



Mathematics

Introduction

The Department of Mathematics conducts basic, applied and interdisciplinary research in varied areas of Mathematics, including Algebra & Number Theory, Analysis, Geometry and Topology, Combinatorics and Theoretical Computer Science, Partial Differential Equations & Numerical Analysis, and Probability & Statistics. The current faculty strength is 41. The new faculty members who joined the department during 2012-2013 are: Prof. Ananthnarayan Hariharan, Prof. Rekha Santhanam, and Prof. Srikanth Srinivasan.

The year witnessed excellent contributions and achievements of faculty and students in research; interaction with industry and noted national and international institutes, universities and organisations; and extended educational activities beyond the departmental academic programmes.

Academic Programs

Student Intake:

Ph.D	: 08
M.Sc. (MA)	: 27
M.Sc. (ASI)	: 30

Degree Awarded:

Ph.D.	: 04
M.Sc.(MA)	: 26
M.Sc. (ASI)	: 28

The department is involved in teaching the Mathematics-related courses in the B.Tech. Programme of the institute. In addition, the department offers two distinct Master's programme: M.Sc. (Mathematics) and M.Sc. (Applied Statistics and Informatics). Moreover, the department has a vibrant research programme leading to Ph.D. degree.

R & D Activities

Sponsored Projects	: 10
New	: 2
Ongoing	: 8
Faculty involved	: 11

Continuing with its tradition, the department has further augmented its basic research, focusing in contemporary areas of fundamental, developmental and strategic importance as well as applied and interdisciplinary research. It is also engaged in a productive collaboration with industries and reputed R&D departments. The collaborating R&D institutions/organisations include:

Indian Institutions: Tata Institute of Fundamental Research (TIFR), Indian Institute of Science (IISc), Indian Statistical Institute (ISI), Institute of Mathematical Sciences (IMSc).

Foreign Universities: Brunei University (U.K), Florida Technical University (USA), Colorado School of Mines (US), Aberystwyth University (UK), Humboldt University (Germany), CNRS-IML, Marseille (France), Institut National des Sciences Appliquées, Toulouse (France), Univ. St-Etienne (France), l'Université Pierre et Marie Curie, Paris (France), Technical University of Denmark, Vilnius University, Lithuania, Emory University, US, French Naval Academy, Universität Bielefeld, Germany, University of Twente, Netherlands.

Nodal Organizations: CSIR, DAE, DBT, DST.

Sponsored Research Projects

S. No.	Project Title	Sponsoring Agency	Status
1	National Programme on Differential Equations: Theory, Computation and Applications (NPDE-TCA)	DST	Ongoing
2	Numerical Treatment of Integral Operators with Non-Smooth Kernels	Indo-French Centre for Promotion of Advanced Research	Ongoing
3	PracTutor	Empower IT solutions	Ongoing
4	Robust parameter designs for quality and safety critical processes	DST	Ongoing
5	Linear error correcting codes and higher dimensional algebraic varieties	IRCC, IIT Bombay	New
6	Algebraic varieties over finite fields and linear error correcting codes	DST-RFBR (Indo-Russian Project)	New
7	INSPIRE Faculty Award Research grant	DST	Ongoing
8	Characteristic fast marching method for fronts propagating in an inhomogeneous moving fluid	DST	Ongoing
9	Discontinuous Galerkin Method for Nonlinear Acoustics	Indo-French Centre for Promotion of Advanced Research	Ongoing
11	Identifying the most successful combination dose in a phase I/II clinical trial	IRCC	Ongoing
12	Liftings of operator tuples and structure theory of operator Algebras	IRCC	Ongoing
Consultancy Projects			
S. No.	Project Title	Sponsoring Agency	Status
1	Statistical Analysis of the data related to scholastic skills obtained using a questionnaire administered after showing animation films to school kids in Mumbai and New Delhi	Worldkids Foundation, Mumbai	Complete

Extension Activities

Workshops and conferences were organized/coordinated by the faculty of the department as follows:

Baskar, S.

Advanced Level Workshop on Recent Developments in Numerical Methods for Evolution Equations, March 2013.

Nataraj, N.

Advanced Level Training Programme of National Programme for Differential Equations, June 2012.

Advanced Level Workshop on Non-standard Finite Element Methods, February 2013.

Rana, I. K.

Math for ECM, CEP short course, April 2012.

8th Professional Development and Technology Orientation for math teachers, CEP short course, July 2012.

TIME Primary Conference for Math Teachers, December 2012.

Ranjan, A.

MPLW Dynamical Systems, April 2012.

Shastri, A. R.

Annual Foundation School II of Advanced Instructional School, held at Pune University, June 2012.

Visitors to the Department

Ahues, Mario, Universite' Jean Monnet, Saint Etienne, France, January 18-February 3, 2013.

Brenner, Susanne, Louisiana State University, February 2013.

Bruen, Aiden, Department of Mathematics, University of Calgary, Canada. Delivered a lecture on Blocking Sets, Configurations and Perspective Sets, October 2012.

Carstensen, Carsten, Humboldt University, February to March 2013.

D'Cruz, Clare, Chennai Mathematical Institute. Delivered a lecture on Castelnuovo Mumford regularity of powers, sum and radical of ideals, April 2012.

Das, Soumya, School of Mathematics, TIFR. Delivered a lecture on Fourier coefficients of Siegel modular forms, September 2012.

Dutta, Amartya, Indian Statistical Institute, Kolkata. Delivered a lecture on The Kuttakadhyayah of Brahmagupta: Emergence of Algebra in Ancient India, February 2013.

Exner, George, Bucknell University, USA. Delivered two lectures on n-contractivity and k-hyponormality: Some measure considerations, November 2012.

Gohm, Rolf, Aberysthwyth University. Delivered a lecture on Non-commutative Markov Chains and Multi-analytic Operators, August 2012.

Grammont, Laurence, Universite' Jean Monnet, Saint Etienne, France. Delivered a lecture on Improvement over the Galerkin and the iterated Galerkin methods for nonlinear integral equations, January 18 - February 3, 2013.

Griewank, Andreas, Department of Mathematics, Humboldt University. Delivered a lecture on From linear to piecewise linear modelling and back, March 2013.

Janwa, Heeralal, University of Puerto Rico, San Juan, Puerto Rico (USA), December 21-28, 2012. Delivered a lecture on On the Main Conjecture on APN Functionson December 27, 2012.

Laishram, Shanta, Indian Statistical Institute, Delhi. Delivered a lecture on Grimm's Conjecture and smooth numbers, March 2013.

Lukacova-Medvidova, Maria, Institut fur Mathematik, Universität Mainz, Germany, March 15-28, 2013. Delivered a lecture on Mathematical Fluid Dynamics: Example and Challenges on March 26, 2013,

Madiman, Mokshay, Yale University, New Haven, USA. Delivered a lecture on An entropy-based sunset calculus for discrete and continuous settings, August 13, 2012.

Mittal, Rajat, Institute for Quantum Computing, University of Waterloo. Delivered a lecture on Helping quantum computers classically, March 2013.

Ram Murty, M., Queens University, Kingston, Canada. Delivered a lecture on The Legacy of Srinivasa Ramanujan, January 3, 2013.

Sreekantan, Ramesh, ISI Bangalore. Delivered a lecture on Circular units and a generalization, September 10, 2012.

Sung, Li-Yeng, Louisiana State University, USA. February 2013.

Venketasubramanian, C. G., Université de Versailles St-Quentin en Yvelines. Delivered a lecture on Representations of $GL(n)$ distinguished by $GL(n-1)$, December 2012.

Viennot, Xavier G., LaBRI, Université Bordeaux 1, Talence, France. Gave A Short Course on Combinatorics and Physics: The Cellular Ansatz, January 3-February 20, 2013.

Wen Ching Winnie Li, The Pennsylvania State University, USA and the National Center for Theoretical Sciences, Taiwan, July 28-31, 2012.

Wilson, Richard, California Institute of Technology (Caltech), USA. Delivered a lecture on A lemma on polynomials modulo p^m and applications to coding theory, December 26, 2012.

Conference/ Workshops/ Seminars (Participated/ Paper Presented)

Anandavardhanan, U.K.

INSPIRE Science Internship Camp, G N Khalsa College, Mumbai, November 16-20, 2012.

“Mod p representations of $GL(2, \mathbb{Q}_p)$ ”, *Automorphic Forms, Galois Representations and L-functions (Indo-French Centre for Promotion of Advanced Research)*, held at IISER Pune, September 03-07, 2012.

“Mod p representations of $GL(2, \mathbb{Q}_p)$ ”, *The Legacy of Srinivasa Ramanujan*, held at University of Delhi, December 17-22, 2012.

Bhaskara, A., Desai, D. and Srinivasan, S.

“Optimal Hitting Sets for Combinatorial Shapes”, *16th. International Workshop on Randomization and Computation (RANDOM '2012)*, 2012.

Baskar, S.

Two lectures on “Numerical Methods for Heat and Wave Equations”, *PG Level Training Program on Differential Equations*, held at IIT Delhi, May 14-June 2, 2012.

Dani, S.G.

“Almora Mathematical Surveys”, *Interface between Hyperbolic Geometry and Diophantine Approximation*, held at Kumaun University, Almora, October 3-6, 2012.

“Geometry in the Sulvasutras”, *Workshop on Promoting History of Science in India*, held at the IIT Gandhinagar, March 16-17, 2013.

“Trigonometry in Ancient and Medieval India”, Conference on *Frontiers of Mathematics and Recent Developments*, held at Rani Channamma University, Belgavi, March 26-27, 2013.

“Studying Values of Binary Quadratic Forms Through Dynamics”, *3rd Indo-Brazilian Symposium in Mathematics*, IMPA, Rio de Janeiro, August 13-17, 2012.

“Role of Mathematical Societies in the Early Development of Mathematics in India”, *International Seminar on History of Mathematics*, held at Ramjas College, Delhi, November 19-20, 2012.

“Katyayana Sulvasutra - Some Observations”, *International Conference on History and Development of Mathematical Sciences*, held at Maharshi Dayanand University, Rohtak, November 21-24, 2012.

“Lattice Subgroup Actions and Diophantine Approximation with Binary Quadratic Forms”, *ICTS Discussion meeting on Recent Trends in Ergodic Theory and Dynamical Systems*, held at Maharaja Sayajirao University of Baroda, Vadodara, December 26-29, 2012.

Dey, S.

Recent advances in Operator Theory and Operator Algebras, held at ISI Bangalore, December 31, 2012-January 11, 2013.

“Repeated interaction model for a Quantum system with a subprocess”, *15th Workshop on Non-Commutative Harmonic Analysis*, held at Bdlewo, Poland, September 23-29, 2012.

Ghorpade, S. R.

“Splitting subspaces, Singer cycles and linear recurrences”, *Séminaire de Théorie des Nombres*, Institut de Mathématiques de Bordeaux, Université Bordeaux 1, Talence, France, May 11, 2012.

“Affine Grassmann codes and their automorphisms”, *Séminaire Arithmétique et Théorie de l'Information*, Institut de Mathématiques de Luminy, Marseille, France, May 24, 2012.

“Arithmetic progressions in a unique factorization domain”, *Séminaire de Théorie des Nombres*, Institut de Mathématiques de Toulouse, Université de Toulouse Le Mirail, Toulouse, France, May 29, 2012.

“Splitting subspace conjecture”, *Kolloquium*, Christian-Alberchts Universität Kiel, Kiel, Germany, June 1, 2012.

“Linear Codes related to Grassmann Varieties and their automorphisms”, *Coding Theory Colloquium*, Technical University of Denmark, Lyngby, Denmark, June 7, 2012.

“Introduction to affine Grassmann codes”, *Sophus Lie Seminar*, Universitetet i Tromsø, Tromsø, Norway, June 20, 2012.

“Grassmann varieties, codes and combinatorics”, *Colloquium talk*, University of Puerto Rico, San Juan, Puerto Rico, June 29, 2012.

Limaye, B.V.

“Well-conditioned basis of a spectral subspace”, *National Seminar on Current Research and Developments in Mathematics and Computing (CDRMMC-2012)*, held at Alia University, Kolkata, October 3, 2012.

“Stokes theorem for intervals, rectangles and cuboids”, *National Symposium on Mathematical Methods and Applications (NSMMA-2012)*, held at Indian Institute of Technology Madras, Chennai, December 22, 2012.

“Conditioning of a Basis”, *International Conference on Numerical Linear Algebra and its Applications (NLAA 2013)*, held at Indian Institute of Technology Guwahati, Guwahati, January 16, 2013.

Mukhopadhyay, S.

“Effect of Model Misspecification on Designs for GLMs”, *International Conference on Statistics and Informatics in Agricultural Research*, December 18-20, 2012.

Eighth International Triennial Calcutta Symposium on Probability & Statistics, December 27-30, 2012.

Nataraj, N.

A series of lectures on Numerical Analysis in *UG level Training Programme of National Programme of Differential Equations- Theory, Computation and Application (NPDE)*, held at Bhuvaneshwar, May 2012.

A series of lectures on *Finite Element Methods in Advanced Training Programme of NPDE*, held at IIT Bombay, June 2012.

Puthenpurakal, T.J.

“Bockstein cohomology of associated graded rings”, *27th Annual Conference of the Ramanujan Mathematical Society*, held at New Delhi, October 20-23, 2012.

“On the intersection of Annihilator of the Valabrega-Valla module”, *National Conference on Topics in Commutative Algebra*, held at Institute of Science, Mumbai, January 24-25, 2013.

Raghunathan, R.

“Factorisation in a Class of L-functions”, *Indo-French Conference on Automorphic forms, Galois representations and L-functions*, held at IISER, Pune, September 3-7, 2012.

“On the Global Exterior Square L-function of Jacquet and Shalika”, *The Legacy of Srinivasa Ramanujan - An international conference*, held at University of Delhi, December 17-22, 2012.

Rana, I.K.

“Enabling Mathematics Learning through Technology”, *RFIME*, New Delhi, July 2-3, 2012.

2nd national Multi-Conference on Contemporary Global Trends in Technology and Management, LNCT Indore, August 2012.

British Council's Global Policy Dialogue on Science and Mathematics, Education in Schools: The way forward, held at New Delhi, January 9-10, 2013.

17th Asia Technology Conference in Mathematics, Bangkok, December 2012.

Sabnis, S.V.

“Multistate Coherent Systems”, *Workshop on Reliability Theory and Survival Analysis*, held at IIT Kanpur, December 3-5, 2012.

“Analyzing the Effects of Metal Derived Products on Survival and Hatching of Zebrafish Embryos using Generalized Estimating Equation (GEE) Methodology” in “Statistics in Action”, *Workshop on Applied Statistics for Statisticians and Users of Statistics in Biological and Social Sciences*, March 7-10, 2013.

“Estimation of Parameters of a Mixture Distribution Function Using Quantile Functions”, *International Conference on Frontiers of Statistics and its Applications (CONFROST-2012)*, Department of Statistics, Pondicherry University, December 21-23, 2012.

Participated in a panel discussion on Statistical Capacity building in South Asia, *International Indian Statistical Association Annual Conference*, Chennai, January 2-5, 2013.

Sane, S.S.

Conference on Algebra and Discrete Mathematics at Kattappana, Kerala, November 2012.

Conference on Mathematics and its Applications: A special talk on Mathematics and Computer Science, Wadia College, Pune, November 2012.

Symposium in Combinatorics at the *Ramanujan Mathematical Society Annual Meeting*, Shiv Nadar University, New Delhi, October 2012.

Recent Trends in Discrete Mathematics, School of Mathematics, Tata Institute of Fundamental Research, December 17-20, 2012.

Santhanam, R.

“Equivariant Baratt-Priddy-Quillen Theorem”, *RMS Conference, Topology Symposium*, October 2012.

Srinivasan, S.

“Certifying Polynomials for AC^0 [parity], with applications”, *Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2012)*, December 2012.

Suresh Kumar, K.

“Controlled Stochastic Processes: Theory and Applications”, *India-UK scientific seminar*, held at Department of Mathematical Sciences, University of Liverpool, UK, March 25-27, 2013.

Verma, J.K.

“Newton Polytopes and Polynomial Equations”, *ATM Workshop and Conference and Complex Analysis and Related Topics*, held at Central University of Rajasthan, March 15-20, 2013.

“Linear Diophantine Equations and Stanleys Solution of Anand-Dumir-Gupta Conjecture”, *Conference on Commutative Algebra*, held at Institute of Science, January 25, 2013.

“Linear Diophantine Equations”, *Ramanujan Memorial Award Lecture at the 78th Annual Conference of Indian Mathematical Society*, held at BHU, Varanasi, January 22-25, 2013.

“Resolution of Singularities and Integral Closure of Ideals”, *27th Annual Meeting of the Ramanujan*, held at Mathematical Society, New Delhi, October 20-23, 2012.

“Local Cohomology of Bigraded Rees Algebras and Normal Hilbert Polynomials”, *Vietnam-France Joint Congress in Mathematics*, Hue City, Vietnam, August 20-24, 2012.

“Products of complete ideals and a theorem of Rees about normal Hilbert polynomials”, *III Indo-Brazil Symposium in Mathematics*, IMPA, Rio de Janeiro, Brazil, August 13-17, 2012.

“Local Cohomology of bigraded Rees algebras”, *34th Japan Commutative Algebra Symposium*, Hayama (Japan), November 22-26, 2012.

“Fundamental Theorem of Algebra”, *Institute Colloquium at LNM-IIT Jaipur*, April 17, 2012.

Invited Lectures**Anandavardhanan, U.K.**

“On ranking and rating, Outreach Programme for Higher Secondary School Teachers & Students” at

Kerala School of Mathematics, Calicut, September 30-1 October 02, 2012.

“Fibonacci primes, Outreach Programme for Higher Secondary School Teachers & Students” at Kerala School of Mathematics, Calicut, September 30- October 20, 2012.

Invited talk on Automorphic forms on adèle groups, *School on Modular Forms*, held at Kerala School of Mathematics, Calicut, October 3-19, 2012.

Three invited lectures on Herzig’s classification of supersingular representations of $GL(n)$ *Hilbert Modular Forms and Varieties*, Kerala School of Mathematics, Calicut, January 21-31, 2013.

“Mod p representations of $GL(2, \mathbb{Q}_p)$, Automorphic forms, Galois representations and L-functions”, *Indo-French Centre for Promotion of Advanced Research, IISER Pune*, September 3-7, 2012.

“Mod p representations of $GL(2, \mathbb{Q}_p)$ ”, *The Legacy of Srinivasa Ramanujan*, University of Delhi, December 17-22, 2012.

Dani, S.G.

Prof. S.V. Keshava Hegde Memorial Endowment Lecture on The Story of Development of Mathematics in India at University of Mysore, March 9, 2013.

Prof. S.V. Keshava Hegde Memorial Endowment Lecture on Diophantine approximation - via arithmetic, geometry and dynamics at University of Mysore, March 9, 2013.

Three lectures on Interface between Hyperbolic Geometry and Diophantine Approximation, *ICTS Workshop on Groups, Geometry and Dynamics*, held at Kumaun University, Almora, December 3-12, 2012.

Three lectures on An introduction to flows on homogeneous spaces, *ICTS Workshop on Recent Trends in Ergodic Theory and Dynamical Systems*, held at Maharaja Sayajirao University of Baroda, Vadodara, December 18-24, 2012.

Four lectures on Continued Fractions and the Geodesic Flow, *Indo-French workshop on Dynamics and Number Theory*, held at Kerala School of Mathematics, Kozhikode, February 4-8, 2013.

Dey, S.

Invited talk on Characteristic function for liftings, *Operator Algebras in Non-equilibrium Statistical Mechanics* held at the Bambolim Beach Resort, Goa, December 17-21, 2012.

Invited talk on Generalized Repeated Interaction Model and Transfer Functions, *International Workshop on*

Operator Theory and Applications (IWOTA), held at University of New South Wales, Sydney, Australia, July 16-20, 2012.

Invited lecture on Outgoing Cuntz Scattering System for a Coisometric Lifting, *Quantum Probabilities and Related Fields (QP33)*, held at the CIRM in Luminy, France, October 1-5, 2012.

Ghorpade, S.R.

“An introduction to the theory of equations”, *DST-INSPIRE Science Camp* held at Govt. College for Men, Kadapa, Andhra Pradesh, July 17, 2012.

Two lectures on Partitions of numbers, a theorem of Euler, and a formula of Ramanujan, *DST-INSPIRE Science Camp* held at Maharaja Krishnakumarsinhji Bhavnagar University, Bhavnagar, Gujarat, July 21-22, 2012.

“Development of the theory of equations”, *DST-INSPIRE Science Camp* held at Smt. Kasturbai Walchand College, Sangli, Maharashtra, August 4, 2012.

“Perfect numbers”, *DST-INSPIRE Science Camp* held at Loyola Degree College, Pulivendula, Andhra Pradesh, August 25, 2012.

“Real analysis” at Loyola Degree College, Pulivendula, Andhra Pradesh, August 25, 2012.

“Counting points of varieties over finite fields: A meeting ground for algebra, analysis, geometry, topology, and number theory”, *Institute Award Lecture Series*, Indian Institute of Technology Bombay, Mumbai, August 29, 2012.

“Euler, Ramanujan, and the theory of partitions”, *DST-INSPIRE Science Camp*, held at Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra, October 12, 2012.

“Decimal expansions and continued fraction expansions”, Dept of Mathematics, Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra, October 12, 2012.

“Partitions of integers and an astonishing formula of Ramanujan”, Shivaji University, Kolhapur, December 22, 2012.

Four invited lectures on Topics in elementary number theory, *UGC Refresher Course in Mathematics/Statistics*, held at Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, September 10-11, 2012.

Two invited lectures on Automorphisms of Grassmann varieties, *Workshop and Conference on Groups and*

Geometries, held at Indian Statistical Institute, Bangalore, December 10-11, 2012.

Four invited lectures on Betti numbers of Stanley-Reisner rings and generalized Hamming weights of codes and matroids, *Workshop on Syzygies and Free Resolutions*, held at Chennai Mathematical Institute, Siruseri, December 19-20, 2012.

Two invited lectures on Linear feedback shift registers and their generalizations, *National Workshop on Computer Applications based on Modern Algebra*, held at Manipal Institute of Technology, Manipal, January 4-5, 2013.

An invited talk on Determinantal Varieties: Glimpses of Abhyankar’s Work and Some Recent Developments, *National Conference on Topics in Commutative Algebra*, held at Institute of Science, Mumbai, January 24, 2013.

An invited talk (Prof. N.E. Joshi Memorial Lecture) on Matrices, polynomials, and linear recurrences over finite fields, *Annual Conference of the Marathwada Mathematical Society* (and the *National Conference on Recent Developments in Mathematics and Statistics*), held at T. C. College, Baramati, February 16, 2013.

Invited talk on Two Miracles About 1-jets of Determinantal Varieties, *Conference on Algebra and Algebraic Geometry in honor of Shreeram Abhyankar’s 82nd birthday*, held at Purdue University, West Lafayette, USA, July 5-8, 2012.

Hariharan, Ananthnarayan

“Real Numbers and the L.U.B. Axiom” at K.T.H.M. College, Nasik, October 2012.

“Tales of a Local Algebraist” at IISER Pune, November 2012.

Invited talk in Connected Sums of Gorenstein Rings, *Conference on Topics in Commutative Algebra* held at Institute of Science, Mumbai.

“Associated Graded Rings and Connected Sums” at Purdue University, USA, July 2012.

Joshi, R.R.

Invited lecture on My Contributions in Scientific Evaluation and Statistical Validation of Yagya-based Inhalation Therapy, *National Workshops at Bhabha Atomic Research Centre*, Mumbai, August, 2012.

Two invited lectures on My Contributions in Innovations in Ancient Sciences at *DIYA Workshop* at CLRI Chennai and Indira Gandhi Atomic Research Centre, Kalpakkam, April, 2012.

Invited talk on An Indian Tradition to Establish Symbiosis Between Man and Nature, *International Conference on Mind, Nature and Technology*, held at Indus Business Academy, Bangalore, February 2013.

Limaye, B.V.

“Reduction of some infinite-rank problems” to matrix problems, Indian Statistical Institute, Kolkata, October 4, 2013.

“Conditioning of a basis of a spectral subspace”, Tata Institute of Fundamental Research - Centre for Applicable Mathematics, Bangalore, February 18, 2013.

“On condition numbers of a basis”, Indian Institute of Science, Bangalore, February 19, 2013.

“Sensitivity of computations involving a basis”, Université Jean Monnet, Saint Etienne, France, June 3, 2013.

Nataraj, N.

An invited talk in *Workshop on elliptic and parabolic PDEs and related topics: Theory and Numerical Methods*, held at IIT Gandhinagar, August 2012.

An invited talk in *DAAD Network Workshop on Modeling, Computing and Optimization*, held at IIT Madras, September, 2012.

An invited talk in *Symposium on PDE, Annual Conference of the Ramanujan Mathematical Society (RMS)*, held at Delhi, October, 2012.

Invited speaker in *International Workshop and Tutorial on Computational Mathematics-Advances in Computational PDEs*, held at Department of Computational Science and Engineering, Yonsei University, South Korea, March 2013.

“Finite element methods for fourth order elliptic problems”, Humboldt University, Berlin, July 2012.

Raghunathan, R.

Two lectures in the workshop on *Hilbert Modular Forms and Varieties*, held at Kerala School of Mathematics, Calicut, January 21-31, 2013

Rana, I. K.

“Infinity and beyond infinity”, *Professional Development for Teachers* at Sanskriti school, Delhi, February 2013.

“Why do we need “limits?””, *Professional Development for Teachers* at Sanskriti school, Delhi, February 2013.

“Mathematics in Engineering” at G.H. Patil College of Engineering, Vallabh Vidya Nagar, Anand, November 2, 2012.

Ranjan, A.

Two lectures on Hopf Rinow Theorem *ATM Workshop in Riemannian Geometry* held at TIFR-CAM Bangalore, July 2012.

Sabnis, S. V.

Two hours talk on Applications of Probability and Statistics in Electronics and Communication Engineering at Dr. Daulatrao Aher Engineering College, Karad, on April 6, 2013.

Sane, S. S.

Gave six lectures for students in the pre-departure camp for preparation to the International Mathematical Olympiad, July 2012.

Mentoring Lecture at the DST Inspire program, University of Baroda, July 2012.

Mentoring and Inaugural Lecture at Mathematics Program, Jidnyasa Trust, Thane, August 2012.

Mentoring and Inaugural Lecture at Mathematics Program, Saad Foundation

Mentoring Lecture at the DST Inspire program, Pharmacy Institute College, NMIMS, Vile-Parle, October 2012.

Mentoring and Inaugural Lecture at a two day conference at Jhunjhunwala College, Ghatkopar, Mumbai, December 2012.

Invited Speaker, Mathematics Department, Shivaji University, Kolhapur, November 2012.

Six lectures in *AIS Program in Combinatorics*, held at The Harish Chandra Research Institute, June 2012.

Three lectures on Cayley Graphs, *Workshop on Ramanujan Graphs and Expander Graphs at Mathematics Department*, held at Pune University, February 2013.

Sharma, V. D.

“Quasilinear hyperbolic equations”, BITS Pilani, April 2012.

Invited lecture on “Elementary waves of the Riemann problem”, *Ramanujan Mathematical Society Conference*, New Delhi, October 2012.

Invited lecture on “Weakly nonlinear waves” and Chaired one Technical Session for invited lectures at *Indo-German Conference*, held at IWAR Tech. Univ. Darmstadt, Germany, September 2012.

Shastri, A. R.

Six lectures and conducted equal number of tutorial sessions in *Workshop on Geometric Methods in Complex Analysis*, held at IISC Bangalore, April 2012.

Nine hours lectures in Algebraic Topology and several hours of tutorials in *Annual Foundation School II of Advanced Instructional School*, held at Pune University, June 4-30, 2012.

Invited talk on An alternative proof of classical regular homotopy theorem *Symposium in Topology at Ramanujam Mathematical Society's Annual Meeting Conference*, Dehli.

Invited talk on A new proof of Brouwer's Invariance of Domain, *Symposium on Topology at Indian Math Society Meeting*, held at BHU, January 22-25, 2013.

Shorey, T. N.

"abc Conjecture", A VSRP lecture at TIFR in July 2012.

Verma, J. K.

"Constructible Regular Polygons" at JECRC University, Jaipur, March 14, 2013.

"Four Problems of Euclidean Geometry", *Inspire Science Camp* at Sarvajanic College of Science, Surat, November 30, 2012.

Twelve lectures on "Zariski-Lipman Theory of complete ideals", Vietnam Institute of Advanced Studies in Mathematics, September 3-21, 2012.

Four lectures on "Cyclic and abelian extensions", *Annual Foundation School III*, HRI, Allahabad, July 23-31, 2012.

Four lectures on "Linear Transformations", *Instructional school for college teachers*, at SGS Institute of Engineering and Technology, Nanded, May 25-26, 2012.

Six lectures on "Cohen-Macaulay Rings", *AIS in commutative algebra*, IIT Madras, May 13-19, 2012.

Six lectures on "Zariski's Theory of complete ideals", Vietnam Institute of advanced Mathematics, August 2012.

Delivered a Ramanujan Memorial Award Lecture at the 78th Annual Conference of Indian Mathematical Society

Significant Awards and Distinctions

Ghorpade, S.R.

"Visiting Professor", Université de Toulouse Le Mirail, Toulouse, France, May 2012.

"IIT Bombay Research Paper Award for the year 2011" (for the paper "Étale cohomology, Lefschetz theorems and number of points of singular varieties over finite fields" with G. Lachaud in *Moscow Math. J.* 2 (2002), 589-631), September 5, 2012.

"Prof. N. E. Joshi Memorial Lecture Award", Marathwada Mathematical Society, February 16, 2013.

Nataraj, N.

"IIT Bombay Excellence in Teaching Award".

Rana, I.K.

"Aryabhata Award" for 2012, by the All India Ramanujan Maths Club, for contributions to math education.

Sane, S.S.

Observer nominated by the NBHM for the Indian Mathematical Olympiad Team performance at the 53rd International Mathematical Olympiad at Mar del Plata, Argentina, July, 2012

Sharma, V.D.

Sectional President for 82nd Annual Session of NASI held at BHU, December 2012.

"Member of the Sectional Committee I" (Mathematical Sciences: Applied Mathematics, Pure Mathematics and Statistics) for INSA (Indian National Science Academy), New Delhi for a term of three years beginning January, 2013-2015 to assess nominations received for INSA Fellow and INSA Young Scientists.

Nominated as a member of the Fellowship Committee to scrutinize the nominations for the Fellowship of the National Academy of Sciences, India (NASI) for the year 2012.

Srinivasan S.

Honorable Mention for the ACM India Doctoral Dissertation Award.

Verma, J.K.

Elected "Fellow of Indian National Science Academy", New Delhi.

Honorary Work

The faculty of the department served in various capacities as follows:

Ananthnarayan, H.

Resource Person for two lectures on "Linear Algebra" at *Confluence*, a programme for U.G. Students at St. Joseph's College, Bangalore, December 2012.

Refereed papers for Illinois Journal of Mathematics, and Journal of Pure and Applied Algebra.

Dani, S. G.

Member of National Board for Higher Mathematics, President of Indian Society for History of Mathematics.

Member of the Editorial Board of: Journal of Theoretical Probability, Monatshefte fuer Mathematik, and Proceedings of the Indian Academy of Sciences (Math. Sci.); as Editor of Ganita Bharati Bulletin of the Indian Society for History of Mathematics.

Member of: Governing body of C.R. Rao Advanced Institute for Mathematics, Statistics and Computer Science, Hyderabad; Governing body of Indian Institute of Science Education and Research (IISER), Thiruvananthapuram; and the Academic Council of the Chennai Mathematical Society, Chennai.

Served on the organizing committee of the Indo-French workshop on *Dynamics and Number Theory*, held at the Kerala School of Mathematics, Kozhikode, February 2013.

Ghorpade, S. R.

Member, Editorial Board, *International Journal of Information and Coding Theory*; Advisory Editor, Course Material in Algebra, Indira Gandhi National Open University, Delhi.

Expert Member, Board of Studies in Mathematics and the Faculty of Science, *The M.S. University of Baroda*, Vadodara, Gujarat, 2011-2013; Member, Membership Scrutiny Committee, National Academy of Sciences India, April 2012; Member, Selection Committee for Mathematics Faculty, BITS Pilani (April 2012 and October 2012), University of Allahabad (November 2012), University of Mumbai (December 2012), and IIT Gandhinagar (January 2012); as Referee for Finite Fields and Their Applications (Elsevier); Referee for a postdoctoral fellowship of the National Board for Higher Mathematics, Govt. of India.

Joshi, R. R.

Referee (External Examiner) of Ph.D. thesis in University of Poona; Reviewer for some international journals in Bioinformatics; Statistics expert for review of projects submitted to DST and DBT.

Chairperson, Board of Studies in Bioinformatics, University of Poona, Pune; Member, BoS in Bioinformatics/Computational Biology, Central University of Pondichery.

Limaye, B.V.

Examiner of a doctoral thesis at Cochin University of Science and Technology, Cochin.

Mukhopadhyay S.

Reviewer for Journal of Applied Statistics, Communications in Statistics, Simulations and Computations, Journal of Statistical Theory and Practice, Psychological Methods.

Reviewer for BRNS, DAE funded project proposals.

Nataraj, N.

Thesis Examiner of Ph.D. students from Anna University and IIT Kanpur; Associate Editor, International Journal of Numerical Analysis and Modelling, Series B.; One of the panelists at the Round table: Role of Mathematics in Emerging Economies in the 6th European Congress of Mathematics, Krakow, Poland, July 2012.

Puthenpurakal, T.J.

Reviewer for Math Reviews and Zentralblatt Math; Refereed papers for Journal of Algebra, Proceedings of the Indian Acad. Sci, Indian Journal of Pure and Applied Mathematics.

Rana, I. K.

Editor, electronic journal eJMT

Raghunathan, R.

Reviewer for Mathscinet
Referee for several journals and conference proceedings

Sabnis, S. V.

Refereed one research article for one International journal.

Sane, S. S.

Served as Selection Committee Member, Computer Science Department, IIT, Indore, May, 2012; R.C. Bose Institute of Cryptography, Indian Statistical Institute, Kolkata, November, 2013; Member, Academic Council, IGIDR (Indira Gandhi Institute of Development Research), Mumbai; National Coordinator, Mathematics Olympiad Program; Selection Committee Member for the MSc, MPhil and PhD degree selection interviews at the IGIDR (Indira Gandhi Institute of Development Research), Mumbai; Convener, Western Zone, Library Committee, National Board for Higher Mathematics; Member of the Board of Studies, Goa University.

Reviewer for Zentralblatt fur Mathematic, Paper Reviews:7, Book Review:1; Associate Editor of the Indian Journal of Pure and Applied Mathematics (from January, 2013); Refereed journal articles: Designs, Codes and Cryptography, Journal of Combinatorial Designs, Discrete Mathematics, Indian Journal of Pure and Applied Mathematics; Refereed two PhD theses (Kalyani University and Kerala University).

Sharma, V. D.

Reviewed papers for Math Reviews (USA) and Zentralblatt MATH (Germany). Served as Member of the selection committees for faculty recruitment at IIT Indore; Defence Inst. of Armament Tech.(Pune), JNU (New Delhi), Univ of Allahabad and Institute of Chem Technology, Mumbai; Member of the committee for the award of Post Doc. Fellowship (CSIR) and the DST-Inspire program at Baroda Univ.; Evaluated Ph.D.

Thesis at Pune University, TIFR Bangalore Centre, BARC (Mumbai), Thaper Univ. Patiala.

Verma, J. K.

Served as Member, Academic Council of Chennai Mathematical Institute (2011); Member, Board of Studies of Central University of Rajasthan, Kishangarh, Rajasthan (2012); Member, Board of Studies of Kumaun University, Almora (Uttarakhand) 2011); Secretary, Apex Committee of the National Centre for Mathematics, a joint centre of IIT Bombay and TIFR, 2010.

Faculty Members and their Specializations

1. Anandavardhanan, U.K.

Number Theory

2. Athavale, Ameer

Functional Analysis

3. Baskar, S.

Hyperbolic Conservation Laws: Theory, Numeric and Applications

4. Das, Ashish

Design of Experiments

5. Dey, Santanu

Operator Algebras

6. Garge, Shripad M.

Number Theory, Linear Algebraic Groups

7. Ghorpade, Sudhir R.

Algebraic Geometry, Combinatorics, Coding Theory

8. Hariharan, Ananthnarayan

Algebra

9. Joshi, Kapil D.

Topology, Discrete Mathematics

10. Joshi, Rajani R.

Computational Biology, Biostatistics and Bioinformatics

11. Kaipa, Krishna (till July 9, 2012)

Complex Analysis

12. Keshari, Manoj Kumar

Commutative Algebra (Projective modules)

13. Kulkarni, Rekha P.

Numerical Functional Analysis, Spline Theory

14. Kulkarni, Ravi S.

Differential Geometry

15. Mahajan, Swapneel

Geometry and Topology

16. Mukhopadhyay, Siuli

Statistics

17. Nataraj, Neela

Finite Element Methods

18. Niranjana, Balachandran

Combinatorics

19. Pani, Amiya K.

Numerical Analysis, Partial Differential Equations, Industrial Mathematics

20. Puthenpurakal, Tony J.

Commutative Algebra

21. Raghunathan, Ravi

Automorphic forms, Number Theory

22. Raman, Preeti

Number Theory

23. Rana, Inder K.

Harmonic Analysis, Mathematics Education

24. Ranjan, Akhil

Differential Geometry

25. Sabnis, Sanjeev V.

Reliability Theory, Industrial Statistics

26. Santhanam, Rekha

Algebraic Topology

27. Sharma, Vishnu D. (Institute Chair Professor)

Quasilinear Hyperbolic Systems of PDEs/ Nonlinear Waves

28. Shastri, Anant R.

Algebraic Geometry, Algebraic Topology

29. Sista, Sivaji Ganesh

Partial Differential Equations

30. Sivasubramanian, S.

Combinatorics

31. Srinivasan, Srikanth

Theoretical Computer Science,

32. Srinivasan, Gopal K.

Partial Differential Equations

33. Srinivasan, Murali K.

Combinatorics

34. Subramanyam, A.
Statistical Inference, Geostatistics

35. Suresh kumar, K.
Stochastic Differential Game Theory, Mathematical
Finance.

36. Vellaisamy, P.
Statistics and Probability

37. Verma, Jugal K.
Commutative Algebra

Emeritus Fellow

38. Limaye, Balmohan V.
Numerical Functional Analysis, Linear Algebra

Visiting Professor

39. Sane, Sharad S.
Combinatorics and Design Theory

Distinguished Visiting Professor

40. Raghunathan, M.S.
Lie Groups

41. Dani , Shrikrishna G.
Ergodic Theory and Lie Groups

42. Shorey, Tarlok Nath
Theory of Numbers

Professor Emeritus

43. Pai, Devidas V.
Functional Analysis, Approximation Theory, Set-
valued Analysis