for continual improvement by the SQC & OR Unit, Kolkata during the year in twenty batches.

A half-day training programme on Six Sigma Awareness was organized for the senior executives of MIDHANI, Hyderabad on February 16, 2007 by the SQC & OR Unit, Hyderabad.

One 3-day SPC programme was conducted for the executives of M/s. ACE Tyres Ltd. as a part of SPC implementation during February-March 2007 by the SQC & OR Unit, Hyderabad.

Four programmes each of 2 days duration on TQM were conducted during February-March 2007 at M/s. Navionics Technologies Pvt. Ltd. as a part of TQM deployment by the SQC & OR Unit, Hyderabad.

One-Day Promotional Awareness programme on Statistical Techniques was conducted in Spinning Mills at Textile Testing Development Centre, Madurai on September 09, 2006 by the SQC & OR Unit, Coimbatore.

One-Day Awareness programme in Six Sigma for Executives in M/s Shri Ramalinga Mills, Aruppukottai was conducted on October 06, 2006 by the SQC & OR Unit, Coimbatore.

A Two-Day Refresher programme was conducted in Premier Fine Yarn for the Green Belt and Black Belt participants during December 27-28, 2006 by the SQC & OR Unit, Coimbatore.

One-day Awareness programme on 'Six Sigma Methodologies' in Indian Telephone Industries was conducted on November 06, 2006 by the SQC & OR Unit, Coimbatore.

One-Day workshop on Achieving Process Excellence in Garment Industry in co-ordination with the 'MICROSOFT' was conducted on November 30, 2006 at Tirupur by the SQC & OR Unit, Coimbatore.

Promotional training was conducted for Bharathiar University on practical use of Statistical Methods in Quality Improvement in industry during December 2006-January 2007 by the SQC & OR Unit, Coimbatore.

Conferences and Seminars

A two-day Training programme on Internal Quality Audit to M/s Elgi Electric Industries, Coimbatore was organised by the SQC & OR Unit, Coimbatore during March 13-14, 2007.

One general training programme was conducted by the SQC & OR Unit, Coimbatore on Six Sigma Green Belt and Black Belt during October-December, 2006.

One Month Part Time Program on Six Sigma Green Belt was organized by the SQC & OR Unit, Chennai during May 04-June 09, 2006.

Part Time Programs on Six Sigma Black Belt were organized in two batches by the SQC & OR Unit, Chennai – one during August 24-November 06, 2006 and the other during November 27, 2006-March 23, 2007.

Another Part Time Program on Six Sigma Black Belt is being organized by the SQC & OR Unit, Chennai which started from January 17, 2007.

A three-day Program on Minitab for Six Sigma was organized by the SQC & OR Unit, Chennai during June 19-21, 2006.

A three-day Program on Design of Experiments was organized by the SQC & OR Unit, Chennai during July 12-14, 2006.

A five-day Program on Six Sigma Green Belt was organized by the SQC & OR Unit, Chennai during July 17-21, 2006.

One Week-end Program on Six Sigma Master Black Belt was organized by the SQC & OR Unit, Chennai during July 08-October 03, 2006.

A Week-end Program on Six Sigma Master Black Belt is being conducted by the SQC & OR Unit, Chennai which started from January 20, 2007.

One more Week-end Program on Six Sigma Green Belt is being conducted by the SQC & OR Unit, Chennai which started from February 18, 2007.

A two-day Orientation Programme on Six Sigma in Software was conducted at Skytech Solutions, Kolkata by the SQC & OR Unit, Kolkata during December 6-7, 2006 .

Four one day sessions on Six Sigma awareness was conducted at Ashok Leyland, Chennai, Hosur, Bhandara & Alwar during December 2006 by the SQC & OR Unit, Bangalore.

A one-day Top Management Program on "Process Excellence through Six-Sigma Methodology" for the Senior Management Personnel of IKCO, Iran was conducted by the SQC & OR Unit, Bangalore in July, 2006.

A Six Sigma Black Belt Certification Programme was conducted by the SQC & OR Unit, Baroda during January 05-April 30, 2007.

One two-day training programme on Basic Statistics and data Analysis was conducted by the SQC & OR Unit, Delhi during May 12-13, 2006 for the executives of Thomson Press (INDIA) Ltd. Faridabad.

The SQC & OR Unit, Delhi also conducted one day Awareness Programme on Six Sigma on August 01, 2006 and a four-day Six Sigma Green Belt Training Programme in September 2006 at BPL Display Devices, Sahibabad.

Conferences and Seminars

Several training programmes were conducted by different SQC & OR Units for L & T, Mysore; Sanmar, Trichy; L.G. Bafakrishnan & Bros. Coimbatore; BHEL, Bhopal; BEML & Ashok Leyland, Chennai and other Industries like EmSys, Macmillan India Ltd. SIEMENS, NIELSEN, Triveni Engineering, Toyota Kirloskar Motors, MICO, L&T (units located at other places), etc. and also for Iran Khodro, Iran, TUV Academy – Iran, Farnor, Iran.

Workshop on "Metadata and Data Standards for e-Governance Applications" was organised by DRTC, Bangalore on June 09, 2006.

Tutorial on "Building Digital Repositories using Open Source Software" organised by Library, Kolkata and CVPRU during December 12 – 15, 2006.

Tutorial on "Building Digital Repositories using Open Source Software" by Library, Kolkata and ICSSR, New Delhi during February 27-28, 2007.

Workshop on "Consortia Based Subscription of Online Resources (CBSOR)" was organized by Library, Kolkata during March 30, 2007.

Workshop on "Open Source Software and digital Libraries" was organized by Library, Bangalore Centre during March 16, 2007 at Department of Library and Information Science, Bangalore University.

Workshop on "Consortia Models: Issues and Challenges" was organized by Library, Bangalore Centre on March 21, 2007 at Department of Library and Information Science, Bangalore University.

National Workshop on "Support Vector Machines (NWSVM)" : CSCR November 09-11, 2006.

Spring School on "Soft Computing: Advances and Applications (SCAA)" : CSCR, March 13-16, 2007.

Workshop on "Statistical Data Analysis using SPSS" : CSSC, at Department of Statistics, Guahati University, Guahati, Assam, August 01-05, 2006.

Workshop on "Computerized Statistical Analysis of Biological Data" : CSSC, at Department of Statistics, Manipur University, Imphal, Manipur, December 12-16, 2006.

One day workshop on "Data Security" : CSSC at IEEE Kolkata Section to celebrate 60 Years of IEEE Computer Society, December 05, 2006.

Lectures and Seminars

P.C. Mahalanobis Memorial Lectures

During the year under review, Professor Donald Michael Titterington, University of Glasgow, UK delivered the P.C. Mahalanobis Memorial lectures at the Institute's Headquarters at Kolkata and its centres at Delhi and Bangalore on the following topics :

- i) Pearson the Elder -- A Statistical Giant.
- ii) Variational approximations in incomplete data problems.
- iii) Neural networks and the interface with statistics.

It may be mentioned that P.C. Mahalanobis Memorial Lectures started in the year 1983 and Professor S. Karlin, Stanford University, USA delivered the first set of lectures. Thereafter, lectures were delivered by Professor T.W. Anderson, Stanford University, USA in 1985; Sir David Cox, Imperial College of Science & Technology, UK in 1988; Professor Peter G. Hall, Australian National University, Australia in 1992; Professor A. P. Dawid, University College London, UK in 1995; Professor James Berger, Duke University, USA in 1997; Professor C. F. Jeff Wu, University of Michigan, USA in 1999; Professor Ildar Ibragimov, The Mathematical Institute, Russian Academy of Sciences in 2000;

Conferences and Seminars

Professor Peter McCullagh, University of Chicago, USA in 2001; Professor Keith J. Worsley, McGill University, Canada in 2003; Professor Ulf Grenander, Brown University, USA in 2004 and Professor Michael S. Keane, Wesleyan University, USA in 2006.

As a part of Platinum Jubilee celebrations of the Institute a three-day lecture series was organized by the SOC& OR Unit, Kolkata during December 20-22, 2006. Prof. Min Xie of National University of Singapore delivered lectures on 'Statistical Monitoring of near-Zero-defect processes, some extended Weibull distributions and its applications in Reliability and Software Reliability models and applications'.

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Abhyankar S., Shreeram, Mathematics Department, Purdue University (December 04-08, 2006) : *Jacobian Problem.*

Basak, Tathagata, University of California at Berkeley, USA (September 12, 2006) : *A curious reflection group and the Monster.*

Bhamidi, Shankar, University of California, Berkeley (January 03, 2007) : *Flows through Random Networks: Some Probabilistic and Statistical Problems.*

Bhattacharya, Rabi, University of Arizona (January 18, 2007) : *Navier-Stocks Equation: A Probabilistic Approach.*

Bhattacharyya, Tirthankar, Department of Mathematics, Indian Institute of Science (May 15, 2006) : *Model Theory: Then and Now.*

Biswas, Indranil, School of Mathematics, Tata Institute of Fundamental Research, Mumbai (October 10, 2006) : *The fundamental group-scheme of Nori.*

Chakraborty, Santanu, University of Texas, Pan American (January 04, 2007) : *Global Solutions for a semilinear equation arising from an interesting branching Markov process.*

Chatterjee, Raghunath, Indian Institute of Chemical Biology, Jadavpur (September 08, 2006) : *Unsupervised detection and assessment of statistical significance of Genomic Islands in pathogenic micro-organisms.*

Dani, S. G., School of Mathematics, Tata Institute of Fundamental Research, Mumbai (October 23, 2006) : *Locally compact groups with dense orbits under commuting groups of automorphisms.*

Ghosh, Anil K., Australian National University, Canberra (September 18, 2006) : *Error rate estimation and bandwidth selection in nonparametric classification.*

Ghosh, Arka P., Iowa State University, USA (June 08, 2006) : *Optimal Controls for Stochastic Networks in Heavy Traffic.*

Ghosh, Souvik, Cornell University, USA (January 15, 2007) : *Phase Transition of Memory in Moving Average Processes: LDP and Long Rare Segments.*

Jana, Nabin Kumar, Bijoy Krishna Girls' College, Howrah (July 31, 2006) : *Models similar to GREM.*

- Kibria, B. M. Golam, Florida International University, University Park, USA (July 19, 2006) : *Matrix-distribution and its applications in the predictive inference for multivariate elliptically contoured error models.*
- Lin, Bor-Luh (Peter), University of Iowa, USA (February 05, 2007) : *On the rotundity of Banach spaces.*
- Madiman, Mokshay, Tata Institute of Fundamental Research, Mumbai and Yale University (March 08, 2007) : *Entropy power inequalities and monotonicity in central limit theorems.*
- Mosler, Karl, Universitaet zu Koeln, Germany (March 12, 2007) : *Stochastic ordering by distribution regions.*
- Mukherjee, Himadri Kumar, North-East Hill University (April 21, 2006) : *PL and Topological homeomorphism classifications of manifolds homotopy equivalent to a given manifold of dimension 5.*
- Omeika, Marek, Charles University in Prague, Czech Republic (November 20, 2006) : *Second order asymptotic properties for some M-estimators and R-estimators in linear models.*
- Pach, Janos, City College, CUNY, Renyi institute and NYU, USA (January 22, 2007) : *Hypergraph coloring and Frequency Allocation.*
- Pal, Jayanta, University of Michigan, Ann Arbor, USA (June 02, 2006) : *Estimation of Polya Frequency using ICM algorithm.*
- Pal, Soumik, Cornell University, USA (January 11, 2007) : *Interacting Brownian Motions and the Distribution of Equity Capital.*
- Rao, Ravi A., School of Mathematics, Tata Institute of Fundamental Research, Mumbai (March 19, 2007) : *Projective modules over polynomial rings and affine algebras.*
- Rao, Ravi A., School of Mathematics, Tata Institute of Fundamental Research, Mumbai (March 20, 2007) : *Linear algebra over commutative rings.*
- Rao, Ravi A., School of Mathematics, Tata Institute of Fundamental Research, Mumbai (March 22, 2007) : *Group structure on orbit spaces of unimodular rows.*
- Rao, Ravi A., School of Mathematics, Tata Institute of Fundamental Research, Mumbai (March 23, 2007) : *Completing unimodular rows via special forms.*
- Rao, Ravi A., School of Mathematics, Tata Institute of Fundamental Research, Mumbai (March 27, 2007) : *Projective generation of ideals.*
- Ray, Urmie, Universite de Reims, Reims, France (March 27, 2007) : *Infinite dimensional Lie algebras.*
- Ray, Urmie, Universite de Reims, Reims, France (March 28, 2007) : *Automorphic dimensional Lie algebras.*
- Roy, Anindya, University of Maryland at Baltimore County, USA (August 14, 2006) : *Nonparametric Bayesian Estimation of the Positive False Discovery Rate.*
- Roy, Parthaniil, Cornell University, USA (May 23, 2006) : *Maharam Extension Theorem for Z^d actions.*
- Sarkar, Deepayan, Fred Hutchinson Cancer Research Centre, Seattle, Washington, USA (March 05, 2007) : *Significance of Optional Map Alignments.*

Conferences and Seminars

Sarkar, Siddhartha, Institute of Mathematical Sciences (IMSc), Chennai (January 17, 2007) : *Finite p-Group Actions on Riemann Surfaces.*

Sen, Bodhisatva, Department of Statistics, University of Michigan, Ann Arbor, USA (September 11, 2006) : *Resampling and Likelihood based Confidence Intervals in some non-regular problems.*

Shah, Riddhi, School of Mathematics, Tata Institute of Fundamental Research, Mumbai (December 28, 2006) : *Some properties of semi-stable measures on p-adic vector spaces.*

Sinha, Kalyan B., Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore (December 21, 2006) : *Quantum Mechanics – Its impact on Modern Mathematics.*

Vittal, P. R., Department of Statistics, University of Madras, Chennai (February 19, 2007) : *Combinants, Bell Polynomials and Applications.*

Waldschmidt, Michel, Institut de Mathematiques de Jussieu Universite Pierre et Marie Curie (Paris VI), France (November 23, 2006) : *An introduction to diophantine analysis and transcendental number theory.*

Stat-Math Unit, Delhi

Bandyopadhyay, Antar, Chalmers University, Gothenberg (May 30, 2006) : *Recursive distributional equations and recursive tree processes.*

Chanda, Kamal, Texas Tech University, USA (December 18, 2006) : *Central limit theorem for nonlinear stationary processes.*

Deshpande, Jayant V., University of Pune, Pune (November 10, 2006) : *Nonparametric tests for perfect judgement rankings.*

Deshpande, Jayant V., University of Pune, Pune (November 14, 2006) : *Some load sharing models for reliability and inference for them.*

Dey, Dipak K., University of Connecticut, USA (December 20, 2007) : *Hierarchical Bayesian analysis of genetic diversity in geographically structured populations.*

Gupta, Rashi, University of Helsinki, Finland (March 21, 2007) : *Problems with gene expression data and solutions under the Bayesian framework.*

Jana, Nabin, Bijoy Krishna Girls' College, West Bengal (October 18, 2006) : *Generalized random energy model and some open problems.*

Karandikar, Rajeeva, Cranes Software International Limited, Bangalore (January 29, 2007) : *Importance of randomness in cryptography.*

Katona, G. G., Alfred Renyi Institute of Mathematics and Hungarian Academy of Sciences, Hungary (December 13, 2006) : *Forbidden configurations on the boolean lattice.*

Nadkarni, M. G., University of Bombay, Mumbai (October 11, 2006) : *Did Cantor show the seed of measure and integral?*

Nadkarni, M. G., University of Bombay, Mumbai (October 12, 2006) : *What is ergodic theory about?*

Narasimhan, M. S., Tata Institute of Fundamental Research, Bangalore (February 13, 2007) : *Affine Kac-Moody algebras and Riemann surfaces.*

Conferences and Seminars

- Prakasa Rao, B. L. S., University of Hyderabad, Hyderabad (September 26, 2006) : *Instrumental variable estimation for linear stochastic differential equations driven by fractional Brownian motion.*
- Prakasa Rao, B. L. S., University of Hyderabad, Hyderabad (September 27, 2006) : *Some stochastic inequalities and stochastic identities.*
- Rajput, Balram, University of Tennessee, USA (December 22, 2006) : *Uniform comparison of tail probabilities of (Non-symmetric) random vectors and their symmetrized counterparts with applications.*
- Rodriguez, Alfonso Montes, University of Sevilla, Spain (March 28, 2007) : *Cyclic composition operators.*
- Sethuraman, Jayaram, Florida State University, USA (February 06, 2007) : *Nonparametric Bayesian methods - I.*
- Sethuraman, Jayaram, Florida State University, USA (February 07, 2007) : *Nonparametric Bayesian methods - II.*
- Shah, Riddhi, Tata Institute of Fundamental Research, Mumbai (October 17, 2006) : *Operator-semistable, operator semi-selfdecomposable probability measures and related nested classes on p -adic vector spaces.*
- Thangavelu, S., Indian Institute of Science, Bangalore (November 21, 2006) : *Random matrices and orthogonal polynomial - I.*
- Thangavelu, S., Indian Institute of Science, Bangalore (November 22, 2006) : *Random matrices and orthogonal polynomial - II.*
- Titterton, Donald M., University of Glasgow, UK (January 22, 2007) : *Variational approximations in incomplete-data problems.*

Stat-Math Unit, Bangalore

- Alhreya, Jayadev, Yale University, USA (March 13, 2007) : *Borel-Cantelli Laws and Geometry of Numbers.*
- Alhreya, Jayadev, Yale University, USA (July 27, 2006) : *Recurrence properties of $SL(2, R)$ actions.*
- Alhreya, Krishna, Iowa State University, USA (January 11, 2007) : *Preferential Attachment Random Graph with General Weight Function.*
- Balasubramanian, R., Institute of Mathematical Sciences, Chennai (March 29, 2007) : *Combinatorics and Arithmetic.*
- Barma, Mustansir, Tata Institute of Fundamental Research, Mumbai (February 20, 2007) : *Driven Diffusive Systems.*
- Barma, Mustansir, Tata Institute of Fundamental Research, Mumbai (February 22, 2007) : *Clustering of Particles subject to Fluctuating Forces.*
- Bharali, Gautam, Indian Institute of Science, Bangalore (September 20-21, 2006) : *Recent advances in the spectral Nevanlinna-Pick interpolation problem: background and new result.*
- Bhatnagar, Shalabh, Indian Institute of Science, Bangalore (April 20, 2006) : *A simulation based algorithm for infinite horizon discounted cost Markov decision processes.*

Conferences and Seminars

- Bhattacharya, Rabi, University of Arizona, Tucson, USA (January 09, 2007) : *Anomalous Diffusions and Super-Diffusivity in Transport in Composite Media.*
- Biswas, Animikh, University of North Carolina at Charlotte, USA (May 15, 2006) : *Commutant lifting in univariate and multivariate setup.*
- Biswas, Indranil, Tata Institute of Fundamental Research, Mumbai (March 28, 2007) : *Thea characteristics and automorphisms.*
- Borkar, V. S., Tata Institute of Fundamental Research, Mumbai (November 14, 2006) : *Ergodic control of diffusion processes.*
- Chakraborty, Parthasarathy, Institute of Mathematical Sciences, Chennai (March 28, 2007) : *Kadison-Kaplansky Conjecture for free groups.*
- Chakraborty, Parthasarathy, Institute of Mathematical Sciences, Chennai (March 28, 2007) : *Kadison-Kaplansky Conjecture for free groups.*
- Chebolu, Sunil, University of Washington, USA (May 30, 2006) : *Stable homotopy theory-A gateway to modern mathematics.*
- Dabeer, Onkar, Tata Institute of Fundamental Research, Mumbai (February 13, 14, 2007) : *Topics in Sensor Networks -- An overview & Signal Parameter Estimation with 1-Bit Precision Sensors.*
- Dalawat, C. S., Harish-Chandra Research Institute, Allahabad (February 06, 2007) : *Congruent Numbers.*
- Datta, Basudeb, Indian Institute of Science, Bangalore (November 30, 2006) : *Minimal triangulations of non-simply connected manifolds.*
- Dey, Santanu, Ernst-Moritz-Arndt Universität Greifswald, Germany (February 20, 2007) : *Liftings and CP maps.*
- Karandikar, Rajeeva, Cranes Software International Limited, Bangalore (October 17, 2006) : *Introduction to Cryptology.*
- Kasturirangan, Rajesh, National Institute of Advanced Studies, Bangalore (November 17, 2006) : *Thinking is believing.*
- Majumdar, Anita, Indian Institute of Science, Bangalore (October 12, 2006) : *On the Gerstenhaber algebra structure of dialgebra cohomology.*
- Naviarekallu, Tejaswi, California Institute of Technology, USA (October 26, 2006) : *Tamagawa conjecture for Artin representations.*
- Oksendal, v, University of Oslo, Norway (January 17, 2007) : *HJB equations for stochastic differential games and applications to risk minimizing portfolios.*
- Pisier, Gilles, University of Paris VI, France and Texas A&M, USA (December 28, 2006) : *Joint unitarizability and amenability for groups or operator algebras.*
- Prakash, Gyan, Harish-Chandra Research Institute, Allahabad (June 23, 2006) : *Structure of large sum-free sets of finite abelian group of type III.*

Conferences and Seminars

Rajput, Balram S, University of Tennessee, USA (January 08, 2007) : *Uniform Comparison of Tail Probabilities of (Non-Symmetric) Random Vectors and their Symmetrized Counterparts with Applications.*

Ramadoss, Ajay, University of Oklahoma, USA (August 10, 2006) : *Some applications of the big chem classes.*

Ramakrishnan, Dinakar, California Institute of Technology, USA (December 29, 2006) : *Introduction to the Langlands program.*

Sarkar, Sucharit, Princeton University, USA (January 04, 2007) : *Knot Floer Homology.*

Schott, Rene, Institut Elie Cartan University of Heri Poincare, France (October 05, 2006) : *Dynamic random walks.*

Seshadri, Harish, Indian Institute of Science, Bangalore (September 13, 2006) : *Ricci flow and the Poincare conjecture.*

Sethuraman, Sunder, Iowa State University, USA (December 22, 2006) : *Ergodicity in nonhomogeneous Markov chains and diffusive limits in a stochastic interacting particle system.*

Shorey, T. N., Tata Institute of Fundamental Research, Mumbai (September 28 and October 03, 2006) : *Prime divisors of products of integers in arithmetic progression.*

Shrihari, S., Institute of Mathematical Sciences, Chennai (June 23, 2006) : *Hyperbolic complex dynamics on Julia sets.*

Skalski, Adam, University of Nottingham, UK (December 21, 2006) : *Wold decomposition for product systems of C^* -correspondences.*

Sundaresan, Rajesh, Indian Institute of Science, Bangalore (September 07, 2006) : *Guessing under source uncertainty.*

Tandon, Rajat, University of Hyderabad, Hyderabad (December 27, 2006) : *Bernstein-Kazdan's work on representations of $GL(n)$ -totally disconnected case – Lecture I.*

Thangavelu, S., Indian Institute of Science, Bangalore (November 09, 2006) : *Heat kernel transform on a nilmanifold.*

Titterton, Donald M., University of Glasgow, UK (February 01, 2007) : *Variational approximations in incomplete-data problems.*

Venkataramana, T. N., Tata Institute of Fundamental Research, Mumbai (December 13, 2006) : *Cohomology of locally symmetric spaces and restriction maps.*

Viswanath, S., University of California at Davis, USA (November 29, 2006) : *Hall-Littlewood polynomials for Kac-Moody algebras.*

Yadav, Manoj Kumar, Harish-Chandra Research Institute, Allahabad (December 11,15, 2006) : *Finite groups with many product conjugacy classes.*

Applied Statistics Division

Applied Statistics Unit

Banerjee, T., Indian Institute of Management, Ahmedabad (March 15, 2006) : *Analysis of Mixed Binary-continuous Outcomes: Binary outcomes misclassified and covariates subject to measurement error.*

Chakraborty, B. V. P., Cadila Pharmaceuticals, Ahmedabad (February 06, 2007) : *Statistical analysis of clinical data: a cancer trials perspective.*

Chatterjee, N., National Cancer Institute, NIH, DHHS (January 16, 2007) : *Recent developments in semi-parametric methods for analysis of case-control studies in genetic epidemiology.*

Kwon, Y., Department of Information & Communication Engineering, South Korea (March 27, 2007) : *An Extension of BGP Algorithm for End-to-End Traffic Engineering.*

Majumdar, D., Texas State University, San Marcos, USA (December 19, 2006) : *Statistical Interaction: Concept and application in the social sciences.*

Mehta, C. R., Cytel Software Corporation and Harvard University, USA (January 09, 2007) : *Flexible adaptive clinical trials in the pharmaceutical industry.*

Mukhopadhyay, I., Department of Statistics, Burdwan University (March 20, 2007) : *Evaluation and comparison of gene clustering methods in microarray analysis.*

Pal, J., University of Michigan (July 06, 2006) : *Penalized likelihood ratio based confidence intervals for the spiking problem.*

Rajagopalan, S., Ahmedabad (February 02, 2007) : *Introduction of Educational Initiatives.*

Roy Choudhury, A., University of Washington, Seattle (September 26, 2006) : *Likelihood estimation of evolutionary tree from genetic data.*

Roy, Chowdhury, K. U. C. C., Cork, Ireland (August 08, 2006) : *The asymptotic distribution of an algebraic estimator of the strain tensor.*

Bayesian and Interdisciplinary Research Unit

Agarwal, Deepak, Yahoo! Research Labs, Santa Clara, California, USA (January 11, 2006) : *Estimating rates of rare events in massive web applications.*

Biswas, Suddhendu, University of North Texas Health Science Center, Fort Worth, TX, USA (February 08, 2007) : *On an Empirical Bayes Estimator for the BLUE of HIV Population Based on CD-4 Cell Count.*

Mukherjee, Dipti Prasad ECSU, ISI (March 22, 2007) : *Image Segmentation and Object Tracking using Active Contour.*

Nandy, Rajesh Ranjan, University of California at Los Angeles, USA (December 21, 2006) : *A novel Receiver Operating Characteristic (ROC) method in functional MRI using real data.*

Roy, Anindya, University of Maryland at Baltimore County, Maryland, USA (August 10, 2006) : *Sample Size Determination for Hierarchical Longitudinal Designs with Differential Attrition Rates.*

Saha Ray, Rita, BIRU (December 07, 2006) : *Critical Sets in Mutually Orthogonal Latin Squares.*

Sen, Bodhisatva, University of Michigan, Ann Arbor, Michigan, USA (August 30, 2006) : *Statistical Challenges in High Energy Physics.*

Sinharay, Sandip, Educational Testing Service, Princeton, NJ, USA (November 23, 2006) : *An Overview of the Statistical Methods Used in GRE and TOEFL.*

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Bandopadhyay, Anirban, International Center of Young Scientists, Japan (July 12-13, 2006) : *Wireless information transport on organic monolayer: Pre-requests of a bio-processor.*

Goswami, Partha P., Kalyani University, Kalyani, India (September 13, 2006) : *New variations of proximity and clustering problems on two dimensional point set.*

Kundu, Sandip, Department of Elect. Engg & Comp. Sc., University of Massachusetts, USA (July 26, 2006) : *Design for manufacturability in Nano Technology.*

Laskar, Renu, Department of Mathematics, Clemson University, South Carolina, USA (February 07, 2007) : *Fall coloring of graphs.*

Lee, D. T., Academia Sinica, Taiwan (December 21, 2006) : *Some research problems on computational geometry.*

Pach, Janos, Alfred Renyi Institute of Mathematics, Hungarian Academy of Sciences (also affiliated to Courant Institute of Mathematical Sciences, New York University, and City University of New York, New York, USA) (January 18, 2007) : *From Sam Lloyd's puzzles to motion planning.*

----- (January 22, 2007) : *Hypergraph coloring and frequency allocation.*

Prasanna, Viktor K., University of Southern California, USA (July 19, 2006) : *Reconfigurable computing: Opportunities and challenges.*

Reddy, M. Venkateswara, DOS Lab, Department of CS&E, IIT Madras, Chennai, India (June 30, 2006) : *Vishwa: Grid middleware for parallel computing on internet.*

Computer Vision and Pattern Recognition Unit

Terrades, Oriol R., Universitat Autònoma de Barcelona, Barcelona, Spain (February 12, 2007) : *A multiresolution descriptor for symbol recognition.*

Electronics and Communication Sciences Unit

Capell, Steve, Havok.com (February 01, 2007) : *On using physical simulation for interactive character animation.*

Choudhury, Ananda, University of Georgia, Athens, Greece (January 22, 2007) : *Computer vision guided virtual craniofacial surgery.*

Dutta, Kaushik, Florida International University, USA (October 30, 2006) : *Storm: An approach to database storage management in data centre environments.*

Conferences and Seminars

Ghosh, Joydeep, Department of Electrical and Computer Engineering, University of Texas, Austin, USA (August 16, 2006) : *Distributed clustering with limited knowledge sharing.*

Majumder, Kaushik, Institute of Mathematical Sciences, Chennai, India (October 20, 2006) : *Linear discriminant on non-linear waves.*

Machine Intelligence Unit,

Chakraborty, Goutam, IWATE State University, Japan (January 02, 2007) : *Soft computing tools to solve sensor-networking problems.*

Girolami, Mark A., Department of Computing Science, University of Glasgow, UK (September 25, 2006) : *Bayesian data integration with Gaussian process priors.*

Masulli, Francesco, University of Genova, Italy (November 24, 2006) : *A graded possibilistic framework for clustering speaker.*

Mitra, Suman K., Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar, India (June 30, 2006) : *Multiple digital Watermarking Schemes for copyright protection.*

Rakshit, Somyadip, Department of Electronics and Electrical Engineering, University of Bath, UK (April 12, 2006) : *High performance low complexity DCT based iris recognition.*

Physics And Earth Science Division

Physics and Applied Mathematics Unit.

Bagchi, A., University of Twente, The Netherlands (November 10, 2006) : *Identification of infinite dimensional interest rate models.*

Das, Prasanta Kumar, Institute of Mathematical Sciences, Chennai (October 26, 2006) : *Higgs quartic coupling λ in the presence of a light stabilized radion and a lower bound on radion VEV ϕ .*

Debnath, L., University of Texas, Pan Am, USA (January 02, 2007) : *Linear and non - linear Rossby waves in an ocean.*

Raha, Udit, University of Bonn, Germany (October 13, 2006) : *Hadronic atoms in effective field theory.*

Sharma, V. D., Department of Mathematics, IIT Mumbai (May 18, 2006) : *Quasilinear hyperbolic systems of PDE's and associated wave phenomena.*

Sumer, B. M., Technical University of Denmark, Denmark (October 16, 2006) : *Effect of turbulence on bed load sediment transport.*

Biological Sciences Division

Agricultural and Ecological Research Unit

Ghosh, A. K., Center for Environment and Development, Kolkata (January 17, 2007) : *Critical Issues in Biodiversity Conservation.*

Gupta S. K., formerly of University of Calcutta (January 04, 2007) : *Soil quality vis-à-vis soil health & sustainability.*

Conferences and Seminars

Kumar, L., Indian Institute of Pulses Research, Kanpur (January 11, 2007) : *Management of biotic stress in plants through allelopathy.*

Nag, K., Memorial University, Canada (November 28, 2006) : *Nanostructuring & assembly in lipid-protein systems.*

Ramratnam, B., Brown Medical School, USA (December 07, 2006) : *The virus - host interactome.*

Thakur, A. R., West Bengal University of Technology, Kolkata (November 02, 2006) : *Microbe fabricated metal nanoparticle generation.*

Biological Anthropology Unit

Mascie-Taylor, C.G.N., Cambridge University (January 11, 2007) : *The impact of food supplementation on maternal and infant weight gain—a review of the Bangladesh Food Supplementation Program.*

Weitz, C. A., Temple University, USA (July 25, 2006) : *A comparison of the growth of Han children and adolescents born and raised at low and high altitude.*

Weitz, C. A., Temple University, USA (July 26, 2006) : *The growth of Tibetan children and adolescents at high altitude on the Qinghai-Tibetan plateau.*

Weitz, C. A., Temple University, USA (July 27, 2006) : *A comparison of the growth of Tibetan and Han children and adolescents born and raised at high altitude.*

Human Genetics Unit

Nakshatri, H., Walter Oncology Centre, USA (August 01, 2006) : *Linking progenitor phenotype of breast cancer cells to invasion and metastasis.*

Roy Choudhury, A., Department of Statistics, Harvard University, USA (September 25, 2006) : *A Two-Stage Pruning Algorithm and Its Applications to Population Tree.*

Kalaydjieva, L., UWA Center for Medical Research, University of Western Australia (October 10, 2006) : *Genetic studies of the Roma/Gypsies.*

Tripathy, A., Chittaranjan National Cancer Institute, Kolkata (October 19, 2006) : *Identification of signaling pathways associated with human breast cancer progression by gene expression profiling.*

Mano, S., Graduate School of Natural Sciences, Japan (March 12–16, 2007) : *Statistical methods for detecting natural selection from genotype data (lecture series).*

Sakaki, Y., Riken Genomics Sciences Centre, Yokohama, Japan (March 14, 2007) : *Metagenomics of human gut microbial flora.*

Social Sciences Division

Economic Research Unit

Bera, Anil K., University of Illinois at Urbana – Champaign, USA (August 07, 2006) : *Scalar Measures of Volatility and Dependence for the Multivariate Models of Financial Market.*

Banerjee, Priyodorshi, Planning Unit, Indian Statistical Institute (September, 27, 2006) : *Price Interventions in Cournot Oligopoly with a Dominant Firm.*

Conferences and Seminars

Banerjee, Swapriendu, Gokhale Institute of Political and Economics, Pune, *Rent a womb : Surrogate selection, Investment Incentives and Contracting.*

Bhaskar, V, University College London, UK (December 28, 2006) : *Parental Choice and Gender Bias.*

Bhattacharjee, Amab, University of St. Andrews, Scotland, UK (January 12, 2007) : *Taking Personalities out of Monetary Policy Decision Making? Interactions, Heterogeneity and Committee Decisions in the Bank of England's MPC.*

Bhattacharya, Debopam, Department of Economics, Dartmouth College, USA (January 31, 2007) : *Inferring Optimal Resource Allocation from Experimental Data.*

Chakrabarti, Bikas K., TCMP Division and CAMC, Saha Institute of Nuclear Physics, Kolkata (October, 19, 2006) : *Why Econophysics? Some Recent Developments in Physics & Economics.*

Chatterjee, Kalyan, Penn State University, USA (December 27, 2006) : *Menu Choice, Environmental Cues and Temptation : A "Dual Self" Approach to Self-Control.*

Dasgupta, Indraneel, School of Economics, University of Nottingham, Nottingham, NG7 2RD, UK (December 22, 2006) : *Revealed preference with stochastic demand correspondence.*

Datta, Madhusudan, Department of Economics, University of Kalyani (June 15, 2007) : *Measurement of Capital Stock – EPD Approach.*

Ganguly, Partha, School of Economics and Finance, University of Western Sydney, NSW, Australia (July 19, 2006) : *Globalization and Equilibrium Regional Integration: Complexity, Fragility and Indeterminacy.*

Lahiri, Sajal, Vandever Professor of Economics, Southern Illinois University, Carbondale, USA (January 10, 2007) : *Conflict in the Presence of Arms Trade: Policy Options for the International Community.*

Maiti, Dibyendu S., Centre for Studies in Social Sciences, Kolkata (December 07, 2006) : *Trade Reform, Vertical Contracts and Innovation in a Developing Economy.*

Mitra, Sophie, Department of Economics, Fordham University, USA (August 17, 2006) : *Disability and the Rural Labor Market in India: Evidence for Males in Tamil Nadu.*

Marjit, Sugata, Centre for Studies in Social Sciences, Kolkata (September 14, 2006) : *Corruption, Comparative Advantage and Missing Trade.*

Mosler, Karl, Seminar fuer Wirtschafts – und Sozialstatistik, Universitaet zu Koeln, D.– 50923, Koeln (March 15, 2007) : *Measuring multivariate inequality and polarization.*

Nahar, Nazmun, Department of Computer Science and Information Systems, University of Jyväskylä, Finland (February 15, 2007) : *Success factors for information technology supported international technology transfer: Finding expert consensus.*

Raut, Lakshmi K., Social Security Administration, Washington D.C., USA (October 26, 2006) : *Economic Epidemiology of Malaria and Economic Growth.*

Sengupta, Kunai, University of Sydney, NSW, Australia (January 04, 2007) : *Multiperson Bargaining With Complementarity: Efficiency Vs. Feasibility.*
Sinha, Uday Bhanu, Delhi School of Economics, Delhi (June 01, 2006) : *On R & D Information Sharing and Merger.*

Planning Unit

- Balakrishnan, Pulapre, Senior Fellow, Nehru Museum and Library (March 09, 2007) : *Understanding Economic Growth in India, A Prerequisite.*
- Bardsley, Peter, University of Melbourne, Australia (November 01, 2006) : *Cryptographic Commitment and Simultaneous Exchange.*
- Bhargava, Alok, University of Houston, USA (July 06, 2006) : *Globalization, Literacy levels and Economic Development.*
- Bhargava, Alok, University of Houston, USA (March 22, 2007) : *HIV Pandemic, Medical Brain Drain and Economic Development in Sub-Saharan Africa.*
- Chakraborty, Archishman, Baruch College, CUNY (December 05, 2006) : *Posterior Stable Matching.*
- Chakravorty, Ujjayant, University of Central Florida, USA (August 04, 2006) : *Heterogeneity and Nonrenewable Resource : When Bad is Good.*
- Dasgupta, Indraneel, University of Nottingham, UK (November 24, 2006) : *Revealed Preference with Stochastic Demand Correspondence.*
- Dechenaux, Emmanuel, Kent State University, USA (July 28, 2006) : *Endogenous Price Leadership and Firm Size Asymmetry: An Experimental Analysis.*
- Dimitrov, Dinko, University of Bielefeld, Germany (February 23, 2007) : *Stable Governments and Semistrict Core.*
- Dutta, Bhaskar, Warwick University, UK (April 28, 2006) : *Correlated Equilibria Incomplete Information and Coalitional Deviations.*
- Engineer, Merwan, University of Victoria, Canada (February 15, 2007) : *Choosing Longevity with Overlapping Generations.*
- Eswaran, Mukesh, University of British Columbia, Canada (February 27, 2007) : *'US' and 'Them': Evolutionary Origins and Some Economic Consequences.*
- Kar, Anirban, University of Warwick, UK (February 19, 2007) : *Weighted Shapely Values and the Obligation Rules on Minimum Cost Spanning Tree Games.*
- Marchant, Thierry, Ghent University, Belgium (August 18, 2006) : *Homogeneity and Invariance Conditions for Bankruptcy Problems.*
- Miguel Angel Delgado Gonzalez, Universidad Carlos III de Madrid, Spain (January 10, 2007) : *Distribution Free Specification Tests of Conditional Models.*
- Niccolo, Antonio, University of Padua, Italy (March 23, 2007) : *Efficient and Stable Collective Choices Under Gregarious Preferences.*
- Rauf, Lakshmi, Social Security Administration, USA (November 08, 2006) : *Long Term Effects of Preschool: Evidence from NSLY.*
- Sills, Erin, North Carolina State University, USA (September 01, 2006) : *Impacts of Iron Ore Mining on Forest Livelihood in Orissa.*

Conferences and Seminars

Tarrow, Benoit, GREQAM-IDEF and Université de la Méditerranée (December 01, 2006) : *Are Equalization Payments Making Canadians Better Off ? A Two Dimensional Dominance Answer.*

Wright, Stephen, University of London, UK (March 02, 2007) : *Information Heterogeneity and Market Incompleteness in the Stochastic Growth Model.*

Yilankaya, Okan, University of British Columbia, Canada (December 08, 2006) : *Optimal Auctions with Participation Costs.*

Sociological Research Unit

Bardhan, Pranab K., Professor of Economics, University of California at Berkeley, USA (December 27, 2006) : *The Rise of China and India . A Comparative Economic Assessment.*

Ray Chaudhuri, Tapan, Emeritus Professor of History, Oxford University, UK (January 09, 2007) : *Western Encounter and Imperialism : The Indian Experience.*

Paliwala, Rajni, Professor of Sociology, Department of Sociology, Delhi School of Economics (October 11, 2006) : *Gender and Caste : Issues and A Framework for Research.*

Statistical Quality Control & Operational Research Division

Kabadi, Santosh N., University of New Brunswick, Canada (July 24, 2006) : *Integer Exact Network Synthesis Problem.*

Library, Documentation and Information Sciences Division

Documentation Research and Training Centre

Amba, S., Scientist (Retd.) CLRI, Chennai (January 23, 2007) : *The other side of Digital Libraries.*

_____ (February 06, 2007) : *Automatic Linking of Thesauri.*

_____ (February 13, 2007) : *Intellectual Property Rights and Libraries.*

Krelschmer, Hildrun, COLNET, Berlin Humboldt University Berlin (December (December 12, 2006) : *An overview of social network.*

_____ (December 14, 2006) : *A well-ordered Distribution of Co-authorship.*

Laxman Moorthy, A., Director, DESIDOC, New Delhi, (May 17, 2006) : *Intellectual Property Rights*

Osswald, Achim, University of Applied Science, Institute for Information Science, Germany (November 15, 2006) : *Library and Information Science Education in Germany.*

_____ (November 20, 2006) : *Library Automation in Germany: a state of the art.*

_____ (November 24, 2006) : *Virtual Reference Services.*

_____ (December 06, 2006) : *E-book and Libraries.*

Peter Ohly, H., Social Science Information Centre, Bonn, Germany and Secretary General of ISKO
(December 14, 2006) : *Future of knowledge organization.*

Center for Soft Computing Research: A National Facility

Binford, Thomas O., Read-Ink Technologies Pvt. Ltd., Bangalore, India (August 01, 2006) : *Solved problems in computer vision.*

Ghosh, Joydeep, University of Texas, Austin, USA (August 16, 2006) : *Clustering and Co-clustering with Bregman Divergences.*

Girolami, Mark A., University of Glasgow, UK, (September 25, 2006) : *Bayesian Data Integration with Gaussian Process Priors.*

Krishnamurthy, E. V., Australian National University, Canberra, ACT 0200, Australia (February 23, 2007). *Smart amorphous computation.*

Malik, Ranjan K., IIT Delhi, Delhi, India (December 29, 2006) : *Effect of channel correlation on the performance of diversity receivers.*

Mandal, Alanendu S., CEERI, Pilani, India (February 01, 2007) : *A modified neural self-organization technique for the generation of Steiner minimal tree.*

_____ (July 10, 2006) : *Modeling the visual cortex area 1 (V1) for pattern recognition.*

Masulli, Francesco, University of Genova, Italy (November 11, 2006) : *DNA microarray data sets biclustering using a possibilistic approach.*

Mitra, Suman K., Dhirubhai Ambani Institute of Information and Communication Technology, India (July 07, 2006) : *Recognition of car license plate using morphology.*

Phadikar, Amit, MCKV Institute of Engineering, Howrah, India (July 24, 2006) : *Robust watermarking techniques for color images.*

_____ (February 05, 2007) : *Digital video and watermarking.*

Zahid, Md. Abdul H., IIT Roorki, India (December 27, 2006) : *Phylogenetic network construction due to constrained recombination.*

5. Sankhyā

The internationally renowned journal Sankhyā was founded by Professor P.C. Mahalanobis in 1933 and began publication under his editorship. It is devoted to original research articles in Applied Statistics, Mathematical Statistics and Probability. Reviews and discussion articles in areas of current research activity are also published. Many seminal articles in the above areas have appeared in Sankhyā and these include contributions from scientists within the Institute as well as outside. Sankhyā receives articles from all over the world and publishes only those which pass the rigorous peer review process. The Editorial Board of Sankhyā includes internationally reputed scholars in relevant areas from all over the world. The compositions of Editorial Committees serving during 2006-07 appear in Part III, Section 10 of the Report.

From 2003, Sankhyā has been published in a single series, four times a year in February, May, August and November. Certain issues come out as a special issue devoted to a particular field.

The following issues have been published during April 2006 to March 2007.

May 2006	:	Volume	68	Part	II
August 2006	:	Volume	68	Part	III
November 2006	:	Volume	68	Part IV	(in press)

Volume 69 Part I (February 2007 issue) is under preparation.

6. SCIENTIFIC PAPERS AND PUBLICATIONS

Books Published

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Delhi

Bhatia, R. : *Positive Definite Matrices*, Princeton University Press, Princeton, USA (Indian ed. by Hindustan Book Agency), pages 254+ix, 2007.

Sinha, K. B. and Goswami, D. : *Quantum Stochastic Processes and Non-Commutative Geometry*, Cambridge University Press, Cambridge, UK, pages 290, 2007.

Applied Statistics Division

Applied Statistics Unit

Ghosh, J. K., Delampady, M. and Samanta, T. : *An Introduction to Bayesian Analysis – Theory and Methods*, Springer Verlag, pages 352, New York, 2006.

Computer and Communication Sciences Division

Advanced Computing and Microelectronics Unit

Bhattacharya, B. B., Murthy, C. A., Chaudhuri, B. B. and Chanda, B. (eds.) : *Proceedings of the International Conference on Computing: Theory and Applications (ICCTA 2007)*, IEEE Press, Kolkata, India, pages 740, 2007.

Computer Vision and Pattern Recognition Unit

Chaudhuri, B. B. (ed.) : *Digital Document Processing*, Springer Verlag, London, pages 464, 2007.

Electronics and Communication Sciences Unit, Kolkata

Jana, D. and Mukherjee, D. P. (eds.) : *Affordable Computing : Proceedings of 41st CSI Annual Convention*, Tata McGraw Hill, New Delhi, pages 324, 2006.

Pal, P. (ed.) : *Advances in Pattern Recognition, Proceedings of the Sixth International Conference*, World Scientific, Singapore, pages 424, 2007.

Physics and Earth Sciences Division

Physics and Applied Mathematics unit

Basu, U. and Mandal, B. N. (eds.) : *Techniques in Applied Mathematics*, Narosa Publishing House, New Delhi, pages 244, 2007.

Dandapat, B. S. and Mazumder, B. S. (eds.) : *Fluid Mechanics in Industry and Environment*, Research Publishing, Chennai, pages 292, 2006.

Publications

Usha, R., Sharma, A. and Dandapat, B. S. (eds.) : *Wave Dynamics and Stability of Thin Film Flow System*, Narosa Publishing House, New Delhi, pages 551, 2006.

Social Sciences Division

Linguistic Research Unit

Dasgupta, P. : *Hlaapicer Kaando* (Bengali translation of Maja Tisjar's Esperanto translation of *Cudnovate zgrade segrta Hlaapica* by Ivana Bric-Mazuranic), Samata, Kolkata, pages 110, 2006.

Dash, N. S. : *Bahurupi Bangla Banan* (Multifaceted Bengali Spelling) (In Bengali), Dakshabharati, Kolkata, pages 140, 2006.

Library, Documentation and information Sciences Division

Library, Kolkata:

Basak, N. D. and Das, B. B. : *Tathya, Internet Evam Granthagarikata* (Information, Internet and Librarianship) (In Bengali), Progressive Publishers, Kolkata, pages 335, 2006.

Computer and Statistical Services Centre (CSCC)

Bagchi, A. and Vijayalakshmi Alluri (eds.) : *Proceedings of the Second International Conference on Information Systems Security (ICISS 2006)*, Lecture Notes in Computer Science Series, Springer Verlag, Vol. 4332.

Papers Published in Journals

Theoretical Statistics and Mathematics Division

Stat-Math Unit, Kolkata

Barua, R., Chakravarty, S. R. and Roy, S. : On the Coleman indices of voting power; *European Journal of Operations Research*, 171, 273-289, 2006.

Barua, R. and Dutta, R. : Password-based encrypted group key agreement, *International Journal of Network Security*, 3(1), 23-34, 2006.

Basak, G. K. and Dasgupta, A. : Central and functional central limit theorems for a class of urn models, *Journal of Theoretical Probability*, 19(3), 741-756, 2006.

Bose, A., Gangopadhyay, S., Maulik, K. and Sarkar, A. : Convergence of tail sum of records, *Extremes*, 9(2), 151 – 168, 2006.

Bose, A. and Sen, A. : Spectral norm of random large dimensional noncentral Toeplitz and Hankel matrices, *Electronic Communications in Probability*, 12, 21-27, 2007.

Bose, A., Dasgupta, A. and Maulik, K. : Maxima of the cells of an equiprobable multinomial, *Electronic Communications in Probability*, 12, 21-27, 2007.

Chaudhuri, P. and Dasgupta, A. : Stationarity and mixing properties of replicating character strings, *Statistica Sinica*, 16, 29-43, 2006.

- Das, M. K., Bhatwadekar, S. M. and Mandal, S. : Projective modules over smooth real affine varieties, *Inventiones Mathematicae*, 166, 151-184, 2006.
- Das, M. K. : The Euler class group of a polynomial algebra II, *Journal of Algebra*, 299, 94-114, 2006.
- Das, M. K. and Mandal, S. : A Riemann-Roch theorem, *Journal of Algebra*, 301, 148-164, 2006.
- Dasgupta, R. : Modelling of material wastage by Ornstein-Uhlenbeck Process, *Calcutta Statistical Association Bulletin*, 58, 15-35, 2006.
- Dasgupta, R. and Roy, S. : Spectrum of the zero point field and statistical stability, *Communications in Applied Analysis*, 11(1), 23, 2007.
- Datta, M. and Pandey, N. : Equivariant Morse relations, *Homology, Homotopy and Applications*, 9(1), 1- 17, 2007.
- Datta, M. and Ambra, Giuseppina D' : Isotropic C^1 - immersions in a pseudo-Riemannian manifold, *Differential Geometry and its Applications*, 24(2), 142-149, 2006.
- Dutta, A. K. : Aryabhata and axial rotation of earth (in 3 parts), *Resonance*, 51-68 [11(3)], 56-74 [11(4)], 58-72 [11(5)], 2006.
- Ghosh, A. K., Chaudhuri, P. and Sengupta, D. : Classification using kernel density estimates : multi-scale analysis and visualization, *Technometrics*, 48, 120-132, 2006.
- Ghosh, A. K., Chaudhuri, P. and Murthy, C. A. : Multiscale classification using nearest neighbor density estimates, *IEEE Transactions on Systems, Man and Cybernetics*, Part B, 36, 1139-1148, 2006.
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