Annual Report
Department of Mathematics
April 2006 – March 2007

In the year 2006-2007, the Department of Mathematics started a number of new activities and restructured some of its existing programmes while continuing with its numerous earlier initiatives.

The Department has initiated a "Distinguished Lecture Series" where eminent mathematicians give four to six lectures on advanced areas of mathematics. A more general visitor's programme with systematic attempts to foster collaborative visits has also been envisaged. This will facilitate short courses of two to four weeks suitable for advanced postgraduate students given by visiting mathematicians.

The Department has also restructured its doctoral programme with a view to making the coursework more structured and the programme itself more rigourous. To this end all doctoral students entering the Ph.D. programme starting July 2007 will be required to pass a qualifying examination in two broad areas of mathematics. In addition, the Department is committed to running twelve basic Ph.D. level courses a year (two in each of its broad areas of strength) as well as several "Advanced Topics" courses. Over fifteen new courses will be introduced next year. Together with the short courses to be delivered by visitors, the Department has considerably broadened and deepened its Ph.D. course structure. The Department is also in the process of formulating a B.Tech. programme in Mathematics and Computing.

Two of the Department's visitors delivered Institute colloquia in 2007 – Professor C. R. Rao (Pennsylvania State University, USA) and Professor R. Balasubramanian (Institute of Mathematical Sciences, Chennai).

The activities of the Special Year in Elliptic curves, Automorphic Forms and L-functions which were earlier scheduled to end in August 2006 were extended to continue until the end of the academic year. Likewise, the Special Year in Computational Partial Differential Equations was also extended into the year 2006-2007. Several mathematicians of considerable international stature visited the Department under the aegis of these programmes.

Academic Programmes

Student Intake
Ph.D   : 09
M.Sc. (MA)   : 17
M.Sc. (ASI) : 19

Degree Awarded
Ph.D.   : 01
M.Sc.(MA)   : 18
M.Sc. (ASI) : 16

Besides the teaching of B. Tech. courses in Mathematics, the Department offers a vibrant M.Sc. programme. It has, in fact, two distinct M.Sc. programmes: M.Sc. in Mathematics, intended primarily for those who wish to pursue research and/or teaching as a career, and M.Sc. in Applied Statistics and Informatics (ASI).   The former has gained an excellent reputation and is widely sought after by students interested in Mathematics from all over India, whereas the latter, which commenced in 1997, has been a trend-setter for some of the other IIT's and several universities.

In addition, the Department has an active Ph.D. programme. This involves broad-based course work followed by directed research. Almost all Ph.D. students receive funding, either through the Institute or from external agencies such as CSIR and NBHM. Students currently pursue doctoral research in many areas of Mathematics, Statistics and Theoretical Computer Science.

R & D Activities

Research in the Department focuses on several contemporary areas of fundamental, developmental and strategic importance, applied and interdisciplinary topics, and collaboration with industry. There is also extensive collaboration with peer academic institutions including the Tata Institute of Fundamental Research (Mumbai and Bangalore), the Indian Institute of Science (Bangalore), the Institute of Mathematical Sciences (Chennai) and the Indian Statistical Institutes as well as with government agencies and public sector organisations like the Indian Space Research Organisation, the Defense Research and Development Organisation, the Oil and Natural Gas Corporation and the Indian Meteorological Center. The Department also has ongoing collaborative research with its counterparts in foreign universities like Brunel Universiy (U.K), CNRS-IML, Marseille (France), Florida Technical University (USA), Humboldt University, Berlin (Germany), INSA, Toulouse (France), Technical University, Dresden (Germany), Université St-Etienne (France), Université Pierre et Marie Curie, Paris (France), Vilnius University, Lithuania. There is also considerable interaction with national nodal organisations such as the Departments of Atomic Energy, Biotechnology and Science and Technology, and the Council for Scientific and Industrial Research.

Sponsored Projects

Sponsored Projects	
New	: 06
Ongoing	: 13
Faculty Involved	: 15
Consultancy	
No. of Faculty Involved	: 01
Total Outlay (in Lakhs)	: 68.6

New

Extension and Web Implementation of PROPAINOR for ab-initio Prediction and Computational Function-Elucidation of 3-D Structure of Proteins, DBT, Govt. of India.

A Fast Marching Method for Monotonically Propagating Fronts in an Inhomogeneous Moving Fluid, IRCC, IIT Bombay.

Instrumentation assisted Decision support System deploying Data Mining Techniques for Pulse Examination and Diagnostics, Ministry of Information Technology, Govt. of India.

Obstruction theory for projective modules, IRCC, IIT Bombay.

Modeling of Panel Data using Hierarchical Bayesian Methodology and Metropolis Hastings Algorithm, TNS India Pvt. Ltd., Mumbai.

Homogenization and Defects in network structures, IRCC, IIT Bombay.

Ongoing

Algebraic Methods in Multivariable Operator Theory, IRCC, IIT Bombay.

Factorization of Period Integrals, IRCC, IIT Bombay.

Software Development for ab-initio Prediction of 3-D structure of Proteins Using a Knowledge based Nonparametric Regression method, DBT, Govt. of India.

Accelerated Refinement Schemes for Computation of Eigenelements of integral operators with singular kernels using wavelet Galerkin Methods, DST, Govt. of India.

Analytical and Numerical study of non-linear gas dynamic waves, ISRO-IITB Space Technology Cell.

Design of Component Reliability Test Plans, their software development and a centre for quality and reliability (CQR), DST, Govt. of India.

Establishing the analytic properties of automorphic L-functions, IRCC, IIT Bombay.

Completed

Monomial ideals, blowup algebras and convex polytopes, DFG (Germany).

Adaptove Mixed Finite Element Methods and Applications, DST-DAAD (Germany).

Extension Activities

Year long programme in Computational Partial Differential Equations.

Special Year in Elliptic Curves, Automorphic forms and L-functions

Statistics-Study group activity: Involves statistics faculties from various colleges affiliated to the University of Mumbai. This group will focus on reading research articles that deal with basic concepts and results taught at the undergraduate level.

Conferences & Workshops Organized by the Department

CEP Programme: MATH for ECM 2006. April 17-30, 2006. **Convener: Inder K. Rana**

Workshop in Mathematics: October 15-20, 2007. **Convener: Inder K. Rana**

One day Workshop for Teachers: Use of Technology in Math Education, March 17, 2007. **Convener: Inder K. Rana**

Activity based, Computer supported MathLab Workshop for school children, January 20, 2007. **Convener: Inder K. Rana**

Indo-German Workshop on Automatic Differentiation, Optimal Control and Adaptivity with Applications, November 11-17, 2006. **Convener: A. K. Pani and Neela Natraj**

NBHM sponsored ATM School for Lecturers in Algebra and Linear Algebra, IIT Bombay, sponsored by the National Board for Higher Mathematics, June 5 – July 1, 2006. **Local Coordinator: A. R. Shastri; Academic Conveners: J. K. Verma and I. B. S. Passi (HRI)**

Publications

Books

S. R. Ghorpade and B. V. Limaye, A Course in Calculus and Real Analysis, *Undergraduate Texts in Mathematics,* Springer, New York, 2006.

K. D. Joshi, Revised edition of `Calculus for Scientists and Engineers – An Analytical Approach' published by Narosa Publishers, New Delhi.

Mahajan Swapneel and Marcelo Aguiar, Coxeter groups and Hopf algebras, Fields Institute Monographs, 23, American Mathematical Society, Providence, RI, 2006.

Pai Devidas V. and H. N. Mhaskar**,** Fundamentals of Approximation Theory*, Revised Edition,* Narosa Publishing House, New Delhi and Alpha Science International Ltd. Oxford, U.K., 2007.

Verma J. K., Commutative Algebra and Combinatorics, Ramanujan Mathematical Society Lecture Notes Series, No. 2, Eds: W. Bruns, R. Thomas, D. Mclagan, R. V. Gurjar, S. A. Katre, R. A. Rao, J. K. Verma, Ramanujan Mathematical Society, 2007.

Chapters in Books

Pai Devidas V. and Indira K**.,** Hausdorff Strong Uniqueness in Simultaneous Approximation. Part II, Chapter 17 in the book entitled *Frontiers in Interpolation and Approximation* Dedicated to the memory of Ambikeshwar Sharma, Eds. N. K. Govil, H. N. Mhaskar, R. N. Mohapatra, Z. Nashed and J. Szabados, Chapman & Hall/CRC 2007, Taylor & Francis Group, Boca Raton, Florida, USA, 365-380.

Shastri A. R. Topology of Algebraic Surfaces, In the book, Affine Algebraic Geometry, edited by T. Hibi, (dedicated to M. Miyanishi), Osaka University Press-2007.

Papers in Journals

International:

Anandavardhanan U.K. and **Prasad, Dipendra,** On the SL(2) period integral, Amer. J. Math., Vol. 128 (2006), 1429- 1453.

Baskar S., François Coulouvrat and Régis Marchiano, Nonlinear reflection of grazing acoustic shock waves: Unsteady transition from von Neumann to Mach to Snell–Descartes reflections, Journal of Fluid Mechanics, Vol 575 (2007), 27-55.

Ghorpade Sudhir R. and K. N. Raghavan, Hilbert functions of points on Schubert varieties in the symplectic Grassmannian, Trans. Amer. Math. Soc., Vol. 358 (2006), 5401-5423.

Joshi Rajani R., Raghuvanshi M. and Pandya P., Yagyopathy vs. oral and I.V. drug administration: Evaluation for pulmonary tuberculosis using compartment modeling, J. Biological Systems Vol. 14(3) (2006), 463-489.

Joshi Rajani R., and Gupta V. K., Data mining of VDJ genes reveals interesting clues, Protein Peptide Letters, Vol. 13(6) (2006), 587-593.

Joshi Rajani R., and Samant V.V., Fast prediction of protein domain boundaries using conserved local patterns. J. Mol. Mod. Vol. 12(6) (2006) 943-952.

Keshari Manoj K., Euler class group of a Laurent polynomial ring: local case, J. Algebra, Vol. 308 (2007), 666 - 685.

Pani, A. K., Anil Kumar and M. C. Joshi, On approximation theorems for controllability of non-linear parabolic problems, IMA J. Math. Control Info., Vol. 24 (2007), 115-136.

Pani, A. K., Neela Nataraj, and Sangitha Singh, A new mixed finite element method for Burger's equation, Journal of Applied Mathematics and Computing, Vol. 23 (2007), 43-55.

Pani, A. K. and Gudi, T., Discontinuous Galerkin methods for quasilinear elliptic problems on nonmonotone type, SIAM J. Numer. Anal., Vol. 45 (2007), 163-192.

Pani, A. K. and J. Y. Yuan, Semidiscrete finite element Galerkin approximation to the equations of motion arising in the Oldroyd model, IMA J. Numer. Anal., Vol. 44 (2006), 804-825.

Pani, A. K., Kannan M. Moudgalya and Jyoti Agarwal, Sliding motion of discontinuous dynamical systems described by semi-implicit index one differential algebraic equations, Chemical Engineering Science, Vol. 61 (2006), 4722-4731.

Pani, A. K., S. Nigam and K. M. Moudgalya, Equivalent dynamic solution of an industrial HDPE slurry reactor, ESCAPE-16/PSE-2006, Gramisch-Partenkirchen (2006), 9-13.

Puthenpurakal T. J and S. Iyengar, Hilbert-Samuel functions of modules over Cohen-Macaulay rings, Proc. Amer. Math. Soc., Vol. 135 (2007), 637-648.

Puthenpurakal T. J., Ratliff-Rush filtration, regularity and depth of higher associated graded modules: Part I, J. Pure Appl. Algebra, Vol. 208, (2007), 159-176.

Jayanthan A.V, **Puthenpurakal T. J., and Verma J.K,** On fiber cones of m-primary ideals, Canad. J. Math. Vol. 59, No 1, (2007), 109-126.

Sabnis S. V. and Agnihothram, G. Application of arithmetic-geometric mean inequality for construction of reliability test plan for parallel systems in the presence of covariates, Economic Quality Control, Vol.21, No.2 (2006), 219-230.

Sabu Nicholas and L.S.Xanthis, Two dimensional approximation of eigenvalue problem for piezoelectric plates, HERMIS, Int. J. of Comp. Math. and its Appl., Vol. 6 (2006), 162-181.

Rajan Arora and **Sharma V. D**., Convergence of strong shock waves in a van der Waals gas, SIAM J. Appl.. Math ., Vol.66 (2006), 1825-1837.

Manoj Pandey and **Sharma V. D**, Interaction of a characteristic shock with a weak discontinuity in a non-ideal gas, Wave Motion (Elsevier, USA), Vol. 44 (2006), 346-354.

Rajan Arora and **Sharma V. D.**, Converging and diverging shock waves of arbitrary strength in a van der Waals gas, Canadian Applied Mathematics Quarterly, Vol.66 (2006), 361-383.

Srinivasan G. K., The Gamma function: An eclectic tour, American Mathematical monthly, Vol. 114 (2007), 97-315.

Srinivasan G. K., A note on Lagrange's method of variation of parameters, Missouri Journal of Mathematical Sciences, Vol. 19 (2007), 11-14.

Amitava Bhattacharya, Sivaramakrishnan Sivasubramanian, and **Srinivasan M. K**., The polytope of degree partitions, Electronic J. of Combinatorics, Research Paper 46, Vol. 13 (2006).

Srinivasan M. K., The Eulerian Generating Function of Q-Derangements, Discrete Math., Vol. 306 (2006), 2134-2140.

Vellaisamy P. and Upadhye, N. S., On the negative binomial distribution and its generalizations. Statistics and Probability Letters, Vol. 77, (2007) 173-180.

National:

Sureshkumar K. A risk-sensitive portfolio optimization problem with stochastic interest rate (with M. Goel) , Journal of Emerging Market Finance, Vol. 5 (2006), 263- 282.

Visitors

Institute Colloquia

Applications of Number Theory to Cryptology by R. Balasubramanian, Director, Institute of Mathematical Sciences, Chennai

Statistics: Past, Present and Future by C. R. Rao, Pennsylvania State University, USA

Institute Lectures

The Early History of Numbers by Bill Casselman, Department of Mathematics, University of British Columbia, Canada

Short Courses

Generalisations of the Riemann Hypothesis and their analogues over finite fields by J. S. Chahal, Brigham Young University, USA**.**

Topology by K. Varadarajan, University of Calgary, Canada.

The Popular Lecture Series

The curvature and topology of surfaces by N. Nitsure, School of Mathematics, TIFR, Mumbai

Department Colloquium and Seminars

Geometric Complexity Theory (GCT) by Milind Sohoni, Department of CSE, IIT Bombay

On some aspects of resolutions of ideals by T. Puthenpurakal, Department of Mathematics, IIT Bombay

Thom polynomials and Schur functions by Piotr Pragacz, Institute of Mathematics, Polish Academy of Sciences, Warsaw, Poland

The Geometry of the Hermite Invariant by Jaydeep Chipalkatti, University of Manitoba, Winnipeg, Canada

Range of correlation matrices for multivariate Bernoulli random vectors by N. Rao Chaganty, Old Dominion University, Norfolk, Virginia, USA

Flexible Adaptive Clinical Trials in the Pharmaceutical Industry by Cyrus Mehta, Co-Founder and President, Cytel Inc., Boston, Adjunct Professor of Biostatistics, Harvard University, Cambridge, Massachusetts, USA

Borsuk-Ulam theorem and Hilbert's (real) nullstellensatz by Dilip Patil, IISc., Bangalore

Poisson Type Approximations for Markov Binomial Approximations by V. Cekanavicius, University of Vilnius, Lithuania

Signed Compound Poisson Approximations by V. Cekanvicius, University of Vilnius, Lithuania

Poisson Type Approximations for Markov Binomial Approximations by V. Cekanvicius, University of Vilnius, Lithuania

Smoothing Techniques for Estimation of Accuracy of Approximations by V. Cekanvicius, University of Vilnius, Lithuania

Jacobian Problem by Shreeram S. Abhyankar, Purdue University, USA

Testing Independence in Bivariate Trials by Rolf D. Reiss, Universität Siegen, Germany

Gelfand models for finite Coxeter groups by Shripad Garge, Université de Paris-sud, Orsay, France

The Hasse principle for Classical groups by Preeti Raman, TIFR Mumbai

Finite Element Methods for Elliptic Interface Problems by Bhupen Deka, IIT Guwahati

Localised defects in a periodic network: An asymptotic by Shivaji Ganesh

Applications of the Hadamard product and Hypergeometric functions to univalent functions by P. Vasundhra, IIT Madras

The Semi definite Linear Complimentarity Problem by T. Parthasarathy, IIT Madras

Asymptotically harmonic spaces in dimension 3 by Hemangi Shah, Department of Mathematics, IIT Bombay

Quantum cohomology of Grassmannians by Anders Buch, Rutgers University, USA

Nonlinear reflection of grazing acoustical shock waves by S. Baskar, Department of Mathematics, IIT Bombay

Challenges and thrills of the Mathematical Olympiad by R. B. Bapat, Indian Statistical Institute, Delhi

Collapsibility results for n-dimensional contingency tables by P. Vellaisamy, Department of Mathematics, IIT Bombay

Primes and cofiniteness by S. Yassemi, University of Tehran, Iran

A Mixed Hybrid Finite Element Method for 4th Order Elliptic Boundary Value Problems with Variable Coefficients by P. K. Bhattacharyya, formerly of the Department of Mathematics, IIT Delhi

Special Year in elliptic curves, automorphic forms and L-functions

Short Course

An introduction to analytic number theory by D. Suryaramana, Harish-Chandra Research Institute, Allahabad.

Seminars

Nonvanishing of L-functions mod p by Kartik Prasanna, University of Maryland, USA

Jordan decomposition in lattices and quasi-unipotence of monodromy by T. N. Venkataramana, Tata Institute of Fundamental Research, Mumbai

Galois representations by Chandrashekhar Khare, University of Utah, USA

Asymptotics for prime specialization over finite fields by Brian Conrad, University of Michigan and Columbia University, USA

Kida's formula in Iwasawa theory by Amala Bhave, Tata Institute of Fundamental Research, Mumbai

The integral basis problem of Eichler by H. Hida, Department of Mathematics, University of California at Los Angeles, USA

Introduction to cryptography by Kirti Joshi, University of Arizona, USA

Numbers and functions by Dinesh Thakur, University of Arizona, USA

Participation in Conferences/Symposia

Faculty Participation in Conferences/Workshops   International   (abroad and India)   : 12   National   Conference/Workshops   : 08

National

Anandavardhanan, U. K.
National Symposium on Combinatorics, Number Theory and Geometry, University of Mumbai, Mumbai, 15-20 January 2007.

Ghorpade Sudhir R.
National Conference on Mathematical Foundations of Coding, Complexity, Computation and Cryptography, Indian Institute of Science, Bangalore, July 2006.

The 17th Mid-Year Meeting of the Indian Academy of Sciences, Indian Institute of Science, Bangalore, July 2006.

Kulkarni Ravindra S.
Advanced Instructional School in Differential Geometry and Lie Groups, Bhaskaracharya Pratishthan, Pune, December 1-28, 2006, (NBHM-sponsored Advanced Training in Mathematics Programme).

Pani Amiya K.
OMS Conference held in Vyasanagar College, Jajpur during January 28-29, 2007.

Sabnis S. V.
National Conference on Statistical Modeling and Inference, Department of Statistics, Shivaji University, Kolhapur, February 12-14, 2007.

Shastri A. R.
National Symposium in Analysis and Applications, Karnatak University, Dharwar, February 2-4 2007.

International

Anandavardhanan, U. K.
Asian-French Summer School in Algebraic Geometry and Number Theory, Institut des Hautes Etudes Scientifiques, Paris, France, 17-29 July 2006.

International Congress of Mathematicians, Madrid, Spain, 22-30 August 2006.

India-UK Number Theory Conference, Institute of Mathematical Sciences, Chennai, 18-23 September 2006.

International Conference on Number Theory, Harish-Chandra Research Institute, Allahabad, 1-5 December 2006.

Ghorpade Sudhir R
International Conference on Algebraic Geometry, in honor of Vikram Mehta's 60-th birthday, Tata Institute of Fundamental Research, Mumbai, August 2006.

International Conference on Projective Modules and Complete Intersections, in honour of S. M. Bhatwadekar's 60-th birthday, Tata Institute of Fundamental Research, Mumbai, December 2006.

International Conference on Number Theory and Cryptography, Harish-Chandra Research Institute, Allahabad, February 2007.

Joshi Rajani R.
International Conference on Bioinformatics – INCOB2006, Hotel Ashoka, New Delhi., December 18-20, 2006. (Organizers: INCOB International, JNU and IITD

International Conference on Emerging Trends in Genomic-Proteomic Sciences, ITC Grand Central Sheraton Towers, Mumbai. October 15-18, 2006. (Organizers: ICMR-Nat. Inst. of Reprod. Res.)

Keshari Manoj Kumar
International conference on Projective Modules and Complete Intersections, TIFR Mumbai during 28th - 30th December 2006

Kulkarni Ravindra S.

Geometry and Topology of Moduli Spaces, Stanford University, USA, Jan 12-16, 2007.

Kulkarni Rekha P.

The Ninth International Conference on Integral Methods in Science and Engineering (IMSE 2006), Niagara Falls, Ontario, Canada. July 23 - 27, 2006. [Presented: *On improvement of the iterated Galerkin solution of the second kind integral equations*.]

International Congress of Mathematicians (ICM 2006), Madid, Spain.August 22 - 31, 2006.

Limaye B. V.

Ninth International Conference on Integral Methods in Science and Engineering, Niagara Falls, Canada, 23-27 July, 2006. [Presented: *On acceleration of spectral computations for integral operators with weakly singular kernels* (with M. Ahnes and A. Largillier).]

Pani Amiya K.

International conference on Recent Trends in Nonlinear Analysis and Its Applications, Nanded, December 19-22, 2006.

International Conference on Industrial and Applied Mathematics, MS University, Baroda, January 16-18, 2007.

Puthenpurakal T.J

Workshop in Commutative Algebra, Essen, Germany, November 20, 2006. [Presented: *Asymptotic Prime Divisors of Extension Functor over local complete intersection rings*.]

Raghunathan Ravi

International Conference in Number Theory, Harish-Chandra Research Institute, Allahabad, December 1-5, 2006. [Presented: *Twisted product identities for L-functions.]*

Ranjan Akhil

International Workshop and conference on Geometric Methods in Topology, Indian Institute of Science, Bangalore, June 12 – 24, 2006.

Sabnis S. V.

International Conference on Statistical Science, O.R. and IT, in conjunction with 26th <mark>Annual</mark> Convention of Indian Society for Probability and Statistics, Dravidian University, Tirupati, January 7-9, 2007. [Presented: *Reliability Test Plans for k-out-of-n and Bridge systems*.]

Vellaisamy P.

International Conference on Statistical Science, Dravidian University, Tirupati, January 7-9, 2007. [Presented: *Collapsibility of Regression Coefficients and its Extensions*.]

Invited Talks

Anandavardhanan, U. K.
Root numbers of Asai *L*-functions, India-UK Number Theory Conference, Institute of Mathematical Sciences, Chennai, 19 September 2006.

Factorization of Period Integrals, International Conference on Number Theory, Harish-Chandra Research Institute, Allahabad, 5 December 2006.

Counting the errors: an introduction to the Sato-Tate conjecture, Thunchan Memorial Government College, Tirur, Kerala, 21 December 2006.

A local global question in Automorphic Forms, National Symposium on Combinatorics, Number Theory and Geometry, University of Mumbai, Mumbai, 17 January 2007.

Ghorpade Sudhir R
"Commutative algebra", A series of eight lectures, NBHM Annual Foundation School (AFS)-II, Bhaskaracharya Pratishthana and University of Pune, Pune, June, 2006.

"Field and Galois theory", A series of eight lectures, First ATM School for Lecturers in Algebra and Linear Algebra, Indian Institute of Technology Bombay, Mumbai, June-July 2006.

"Glimpses of interactions between coding theory and algebraic geometry", National Conference on Mathematical Foundations of Coding, Complexity, Computation and Cryptography, Indian Institute of Science, Bangalore, July 2006.

"Convexity, concavity and differentiability of functions of several variables", A series of three lectures, ATM School for Lecturers in Multivariable Calculus, University of Pune, Pune, November 2006.

"Algebraic functions and elementary transcendental functions", S. P. College, Pune, December 2006.

"Geometric approach to saddle points", NBHM Sponsored Lecture Series for college teachers and students, Bhaskaracharya Pratishthana, Pune, January 2007.

"Error correcting codes and loci of polynomial equations", Birla Institute of Science and Technology Pilani, Goa campus, Goa, January 2007.

"Geometric, topological and combinatorial aspects of subspaces of a vector space", Goa University, Goa, January 2007.

"Solving Polynomial Equations", University of Delhi South Campus, New Delhi, February 2007.

"Grassmann varieties over finite fields and linear codes'', International Conference on Number Theory and Cryptography, Harish-Chandra Research Institute, Allahabad, February 2007.

"What is algebraic geometry", Science Special Lecture Series of the Karnataka Academy of Science and Technology, University of Mysore, Mysore, March 2007.

K. D. Joshi
Refresher course at University of Pune, Pune.

Workshop on Effective Teaching of Mathematics at Beed, Maharashtra

ATM Workshop on Analysis at Karnataka University

Joshi Rajani R.
"Mining the Gene-Protein Data – Novel Statistical Techniques", International Conference on Bioinformatics – INCOB2006, Hotel Ashoka, New Delhi. Dec. 18-20, 2006 (Organizers: INCOB International, JNU and IITD).

"Computer-Aided Paratope Designing and Extended Applications in Immuno Proteomics". International Confreence on Emerging Trends in Genomic-Proteomic Sciences, ITC Grand Central Sheraton Towers, Mumbai. October 15-18, 2006 (Organizers: ICMR-Nat. Inst. of Reprod. Res.).

"Statistical mining of gene & protein data bank**",** National Workshop on Bioinformatics - Application in Life Sciences, Mumbai University, 9-11 Feb, 2007.

Keshari Manoj Kumar
"Cancellation of projective modules over affine algebras", International conference on Projective Modules and Complete Intersections, TIFR Mumbai, December 28-30, 2006.

Kulkarni Ravindra S.
Three lectures at the University of Calgary, January 2007.

"Dynamical Viewpoint in Mathematics", Deendayal Upadhyay College, University of Delhi, New Delhi, August 7, 2006.

"Poincare Conjecture and Geometrization Conjecture for 3-manifolds", Special Lecture in University of Mumbai's Sesqui-centennial Year Programme, Oct 24, 2006.

Lecturer in the School for College faculty in "Calculus on manifolds", University of Pune, Pune, November 6-18, 2006.

Organizer and Lecturer in "Advanced Instructional School in Differential Geometry and Lie Groups", Bhaskaracharya Pratishthan, Pune, December 1-28, 2006, (NBHM-sponsored Advanced Training in Mathematics Programme).

"Evolution of the Idea of Curvature", <mark>Annual</mark> Meeting of the Marathwada Mathematical Society, December 19 - 22, 2006.

Kulkarni Rekha
"Approximate solutions of Second Kind Integral Equations", A series of two lectures, University of Porto, Porto, Spain, June 6-9, 2006.

"A super convergent projection method for solutions of compact operator equations", University of Porto, Porto, Spain, June 2006. .

"Approximate solutions of Second Kind Integral Equations using two grid methods", Colloquium talk, Jean Monet University, St Etienne, France. June 22, 2006

Neela Natraj
"Mixed Finite Element Methods for Fourth-Order Problems", WIAS, Berlin, Germany, May 2006.

"On Mixed Finite Element Methods for Elliptic Source and Eigenvalue Problems", Instructional Workshop and Conference in Analysis and Applications, IISc Bangalore, March 2006.

Pai Devidas V.
"On Well-posedness and Regularization in Variational Analysis", (a survey talk), 38th Meeting of the Programme Advisory Committee , Mathematical Sciences (PAC-MS) of SERC, DST Govt of India, Jaipur, March 2006.

"Wavelet Analysis-an Introduction", Opening Lecture, DST sponsored Second National Workshop on Techniques in Applied Mathematics, Calcutta University, Kolkata, India, June 2006.

"Viscosity Methods in Minimization Problems", Colloquium Lecture, Department of Mathematics, Sardar Patel University, Vallabh Vidyanagar, Gujarat, October 2006.

"Conjugate Duality in Optimization", A series of three lectures, Workshop in Optimization, IIT Kanpur, December, 2005.

Pani Amiya K.
"Adaptive mixed finite element method for Heat Equations", Humboldt University, Berlin, November-December 2006.

3 hour talks on "Discontinuous Galerkin Methods" during December 25-26, 2006 in the Symposium organised by Mathematics Department at IIT Madras.

"Enhanced Oil Recovery in Reservoir Studies: Some Mathematical Issues", Symposium on Recent Advances in Mathematical Sciences, IIT Kanpur, January 16-17, 2007.

Given a series of four talks in the Workshop on Computational Mathematics in CV Raman Engineering College, Bhubaneswar during January 26-27, 2007.

"Computation of Fair Price in Financial Market : A Case Study and Job Prospects", CV Raman Engineering College, Bhubaneswar on January 27, 2007.

Given a series of talks in the Indo-German Workshop on Automatic Differentiation, Optimal Control and adaptivity with Applications, IIT Bombay, November 11-17, 2006.

Puthenpurakal T.J
Gorenstein Approximations and Applications, Oberseminar, Universität Essen, Essen, Germany, November 2006.

Depth of Higher associated graded rings, University of Barcelona, Spain, Dec 1, 2006

Raghunathan Ravi
"The Tao of prime numbers", "Mathminar", Bhavan's College, Mumbai, September 8, 2006.

Rana I. K.
Plenary Talk on "Role of Technology in Math Education", Conference in Math Education, DPS New Delhi, March 28, 2007.

Ranjan Akhil
A series of 12 lectures on Topology in MTTS-06, UICT Mumbai.

Sabnis S. V.
"Applications of Markov Chain Theory to Telecommunications and Electronics", Invited two hour talk, V.C.E.T.College,Vasai, Mumbai, March 16, 2007

"Sample Size Methodology", A series of eight lectures, DST sponsored Workshop, October 2006.

"Economic component level reliability test plan for a parallel system using exact expression for system reliability", National Conference on Statistical Modeling and Inference, Shivaji University, Kolhapur, February 12-14, 2007.

"Construction of confidence intervals for the mean with samples of size one and two", First Meeting of Statistics-Study Group, IIT Bombay, March 24, 2007.

Sharma V.D.
"Nonlinear Waves", International Conference on Recent advances in Heat Transfer, Karunya Institute of Technology (Deemed University), Coimbatore, September 21-22, 2006.

"Quasilinear PDEs and Systems" at Bhaskaracharya Pratishthana, Pune, November 25, 2006.

"Application Orientation in Engineering Mathematics and Mathematical Modeling", Key Note Address, ISTE Training Programme, National Institute of Technology, Surat, December 2006.

"Resonantly interacting waves", Platinum Jubilee Commemoration Lecture, 94th Indian Science Congress, Annamalai University, Tamilnadu, January 4, 2007

Shastri A. R.
"Gauss Elimination Method and Lagrange-Beltrami identities", University of Mysore, May 2006.

"Runge's theorem and related topics", National Symposium in Analysis and Applications, Karnataka University, Dharwar, February 2-4, 2007.

Sureshkumar K.
"Interest rate models", A series of lectures, Discussion meeting on Mathematical Finance, Orange County, Coorg, November 29 – December 3, 2006.

Verma J. K.
"Hilbert-Samuel coefficients", A series of seven lectures, University of Essen, Essen, Germany, September-November, 2006.

"Cohen-Macaulay Multi-Rees Algebras", Colloquium talk, Department of Algebra and Geometry, University of Barcelona, Spain, November 10, 2006.

"Rings and Factorization", A series of eight lectures, ATM School for Lecturers in algebra and linear algebra, IIT Bombay, June 2006.

Significant Awards and Distinctions

Sharma, V.D.
Platinum Jubilee Lecture at the 94th Indian Science Congress, January 3-7, 2007, Annamalainagar, Tamil Nadu.

Honorary Work

Anandavardhanan, U. K.
Reviewer for MathSciNet, Zentralblatt MATH.

Ghorpade Sudhir R.
Referee for Comptes Rendus Mathématique de l'Académie des Sciences, Paris; IEEE Transactions of Information Theory; Resonance.

Member, Faculty Selection Committee of a university.

Editor, *Resonance*, A Journal of Science Education published by the Indian Academy of Sciences, Bangalore and co-published (from 2007) by Springer, NY

Joshi Rajani R.
Examined one PhD Thesis (IIT Delhi).

Reviewed Papers submitted to "Current Bioinformatics" and "Nucleic Acid Research", "Protein Peptide Letters".

Reviewed Research Project Proposals (in Biostatistics, and in Comprehensive Medical Systems) submitted to DST, India and MRC, South Africa.

Kulkarni Ravindra S.
Editor in Chief, Ramanujan Mathematical Society Lecture Notes Series

Editor, Journal of the Ramanujan Mathematical Society

Kulkarni Rekha P.
Referee work for a Ph. D. Thesis from Sardar Patel University, Vallabh Vidyanagar, Anand, Gujarat.

Nataraj Neela
Reviewer for International Journal of Solids and Structures

Pai Devidas V.
Member, Scientific Committee, Indian side, Indo-French Institute of Mathematics (IFIM) Co-opted by DST, Govt. of India.

Member, *Programme Advisory Committee on Mathematical Sciences (PAC-MS)* SERC, DST, Govt. of India

Member, *UGC Review Committee for Final Review of Special Assistance Programme (SAP) DSA*, Phase-III to Department of Mathematics of an Institute of national Importance in India.

Member, (UGC nominee), *Advisory Committee for Special Assistance Programme (SAP) DRS* for Department of Mathematics , Sardar Patel University, Gujarat.

Pani Amiya K.
Refereed papers for SIAM J Numer Anal., IMA J. Numer. Anal., Numerical Algorithms, etc.

Member, Editorial Board: Differential Equations and Dynamical Systems, International Journal of Numerical Analysis and Modeling, Journal of Applied Mathematics and Computing, Journal of Functional Analysis and Approximation Theory, Journal of Orissa Mathematicsal Society.

Member of a few selection committees.

Organiser of the DST PAC Meeting in November, 06

Member of the organising Committee of International Conference on Recent Trends in Nonlinear Analysis and Its Applications held in Nanded.

Puthenpurakal T.J

Reviewer for Math Reviews and Zentralblatt Math.

Refereed papers for Journal of Algebra, Proceedings of the Indian Academy of Sciences, Indian Journal of Pure and Applied Mathematics.

Raghunathan Ravi
Reviewer for Mathematical Reviews

Ranjan Akhil
Refereed papers for Proceedings of Indian Academy of Science and Journal of Geometric Analysis.

Evaluated a M. Phil thesis from the University of Mumbai.

Sabnis S. V.
Refereed three research articles for (i) Calcutta Statistical Association, (ii) OPSEARCH, (iii) Proceedings of the National Academy of Sciences.

Organiser, Statistics Study Group Activity, IIT Bombay.

Sharma V.D.
Reviewed papers for Zentrablatt Math (Germany) and Math Reviews (USA)

Examined Ph.D. Theses from Bharathiar University and Pune University

Served as a member of Selection committees for faculty recruitment at IIT Kharagpur, NIT Warangal, NIT Surat and NEHU Shillong.

Vellaisamy P.
Evaluated two Ph.D. theses from IIT Kharagpur

Verma J. K.
Reviewer for Mathematical Reviews.

Secretary, Advanced Training in Mathematics Schools.

Trustee, Bhaskaracharya Institute of Mathematics, Pune.

List of Faculty and Specializations

1. **Ameer Athavale** - *Functional Analysis*
2. **Anandavardhanan U.K**. - *Number Theory*
3. **Baskar S.** – *Partial Differential Equations, Nonlinear Waves*
4. **Dipendra Prasad –** *Number Theory*
5. **Ghorpade Sudhir R**. - *Algebraic Geometry, Combinatorics, Coding Theory*
6. **Joshi K. D**. - *Topology, Discrete Mathematics*
7. **Joshi Rajani R**. - *Computational Biology*, *Biostatistics* and *Bioinformatics*
8. **Keshari Manoj Kumar -** *Commutative Algebra*
9. **Kulkarni Rekha P**. - *Numerical Functional Analysis, Spline Theory*
10. **Limaye Balmohan V**. - *Functional Analysis, Numerical Analysis, Spectral Approximation*
11. **Mahajan Swapneel -** *Algebra*
12. **Neela Nataraj -** *Finite Element methods*
13. **Pai Devidas V**. - *Functional Analysis, Approximation Theory, Set-valued Analysis*
14. **Pani Amiya K**. - *Numerical Analysis, Partial Differential Equations, Industrial Mathematics*
15. **Puthenpurakal T.J** **-** *Commutative Algebra*
16. **Raghunathan Ravi** - *Automorphic forms, Number Theory*
17. **Rana Inder K**. - *Harmonic Analysis, Mathematics Education*
18. **Ranjan Akhil** - *Differential Geometry*
19. **Ravi S. Kulkarni –** *Differential Geometry*
20. **Sabnis S. V**. - *Reliability Theory, Industrial Statistics*
21. **Sabu Nicholas** – *Partial Differential Equations*
22. **Sharma V.D**. - *Quasilinear Hyperbolic Systems of PDEs/ Nonlinear Waves*
23. **Shastri A. R**. - *Algebraic Geometry, Algebraic Topology*
24. **Sivaji Ganesh Sista –** *Partial Differential Equations*
25. **Srinivasan G. K**. - *Partial Differential Equations*
26. **Srinivasan M. K**. - *Combinatorics*
27. **Subramanyam A**. - *Statistical Inference, Geostatistics*
28. **Sureshkumar K**. - *Stochastic Differential Game Theory, Mathematical Finance.*
29. **Vellaisamy P**. - *Applied Probability, Statistical Inference, Industrial Statistics*
30. **Verma J. K.** - *Commutative Algebra*