ACADEMIC REVIEW

for the period

April 2011 – January 2016

Department of Mathematics
Indian Institute of Science
Bangalore

February 08, 2016

Contents

1 About the Department

1.1 Institute and Department background

Indian Institute of Science was set up in 1909 as envisaged by J. N. Tata as an institute of higher learning, pursuing excellence in research and education in science and engineering. The Institute is probably the oldest and the finest institution of its kind in India. On one hand, IISc is like a national laboratory where research gets a high priority. On the other hand, emphasis is also given to teaching (as in a university) and training younger generation of scientists and engineers, and initiating them in to a career in research.

The Department of Mathematics traces its beginnings to the fledgling Department of Applied Mathematics established in 1956. By the early 1950's, the Indian Institute of Science had begun to keenly feel the need for teaching mathematics to its postgraduate science and engineering students and, in January 1956, invited a young, but already well-known, mathematician as Professor of Applied Mathematics. This mathematician was P. L. Bhatnagar, whose work on the kinetic theory of gases would later come to be widely recognized as the influential BGK Model of gas dynamics. Owing to Bhatnagar's enthusiasm, research students from all across India were drawn to the Institute. This core group, specializing in the Kinetic Theory of Gases and Plasma Physics, soon became the nucleus of one of the most active applied-math departments in India. By the mid-1970's, the Department of Applied Mathematics had research groups working in Fluid Mechanics, Non-linear Waves and Shock Waves, Diffraction Theory, and in the mathematical aspects of General Relativity. In all these years, the department continued to live up to its initial mandate of providing mathematical training to students in the science and engineering programmes at the Institute.

In tune with changing trends, a programme of recruiting active mathematicians across a range of disciplines was begun in the mid-1980's. The late 20th century witnessed, in many of the strongest mathematical developments of that time, a gradual blurring of the boundaries between Pure and Applied Mathematics. In keeping with this trend, and to reflect the range of interests of its faculty, the department was renamed the Department of Mathematics in 1989. The department is today one of the leading center of research in Mathematics and has the unique feature of having strong research programmes in both Applied and Pure Mathematics in one department. The department today has a widely respected research programme. Since the mid-1990's, the department has built up research groups in Combinatorial Topology; Commutative Algebra and Algebraic Geometry; Complex Analysis in Several Variables, and Complex Geometry; Harmonic Analysis; Low-dimensional Topology; Non-linear Dynamics; Numerical Analysis; Operator Theory; Partial Differential Equations; Representation Theory; Stochastic Systems, Differential Games, and Stochastic Control. It has recently started - in collaboration with interested colleagues across several departments in the Institute - a major new initiative in Mathematical Biology. The department has a postgraduate programme offering the Ph.D. In addition, it runs an Integrated Ph.D. programme designed for students who have completed a Bachelors degree and intend to pursue research leading to a Ph.D.

The department has been a pioneer in nurturing mathematics talent at the school level through the Mathematical Olympiad (MO) programmes since 1968. Since 1991, training programmes for the International Mathematical Olympiad (IMO) have been taking place in the Department of Mathematics as the nodal centre.

1.2 Scientific Staff in the Department

1.2.1 Faculty

Name, Designation	Qualification	Fields of Research Interest
Arvind Ayyer Assistant Professor	Ph. D. (Rutgers)	Probability, Combinatorics Statistical Mechanics
Abhishek Banerjee Assistant Professor	Ph. D. (Johns Hopkins)	Algebraic Geometry Noncommutative Geometry
Gautam Bharali Associate Professor	Ph. D (Wisconsin)	Several Complex Variables
Tirthankar Bhattacharyya Professor	Ph. D (ISI) FASc	Functional Analysis
Soumya Das Assistant Professor	Ph. D. (HRI)	Number Theory
Basudeb Datta Professor	Ph. D. (ISI) FASc, FNASc	Combinatorial and Piecewise Linear Topology
Siddhartha Gadgil Professor	Ph. D. (Caltech)	Low-dimensional Topology, Mathematical Biology
Mrinal K. Ghosh Professor	Ph. D. (TIFR-IISc) FASc, FNASc	Stochastic Processes, Applied Probability, Mathematical Finance
Thirupathi Gudi Assistant Professor	Ph. D. (IIT Mumbai)	Numerical Analysis, PDE
Subhojoy Gupta Assistant Professor	Ph. D. (Yale)	Low Dimensional Geometry & Topology
Srikanth K. Iyer Professor	Ph. D. (UC Santa Barbara)	Probability, Stochastic Processes, Statistics, Mathematical Finance
Manjunath Krishnapur Associate Professor	Ph. D. (UC Berkeley)	Probability Theory
Gadadhar Misra Chairman, Professor	Ph. D. (Stony Brook) FNA, FASc, FNASc	Functional Analysis
A. K. Nandakumaran Professor	Ph. D. (TIFR-IISc)	PDE, Homogenization, Controllability, Computations
E. K. Narayanan Associate Professor	Ph. D. (ISI)	Harmonic Analysis
Dilip P. Patil Professor	Ph. D. (TIFR-BU)	Commutative Algebra, Algebraic Geometry
Govindan Rangarajan Professor	Ph. D. (Maryland) FASc, FNASc	Nonlinear Dynamics & Chaos, Time Series Analysis
Harish Seshadri Associate Professor	Ph. D. (Stony Brook)	Differential Geometry

Name, Designation	Qualification	Fields of Research Interest
Pooja Singla Assistant Professor	Ph. D. (IMSc, Chennai)	Representation Theory
S. Thangavelu Professor	Ph. D. (Princeton) FNA, FASc	Harmonic Analysis
Kaushal Verma Associate Professor	Ph. D. (Indiana) FASc	Several Complex Variables

1.2.2 UGC Research Scientist

Name, Period	Designation	Qualification	Fields of Research Interest
Mahesh Kumari 1986 - 31.07.2015	UGC Research Scientist C	Ph. D. (IISc)	Fluid mechanics, Heat & Mass Transfer

1.2.3 Emeritus Scientists

Name, Period	Designation	Qualification	Fields of Research Interest
A. Chakrabarti 1.1.11-31.12.15	NASI Platinum Jubilee Fellow	D. Phil. (Calcutta), FNASc, FIMA, C.Math	Integral Equations, Diffraction Theory
A. Chakrabarti 1.1.16-31.12.20	NASI Honorary Scientist	,,	,,
Phoolan Prasad 3.1.12-2.1.17	NASI Platinum Jubilee Fellow	Ph. D. (IISc), FNA, FASc, FNASc	Nonlinear Waves, Fluid Mechanics, PDE
A. Sitaram 1.12.09-30.11.14	DAE Raja Ramanna Fellow	Ph. D. (Washington), FASc	Harmonic Analysis, Lie Groups
U. N. Bhosle 16.6.14-15.6.17	DAE Raja Ramanna Fellow	Ph. D. (TIFR-BU), FNA, FASc, FNASc	Algebraic Geometry, Vector Bundles

1.2.4 NMI Distinguished Associate

Name	Qualification	Fields of Research Interest
V. S. Borkar	Ph. D. (Berkeley), FNA, FASc, FNASc, FNAE, FIEEE, FTWAS, FAMS	Stochastic Processes, Applied Probability
M. S. Narasimhan	Ph. D. (TIFR-BU), FRS, FNA, FASc, FNASc	Algebraic Geometry, Differential Geometry,
K. B. Sinha	Ph. D. (Rochester), FNA, FASc, FTWAS	Noncommutative Geometry

1.2.5 MO Cell Faculty

Name	Designation	Qualification	Fields of Research Interest
C. R. Pranesachar	Associate Professor, HBCSE, TIFR	Ph. D. (IISc)	Combinatorics
B. J. Venkatachala	Associate Professor, HBCSE, TIFR	Ph. D. (IISc)	Differential Equations

1.2.6 INSPIRE Fellows/DST Young Scientists

Name	Designation	Qualification	Fields of Research Interest
Koushik Saha 1.3.2012-28.3.2014	INSPIRE Faculty	Ph. D (ISI)	Probability
Mousumi Mondal 25.2.2013-	INSPIRE Faculty	Ph. D (IITB)	Commutative Algebra
Umesh V. Dubey 22.10.2013-	INSPIRE Faculty	Ph. D (IMSc)	Probability
Jaban Meher 31.10.2013-7.12.2015	INSPIRE Faculty	Ph. D (HRI)	Number Theory
Esha Chatterjee Ghosh 8.8.2011-	DST Young Scientist	Ph. D. (Rhode Island)	Nonlinear Difference Equations

1.2.7 Post Doctoral Fellows/Research Associates

Name, Period	Qualification	Scholarship	Fields of Research Interest
Anoop T. V. 30.08.2011-31.12.2012	Ph. D. IMSc	UGC Kothari-PDF	PDE
R. Dhanya 23.12.2011-04.09.2014	Ph. D. TIFR CAM	NBHM PDF	PDE
H. S. Gupta 03.01.2011-03.01.2013	Ph. D. IISc	NBHM PDF	PDE, Numerical Analysis
David Michael Farris 23.12.2011 - 23.12.2012	Ph. D.	IISc RA	Topology
Sameer Kamal 01.07.2011-06.12.2012	Ph. D. TIFR	NBHM PDF	Applied Probability
Ashish Kumar 01.02.2011 - 18.11.2013	Ph. D IITK	UGC Kothari-PDF	Harmonic Analysis
R. Lakshmi Lavanya 02.01.2012-7.8.2015	Ph. D. Madras	NBHM PDF	Harmonic Analysis
Micah Miller 16.07.2012 - 15.7.2014	Ph. D. CUNY	IISc CPDF	Topology

Name, Period	Qualification	Scholarship	Fields of Research Interest
Venku Naidu 01.07.2011-02.04.2012	Ph. D. IITM	UGC Kothari-PDF	Harmonic Analysis
K. Nidhin 03.06.2010-31.3.2013	Ph.D. Calicut	UGC Kothari-PDF	Stochastic Process
Soumen Sarkar 02.01.2012-13.03.2012	Ph. D. ISI	IISc CPDF	Topology
Rajesh Srivastava 01.08.2011-01.10.2012	Ph. D. IITK	UGC Kothari-PDF	Harmonic Analysis
M. K. Yadav 01.08.2011- 06 07.2012	Ph. D. IITM	UGC Kothari-PDF	PDE, Numerical Analysis
G. P. Balakumar 18.07.2012 - 25.03.2013	Ph. D. IISc	IISc RA	Several Complex Variables
Dheearaj Kulkarni 14.12.2012 - 05.06.2013	Ph. D. IISc	IISc RA	Low Dimensional Topology
Rahul Garg 28.05.2012 - 02.11.2012	Ph. D. IISc	IISc RA	Harmonic Analysis
Dinesh Kumar Kesari 30.07.2012 - 31.08.2013	Ph. D. IISc	IISc RA	Operator Theory
Soma Maity 25.05.2012 - 14.03.2013	Ph. D. IISc	IISc RA	Riemannian Geometry
Amit Samantha 18.05.2011 - 15.10.2012	Ph. D. IISc	IISc RA	Harmonic Analysis
Jotsaroop Kaur 02.07.2012 - 01.03.2013	Ph. D. IISc	IISc RA	Harmonic Analysis
Thomas Richard 1.10.2012 - 31.12.2013	Ph. D. Grenoble	IISc RA	Differential Geometry
J. Jaikrishnan 28.06.2014 - 15.4.2015	Ph. D. IISc	IISc RA	Several Complex Variables
D. Divakaran 20.06.2014 - 14.10.14	Ph. D. IISc	IISc RA	Topology
R. Manikandan 02.04.2014 - 30.11.2015	Ph. D. Cochin	UGC Kothari-PDF	Stochastic Analysis
Chandan Pal 01.04.2014 -	Ph. D. IITB	UGC Kothari-PDF	Stochastic Analysis
K. Manchanda 01.04.2014 -	Ph. D. JNU	UGC Kothari-PDF	Combinatorics
V. K. Sohani 01.10.2014 -	Ph. D. HRI	NBHM - PDF	Harmonic Analysis
Surjit Kumar 14.1.2015 -	Ph. D. IITK	Kothari - PDF	Functional Analysis

Name, Period	Qualification	Scholarship	Fields of Research Interest
Sumit Mohanty 01.12.2015 -	Ph. D. IITK	UGC Kothari - PDF	Combinatorial Topology
Dipendu Maity 28.12.2015 -	Ph. D. IITP	NBHM PDF	Combinatorial Topology
A. Satish Kumar 31.12.2015 -	Ph. D.	NBHM PDF	Functional Analysis

1.2.8 Students

1.2.8.1 Research Scholars

Sl. No.	Name	Year of joining	Guide	Scholarship
1.	Sandeep Mody (Thesis submitted)	2009	G. Rangarajan	IISc
2.	Jis Joseph	2010	E. K. Narayanan	CSIR
3.	Sudipto Chowdhury	2010	T. Gudi and A. K. Nandakumaran	NBHM
4.	S. Nanda Kishore Reddy	2011	Manjunath Krishnapur	CSIR (SPM)
5.	S. Aiyappan	2012	A. K. Nandakumaran	NBHM
6.	Monojit Bhattachariya	2012	G. Misra	NBHM
7.	Gaddam Sharat	2012	Thirupathi Gudi	IISc
8.	Somnath Hazra	2012	G. Misra	IISc
9.	Rakesh Kumar	2013	S. Thangavelu	CSIR
10.	A. V. Pramath	2014	S. Das	Inspire Fellow
11.	Sourav Hait	2014	S. Thangavelu	NBHM
13.	Anirbhan Kundu	2014	Kausha Verma	IISc
14.	Ritwik Pal	2014	S. Das	NBHM
12.	S. K. Jhawar	2014	yet to decide	Inspire Fellow
15.	Lakshmi Priya	2015	yet to decide	NBHM
16.	Paramita Pramanick	2015	yet to decide	NBHM
17.	Srimalla Srikanth	2015	yet to decide	CSIR

1.2.8.2 Integrated Ph. D. Students

Sl. No.	Name	Year of joining	Guide	Scholarship
18.	Kartick Adhikari	2009	Manjunath Krishnapur	CSIR
19.	Arpan Kabiraj	2009	S. Gadgil	CSIR
20.	Md. Ramiz Reza	2009	G. Misra	CSIR
21.	Vikramjeet Singh Chandel	2009	G. Bharali	IISc
22.	Haripada Sau	2010	T. Bhattacharyya	IISc
23.	Bidhan Chandra Sardar	2010	A. K. Nandakumaran	IISc
24.	Samarpita Ray	2011	A. Banerjee	IISc
25.	Harshavardhan Raghunathan	2011	S. Thangavelu	IISc
26.	Soumitra Ghara	2011	G. Misra	IISc
27.	Amar Deep Sarkar	2011	Kaushal Verma	IISc
28.	M. Hassain	2012	Pooja Singla	IISc
29.	Samrat Sen	2012	G. Misra	IISc
30.	Anwoy Maitra	2012	G. Bharali	IISc
31.	Manish Kumar	2013	Arvind Ayyer	IISc
32.	Sayantan Maitra	2013	Harish Seshadri	IISc
33.	Somnath Pradhan	2013	M. K. Ghosh	IISc
34.	Subhajit Ghosh	2013	Arvind Ayyer	IISc
35.	Sruthi Sekar	2014	yet to decide	IISc
36.	Nidhi Rathi	2014	yet to decide	IISc
37.	Nimisha Pahuja	2014	yet to decide	IISc
38.	Ramesh Chandra Sau	2014	yet to decide	IISc
39.	Rahul Biswas	2014	yet to decide	IISc
40.	Anindya Biswas	2014	yet to decide	IISc
41.	Sahil Gehlawat	2015	yet to decide	IISc
42.	Abu Safian	2015	yet to decide	IISc
43.	Himanshu Gupta	2015	yet to decide	IISc
44.	Surjadipta De Sarkar	2015	yet to decide	IISc
45.	Kriti Sehgal	2015	yet to decide	IISc
46.	Prateek K Viswakarma	2015	yet to decide	IISc

1.2.8.3 NMI Interdisciplinary Ph. D. Students

(with one guide from the department)

Sl. No.	Name	Year of joining	Guides	Under the Department
1.	Saptak Banerjee	2008	Rajesh Sundaresan & S. K. Iyer	ECE
2.	Satya Prakash Rangta	2010	Aditya Murthy & G. Rangarajan	CNS
3.	Shirhatti Vinay Dhruva	2011	Supratim Ray & G. Rangarajan	CNS
4.	Shweta Srivastava	2012	Sashikumaar Ganesan & Thirupathi Gudi	SERC
5.	Bharath K. Ethamakula	2012	D. P. Patil & P. Vijay Kumar (ECE)	MATH
6.	Salelkar S. Pramod	2013	Supratim Ray & G. Rangarajan	CNS
7.	Papri Majumder	2014	Thirupathi Gudi & S. Ganesan (CDS)	MATH
8.	Deepika Garg	2015	Thirupathi Gudi & Raghurama Rao (AE)	MATH
9.	Varsha Sreenivasan	2015	Sridharan Devarajan & G. Rangarajan	CNS
10.	Dipankar Roy	2015	Arvind Ayyer & Rahul Pandit (PHY)	MATH

1.2.8.4 Research scholars of other departments working under joint guides

Sl. No.	Name	Year of joining	Guide	Under the Department
1.	K. P. Mohanan	2009	R. M. Vasu & A. K. Nandakumaran	Instrumentation

1.2.8.5 Studendts awarded Ph.D. degree during the period under review

Sl. No.	Name	Title of the thesis
1.	Suparna Sen 18.3.2011	Segal Bargmann Transform and Paley Wienner Theorems on Motion Groups
2.	Rahul Garg 14.12.2012	On the role of the Bargmann Transform in Uncertainty Principles
3.	Amit Tripathi 14.12.2012	Vector bundles over hypersurfaces of Projective varieties

Sl. No.	Name	Title of the thesis
4.	Dheerauj Kulkarni Dattatray (14.12.2012)	Relativwe Symplectic Caps, Fibered Knots and 4-Genus
5.	Dinesh Kumar Keshari(14.12.2012)	Infinitely Divisible Metrics, Curvature Inequalities and Curvature Formulae
6.	Amit Samanta 14.12.2012	Joint Eigenfunctions on the Heisenberg Group and Support Theorems on $\mathbb{R}^n$
7.	Jotsaroop Kaur 14.12.2012	Grushin Multipliers and Toeptitz Operators
8.	G. P. Balakumar 12.03.2013	Rigidity and Regularity of Holomorphic Mappings
9.	P. K. Sanjay 12.03.2013	Reisz Transforms associated with Heisenberg Groups and Grushin Operators
10.	Tamal Banerjee 28.12.2013	Analyzing credit Risk Models in a Regime switching Market Grushin Operators
11.	Ravi Prakash 28.12.2013	Homogenization of Optimal Control Problems in a Domain with Oscillating Boundary
12.	Subhamay Saha 28.12.2013	Single and Multi - players Stochastic Dynamic Optimization
13.	Samar S. Bahadur 28.12.2013	Study of Higher Order Split-Step Methods for Stiff Stochastic Differential Equations
14.	Satanu Sarkar 27.06.2014	Some problems in multivariable operator theory
15.	J. Jaikrishnan 23.12.2014	On the structure proper holomorphic mappings
16.	Atreyee Bhattacharya 23.12.2014	On an ODE associated to the Ricci Flow
17.	Kamana Porwal 23.12.2014	A Posterior Error Analysis of Discontinuous Galerkin Methods for Elliptic variational Inequalities
18.	D. Divakaran 23.12.2014	Compactness theorems for the spaces of distance measure spaces and Riemann surface laminations
19.	Avijit Pal 23.12.2014	Contractivity, Complete Contractivity and Curvature Inqualities
20.	T. V. H. Prathamesh 30.9.2015	Mechanising Knot Theory
21.	Sayan Bagchi 30.9.2015	Weighted norm inequalities for weyal multipliers and Hermite Pseudo-multipliers
22.	Bidyut Sanki 30.9.2015	Shortest Length Geodesics on closed Hyperbolic surfaces
23.	Biplap Basak 30.9.2015	Minimal crystallizations of 3- and 4-manifolds
24.	Sayani Bera (Defended)	On shift-like automorphisms of $\mathbb{C}^k$

Sl. No.	Name	Title of the thesis
25.	Pradeep Boggarapu (Defended)	Mixed norm estimates in Dunkl setting and chaotic behaviour of heat semigroups
26.	Rajiv Gupta (Defended)	The Caratheodory-Fejer interpolation problems and the Von-Neumann inequality
27.	Senthil Raani K. S. (Defended)	L^p-Asymptotics of Fourier transforms of factal measures
28.	Tulasi Ram Reddy (Defended)	On critical points of random polynomials and spectrum of certain products of Ginipre matrices
29.	Pranav Haridas (Defended)	The Green's function, Bergman kernel and quadrature domain in $\mathbb{C}^n$
30.	Ratna Pal (Defended)	Dynamical properties of families of holomorphic mappings

1.2.8.5 Studendts awarded NMI Interdisciplinary Ph. D. degree during the period under review

Sl. No.	Name	Title of the thesis
31.	Srishti Shukla 28.06.2014	Wireless network-coded multi-way relaying using Latin hyper-cubes for M-PSK modulation
32.	Nitin Singh 28.06.2014	On Walkup's class of manifolds and tight triangulations

1.2.8.6 Students awarded M. S. degree during the period under review

Sl. No.	Name, Year	Title of the thesis
1.	Jonathan Fernandez (2011)	Fourier analysis on number fields
2.	Amita Mallik (2011)	An Algorithmic Approach to Crystallographic Coxeter Groups
3.	Abhinav Verma (2011)	Irreducible representations of the symmetric group and general linear group
4.	Prahllad Deb (2012)	Curvature Calculations of the Operators in Cowen-Douglas Class
5.	Tapan Kumar Hota (2013)	Subrormality and Moment Sequences
6.	Samya Kumar Ray (2013)	Grothendieck Inequality
7.	Devang S. Ram Mohan (2013)	An Introduction to Minimal Surfaces

Sl. No.	Name, Year	Title of the thesis
8.	Chandramouli (2013)	Homogeneous Operators and some Irreducible Representations of the Mobious Group
9.	Balaji Rao (2013)	A formal proof of Feit-Higman theorem in Agda
10.	Sumit Kumar (2013)	Normal Spectrum of a subnormal operator
11.	Samir Ch. Mandal (2015)	Dilation Theory of Contractions and Nevalinna–Pick Interpolation Problem

1.2.9 Visiting Students

The following students have visited the department for short term to take some courses and/or to collaborate with the faculty in the department:

1. Ms. R. Lakshmi Lavanya, Ramanujan Institute, Chennai, visited the department during April 2011 - March 2012. She worked with Prof. S. Thangavelu on her Ph. D. thesis.
2. Ms. Kine Hansvold, Norweign University of Science and Technology, Norway, visited the department during Aug. - Oct. 2012.
3. Mr. Hideya Kuwata, Osaka City University, Japan, visited the department during June - July 2012.
4. Mr. Philipp Rohrmuller, Technische Universitat Munchen, Germany, visited the department during Aug. - Sept. 2012.
5. Mr. Josef Rieger, Technische Universitat Munchen, Germany, visited the department during Aug. - Sept. 2012.
6. Mr. Henrik Poppe, Technische Universitat Munchen, Germany, visited the department during Aug. 2012 - Apr. 2013.
7. Ms. Maja Rita Rudolph, Massachusetta Institute of Technology Cambridge, USA, visited the department during Aug. 2012 - Dec. 2012.
8. Mr. Jaeoh Woo, Yale University, USA, visited the department during 30 Dec. 2012 - 15th May 2013.
9. Mr. Mathurin Massias, Ecole Centrale Paris, France, visited the department during Jan. - Apr. 2013.

2 Center for Advanced Study

Thrust Area: Analysis and Applications

2.1 Faculty involved

2.1.1 In the identified thrust area

- Dr. Arvind Ayyer
- Prof. Gautam Bharali
- Prof. Tirthankar Bhattacharyya
- Prof. Mrinal K. Ghosh
- Dr. Thirupathi Gudi
- Prof. Srikanth K. Iyer
- Prof. Manjunath Krishnapur
- Dr. Mahesh Kumari
- Prof. Gadadhar Misra
- Prof. A. K. Nandakumaran
- Prof. E. K. Narayanan
- Prof. Govindan Rangarajan
- Prof. Harish Seshadri
- Prof. S. Thangavelu
- Prof. Kaushal Verma

2.1.2 In other area

- Dr. Abhishek Banerjee
- Dr. Soumya Das
- Prof. Basudeb Datta
- Prof. Siddhartha Gadgil
- Dr. Subhojoy Gupta
- Prof. Dilip P. Patil
- Dr. Pooja Singla

3 Major achievements

3.1 Teaching

The courses taught during the period April 2011 - March 2012 were:

1. MA 212: Algebra-I by C. R. Pranesachar and B. J. Venkatachala
2. MA 219: Linear Algebra by B. Datta
3. MA 221: Analysis -I by A. K. Nandakumaran
4. MA 231: Topology -I by S. Thangavelu
5. MA 261: Probability Models by M. Krishnapur
6. MA 223: Functional Analysis by T. Bhattacharayya
7. MA 242: Partial Differential equations by T. Gudi
8. MA 232: Introduction to Algebraic Topology by S. Gadgil
9. MA 323: Operator Theory by G. Misra
10. MA 328: Introduction to several complex variables by G. Bharali
11. MA 362: Stochastic Process by M. K. Ghosh
12. MA 222: Analysis -II by G. Bharali
13. MA 224: Complex Analysis by E. K. Narayanan
14. MA 229: Calculus on Manifolds by H. Seshadri
15. MA 241: Ordinary differential equations by G. Rangarajan
16. MA 213: Algebra -II by T. Bhattacharyya
17. MA 361: Probability theory by M. K. Ghosh
18. MA 315: Galois theory by D. P. Patil
19. MA 321: Analysis -III by T. Gudi
20. MA 322: Fourier/Harmonic analysis by S. Thangavelu
21. MA 325: Operator Theory - II by T. Bhattacharyya
22. MA 326: Fourier analysis by S. Thangavelu
23. MA 338: Cohomology of manifolds and groups by S. Gadgil
24. MA 371: Linear Lie groups and representations by A. Sitaram/E. K. Narayanan
25. MA 372: Abstract Harmonic Analysis by E. K. Narayanan
26. MA 369: Topics in Stochastic Processes by Sameer Kamal

27. MA 393: Optimal Control of Distributed System by A. K. Nandakumaran
28. MA 374 Advanced PDE and Finite Element Methods by A. K. Nandakumaran & T. Gudi

The courses taught during the period April 2012 - March 2013 were:

1. MA 212: Algebra I by C. R. Pranesachar and B. J. Venkatachala
2. MA 219: Linear Algebra by Kaushal Verma
3. MA 221: Analysis I by S. Thangavelu
4. MA 231: Topology I by E. K. Narayanan
5. MA 261: Probability Models by Koushik Saha
6. MA 223: Functional Analysis by T. Bhattacharayya
7. MA 232: Introduction to Algebraic Topology by B. Datta
8. MA 242: Partial Differential equations by T. Gudi and Phoolan Prasad
9. MA 210: Mathematical Logic and Computability by S. Gadgil
10. MA 226: Complex Analysis II by G. Mishra
11. MA 315: Lie Algebra and their Representation by P. Singla
12. MA 321: Analysis III by T. V. Anoop and A. K. Nandakumaran
13. MA 392: Random Graphs & Interacting Particle Systems by S. K. Iyer
14. MA 222: Analysis II by E. K. Narayanan
15. MA 224: Complex Analysis by H. Seshadri
16. MA 229: Calculus on Manifolds by G. Mishra
17. MA 241: Ordinary differential equations by G. Rangarajan
18. MA 213: Algebra II by P. Singla
19. MA 315: Galois theory by D. P. Patil
20. MA 320: Representation Theory of Compact Lie Groups by S. Thangavelu
21. MA 323: Operator Theory II by T. Bhattacharyya
22. MA 332: Algebraic Topology by Micah Miller and S. Gadgil
23. MA 333: Reimannian Geometry by David Farris and H. Seshadri
24. MA 368: Topics in Probability and Stochastic Process M. Krishnapur
25. MA 382: Special Topics in Operator Theory by T. Bhattacharyya and K. B. Sinha
26. MA 351 (May 2012): Semigroup Theory and Evolution Equations by A. K. Nandakumaran

27. UM 102 (Jan 2013): Calculus and Linear Algebra II by A. K. Nandakumaran
28. E0 219 (Aug 2012): Discrete Structures by D. P. Patil.

The courses taught during the period April 2013 - March 2014 were:

1. UM 101: Calculus and Linear Algebra I by G. Bharali
2. UM 102: Calculus and Linear Algebra II by T. Bhattacharyya
3. UM 201: Probability and Statistics by M. Krishnapur
4. UM 202: Multivariable Calculus and Complex Variables by K. Verma
5. UM 203: Elementary Algebra and Number theory by S. Gadgil
6. MA 210: p-adic Analysis Compared with Real by Pooja Singla
7. MA 212: Algebra by Mousumi Mandal
8. MA 215: Introduction to Modular Forms by Soumya Das
9. MA 219: Linear Algebra by E. K. Narayanan
10. MA 221: Real Analysis by Pooja Singla
11. MA 222: Measure Theory by Harish Seshadri
12. MA 223: Functional Analysis by Gadadhar Misra
13. MA 224: Complex Analysis by E. K. Narayanan
14. MA 229: Calculus on Manifolds by A. K. Nandakumaran
15. MA 231: Topology by B. Datta
16. MA 232: Introduction to Algebraic Topology by B. Datta
17. MA 234: Metric Geometry of Spaces and Groups by S. Gadgil
18. MA 241: Ordinary differential equations by G. Rangarajan
19. MA 242: Partial Differential equations by T. Gudi
20. MA 261: Probability Models by M. K. Ghosh / S. K. Iyer
21. MA 303: Topics in Operator Theory by Gadadhar Misra
22. MA 304: Abstract Harmonic Analysis by Lakshmi Lavanya/ S. Thangavelu
23. MA 315: Galois Theory by D.P. Patil
24. MA 321: Analysis III by Dhanya and A. K. Nandakumaran
25. MA 322: Harmonic Analysis by S. Thangavelu
26. MA 324: Topics in Complex Analysis by G. Bharali
27. MA 326: Fourier Analysis by S. Thangavelu

28. MA 332: Symplectic Geometry by David Farris/Harish Seshadri
29. MA 338: Differentiable Manifolds and Lie Groups by Thomas Richard/Harish Seshadri
30. MA 347: Advanced PDE and FEM by T. Gudi
31. MA 361: Probability Theory by A. Ayyer
32. MA 365: Topics in Gaussian processes by M. Krishnapur

The courses taught during the period April 2014 - March 2015 were:

1. UM 101: Calculus and Linear Algebra I by A. Ayyer
2. UM 102: Calculus and Linear Algebra II by T. Bhattacharyya
3. UM 201: Probability and Statistics by S. K. Iyer
4. UM 202: Multivariable Calculus and Complex Variables by G. Bharali
5. UM 203: Elementary Algebra and Number Theory by S. Das
6. MA 210: Logic, Types and Spaces by S. Gadgil
7. MA 212: Algebra by Abhishek Banerjee
8. MA 213: Representation thoery of finite groups by P. Singla
9. MA 219: Linear Algebra by P.Singla
10. MA 221: Real Analysis by T. Gudi
11. MA 222: Measure Theory by H. Seshadri
12. MA 223: Functional Analysis by S. Thangavelu
13. MA 224: Complex Analysis by S. Thangavelu
14. MA 232: Introduction to Algebraic Topology by S. Gadgil
15. MA 231: Topology by B. Datta
16. MA 241: Ordinary differential equations by A.K.Nandakumaran
17. MA 242: Partial Differential Equations by M. K. Ghosh
18. MA 261: Probability Models by C. Pal and M. K. Ghosh
19. MA 312: Commutative Algebra by D. P. Patil
20. MA 315: Galois Theory by Abhishek Banerjee
21. MA 317: Introduction to Number Theory by S. Das
22. MA 318: Combinatorics by A. Ayyer
23. MA 329: Topics in Several Complex Variables by G. Bharali
24. MA 338: Differentiable Manifolds and Lie Groups by H. Seshadri

25. MA 347: Advanced PDE and FEM by T. Gudi
26. MA 351: Semigroup Theory and Evolution Equations by A. K. Nandakumaran

The courses taught during the period April 2015 - March 2015 were:

1. UM 101: Calculus and Linear Algebra by G. Bharali
2. UM 201: Probability and Statistics by S. K. Iyer
3. MA 212: Algebra by A. Banerjee
4. MA 213: Algebra II by M. Mandal
5. MA 215: Introduction to Modular forms by J. Meher
6. MA 219: Linear Algebra by H. Seshadri
7. MA 221: Analysis I by S. Thangavelu
8. MA 222: Analysis II by A. K. Nandakumaran
9. MA 223: Functional Analysis by T. Bhattacharyya
10. MA 224: Complex Analysis by G. Bharali
11. MA 229: Calculus on Manifolds by G. Misra
12. MA 231: Topology by S. Gadgil
13. MA 232: Introduction to Algebraic Topology by B. Datta
14. MA 241: Ordinary Differential Equations by T. Gudi
15. MA 242: Partial Differential Equations by M. K. Ghosh
16. MA 261: Probability Models by A. Ayyer
17. MA 278: Introduction to Dynamical Systems by G. Rangarajan/J. Balakrishnan
18. MA 313: Algebraic Number Theory by D. P. Patil
19. MA 314: Introduction to Algebraic Geometry by U. Dubey
20. MA 315: Lie Algebras and their Representaitons by E. K. Narayanan
21. MA 317: Introduction to Analytic Number Theory by S. Das
22. MA 319: Algebraic Combinatorics by A. Ayyer
23. MA 320: Representation of Compact Lie Groups by S. Thangavelu
24. MA 332: Algebraic Topology by S. Gupta
25. MA 347: Advanced PDE and FEM by T. Gudi
26. MA 361: Probability Theory by M. Krishnapur
27. MA 364: Linear and Nonlinear Time Series Analysis by G. Ranagarajan
28. MA 368: Topics in Probability and Stochastic Processes by M. Krishnapur
29. MA 369: Quantum Mechanics by M. Krishna/K. Verma

3.2 Research

3.2.1 Research Highlights in Thrust area

Complex Dynamics

• The dynamics of holomorphic correspondences on $\mathbb{P}^1$ was initiated, with an aim to define and construct invariant measures for such a dynamical system. This research was motivated by constructions that exist for correspondences F that have "large topological degree", i.e., which satisfy $d_{top}(F) > d_{top}(F^\dagger)$, where d_{top} denotes topological degree and $F^\dagger$ denotes the adjoint of F. Analogous constructions were were acomplished for corresponsences of *small* topological degree under certain conditions. These conditions are rather natural; for instance: the action of a Kleinian group can be modelled by correspondences that satisfy the conditions alluded to. It was shown, specifically, that this measure can be obtained as the weak*-limit of the normalized empirical measures of iterated pre-images of a generic point in $\mathbb{P}^1$ [309].

• The dynamics of skew products of Hénon maps was studied in [290]. Such families naturally occur as examples in the classification of degree 2 automorphisms of $\mathbb{C}^3$ due to Fornaess–Sibony. Several dynamically interesting objects were constructed such as fibered Green's functions, the corresponding stable and unstable currents and fibered invariant measures. It was shown that the pullbacks of a suitable class of currents by a compact family of Hénon maps converges to a multiple of the fibered stable current. Finally, a lower bound for the topological entropy for this skew product family was obtained. All these statements extend existing results for the classical case of a single Hénon map.

Complex-Analytic Geometry

• Several rigidity theorems, which provide conditions under which a general holomorphic self-map of the total space of a holomorphic fiber space (with connected fibers) is a morphism of fiber spaces, were proved [159].

• Some new ideas were developed to answer the question of when two compact complex manifolds admitting a degree-one holomorphic map between them are biholomorphic. These were used to prove that, for a large class of manifolds that properly contains the class of compact Kähler manifolds, equality of the second Betti numbers suffices to infer biholomorphic equivalence [217]. These ideas were also used to study, in the complex setting, a dominance relation given by Gromov.

• It was shown that proper holomorphic map between two non-planar bounded symmetric domains of the same dimension, one of them being irreducible, is a biholomorphism. Some new techniques were developed to give a single, all-encompassing argument that unifies the various special cases in which this result has been known. These methods were also applied to domains having noncompact automorphism groups that are not assumed to act transitively to deduce rigidity results such domains [160].

• A new approach to using the Kobayashi distance to study the behaviour of holomorphic maps, as well maps that are 1-Lipschitz relative to the Kobayashi distance, was explored in [310]. As a result, a new family of domains — defined in terms of a lower bound on how fast the Kobayashi metric grows and an upper bound on how fast the Kobayashi distance grows as one approaches the boundary — was introduced. It was shown that all pseudoconvex domains of finite type belong to this family. It was also shown that several known families of bounded domains having low boundary regularity

or with boundary points of infinite type also belong to this new family. It was shown that any domain in this family satisfies a visibility condition in the sense of Eberlein and O'Neill — which makes it resemble a negatively-curved Riemannian manifold in a weak sense. Using this, several results known previously for convex domains were extended to the non-convex setting.

Fluid Mechanics

• During the last few decades, mixed convection flows have been studied quite extensively. These have been motivated by their importance in technological, engineering and natural applications. Prominent among these are the cooling of electronic equipments, lubrication and drying technologies, food production, float glass production, solar energy production devices, thermal-hydraulics of nuclear reactors and dynamics of lakes.

• In recent years, convective heat transfer problems in nanofluids have become more important. The nanofluids have many industrial applications since materials of nanometer size have unique physical and chemical properties. Nanofluids are solid-liquid composite materials consisting of solid nanoparticles or nanofibers suspended in liquid. Nanofluids have attracted great interest recently because of reports of greatly enhanced thermal properties.

• Also, in recent years, non-Newtonian fluids have been appearing in an increasing number of applications. These applications include molten plastics, polymer solutions, dyes, varnishes, industrial suspensions, multi-grade oils, paints and printing ink etc. Any fluid that does not behave in accordance with the Newtonian constitute relation is called non - Newtonian.

• In view of importance of several physical and practical problems, the following flow problems are investigated during this period:

- Combined convection on a vertical cylinder in a non-Newtonian nanofluid
- convection in an axisymmetric stagnation flow of a non-Newtonian nanofluid on a vertical cylinder
- Natural convection heat and mass transfer from a sphere in non-Newtonian nanofluids.
- Mixed convection with thermal radiation in a vertical pipe with partially heated or cooled wall
- Mixed convective boundary layer flow over a vertical wedge embedded in a porous medium saturated with a nanofluid

• Fluid flow problems involving infinite channels with arbitrary bottom topography have been handled successfully by utilizing the linearized as well as the fully non-linear theories. Multiple layers of fluids also have been examined in detail [61].

Granger Causality Analysis

Granger causality is increasingly being applied to multielectrode neurophysiological and functional imaging data to characterize directional interactions between neurons and brain regions. A multivariate framework for estimating Granger causality was proposed [3]. This framework was based on spectral density matrix factorization and offers the advantage that the estimation of such matrix needs to be done only once for the entire

multivariate data set. For any subset of recording channels Granger causality can be calculated through factorizing the appropriate sub-matrix of the overall spectral density matrix.

To what extent Granger causality can be applied to functional magnetic resonance imaging (fMRI) data is debatable. There are two separate issues. First, is Granger causality applicable to fMRI data? From a statistical standpoint, the realm of applicability of Granger causality is the same as any other time-series based connectivity measures such as coherence and total interdependence. The reason is that these measures make the same assumptions about the time series under investigation (e.g. stationarity). As time-series based connectivity measures are increasingly applied to fMRI data, Granger causality, in conjunction with other methods, can provide additional empirical characteristics and biomarkers. Second, how to interpret fMRI causal connectivity in terms of the underlying neuronal causal connectivity? This issue is at the heart of the current debate. Often-cited concerns include: (a) latency variability of hemodynamic response function (HRF) across different brain, (b) low sampling rates, and (c) measurement noise. It has been shown that these factors can adversely affect the estimation of Granger causality in fMRI data and result in spurious causality patterns.

The following question was addressed: What is the relation between changes in Granger causality at the BOLD level and that at the neuronal level? More specifically, is the strength of Granger causality estimated at the 'BOLD level a monotonic function of the strength of Granger causality estimated at the underlying neuronal level? If such monotonicity holds, increase or decrease of BOLD-level Granger causality as the experimental condition is varied, can then be interpreted in terms of the corresponding increase or decrease of neuronal-level Granger causality. This question was addressed [133] by carrying out numerical simulations where autoregressive (AR) models were used to generate neuronal level time series data. By convolution with the HRF function, downsampling, and addition of measurement of noise, such data were then transformed into BOLD signals that mimic real recordings. Strengths of Granger causal influences at the neuronal level were systematically manipulated by changing the parameters in the AR model.It was demonstrated that Granger causality is a valid technique for assessing causal relations in fMRI data in the above context.

Helical propulsion is at the heart of locomotion strategies utilized by various natural and artificial swimmers. Experimental observations and a numerical model were used to study [166] the various fluctuation mechanisms that determine the performance of an externally driven helical propeller as the size of the helix is reduced. From Granger causality analysis, an overwhelming effect of orientational noise at low length scales was observed, which strongly affects the average velocity and direction of motion of a propeller. For length scales smaller than a few micrometers in aqueous media, the operational frequency for the propulsion system would have to increase as the inverse cube of the size, which can be the limiting factor for a helical propeller to achieve locomotion in the desired direction.

Most of the signals recorded in experiments are inevitably contaminated by measurement noise. Hence, it is important to understand the effect of such noise on estimating causal relations between such signals. A primary tool for estimating causality is Granger causality. Granger causality can be computed by modeling the signal using a bivariate autoregressive (AR) process. The previous analysis of the effect of noise by considering a bivariate AR process of general order p was greatly extended 183. From this analysis,

the analytical dependence of Granger causality on various noise-dependent system parameters was obtained. In particular, measurement noise was shown to lead to spurious Granger causality and can suppress true Granger causality. These results were verified numerically.

Functional Analysis and Operator Theory

• For any bounded domain Ω in $\mathbb{C}^2$ admitting an isometric embedding into the $n \times n$ matrices, it is shown that there exists a contractive homomorphisms of the algebra $\mathcal{A}(\Omega)$ which is not completely contractive except when Ω is the bidisc.

• An alternative approach to the Carathéodory-Fejér interpolation problem, in the special case of $n = 2$, adapting a theorem of Korányi and Pukánzsky has been given. A complete solution to the Carathéodory-Fejér interpolation problem for a class of polynomials is produced in this way. A natural generalization of the Hankel operators on the Hardy space of $H^2(\mathbb{T}^2)$ then becomes apparent which is investigates proving a theorem like that of Nehari in one variable.

• A curvature inequality follows from the contractivity assumption on a Hilbert Module over the polynomial ring. In the absence of any other assumption,it is easy to see that the curvature inequality does not imply contractivity. However, imposing a mild restriction on the Hilbert module, via infinite divisibility, we show that the curvature inequality implies the contractivity of the Hilbert module [109].

• Combining the jet construction arising in the study of quotients of Hilbert modules and the study of Homogeneous operators, a new class of operators $\mathcal{F}B_n(\Omega)$ in the Cowen-Douglas class is identified. While finding tractable invariants for the operators in the Cowen-Douglas class has remained elusive, we show that for this new class we have a very natural (complete) set of invariants which are easy to compute. For $n = 2$, the class $\mathcal{F}B_2(\Omega)$ is the set of operators $T \in B_2(\Omega)$ which admit a decomposition of the form $T = \begin{pmatrix} T_0 & S \\ 0 & T_1 \end{pmatrix}$ for some choice of operators T_0, T_1 in the Cowen-Douglas class $\mathcal{B}_1(\Omega)$ and an intertwiner S between the two operators T_0, T_1, that is, $T_0 S = S T_1$.

Theorem 3.1 ([174]) *Let* $T = \begin{pmatrix} T_0 & S \\ 0 & T_1 \end{pmatrix}$ *and* $\tilde{T} = \begin{pmatrix} \tilde{T_0} & \tilde{S} \\ 0 & \tilde{T_1} \end{pmatrix}$ *be two operators in* $\mathcal{F}B_2(\Omega)$. *Also let* t_1 *and* $\tilde{t}_1$ *be non-zero sections of the holomorphic Hermitian vector bundles* E_{T_1} *and* $E_{\tilde{T}_1}$ *respectively. The operators* T *and* $\tilde{T}$ *are equivalent if and only if*

$$\mathcal{K}_{T_0} = \mathcal{K}_{\tilde{T}_0},\ (ii)\ \frac{\|S(t_1)\|^2}{\|t_1\|^2} = \frac{\|\tilde{S}(\tilde{t}_1)\|^2}{\|\tilde{t}_1\|^2}.$$

• A holomorphic Hermitian vector bundle is said to be Hilbertian if the Hermitian structure is the restriction of a fixed inner product. For any Hilbertian line bundle $\mathcal{L}$ with Hermitian structure G, define a new line bundle $\mathcal{L}^{(t)}$ corresponding to the Hermitian structure G^t, $t > 0$. This new line bundle need not be Hilbertian. Determining for which $t > 0$, the line bundle $\mathcal{L}^{(t)}$ is Hermitian is an important problem. While the answer to this is known only for very few examples. A similar question arises for jet bundles. It is shown that the first order jet bundle obtained from the line bundle $\mathcal{L}^{(t)}$ always admits a Hermitian structure 288.

• Following the classification of the homogeneous vector bundles over the unit disc, in the case of arbitrary bounded symmetric domains, one obtains all such vector bundles

using holomorphic induction from representations of a certain parabolic group on finite dimensional inner product spaces. The representations, and the induced bundles, have composition series with irreducible factors. An equivariant constant coefficient differential operator is written down which intertwines the bundle with the direct sum of its irreducible factors. As an application it is shown that in the case of the closed unit ball in $\mathbb{C}^n$ all homogeneous n - tuples of Cowen-Douglas operators are similar to direct sums of certain basic n - tuples (cf. 289).

• Let P be a contraction and S be a bounded operator commuting with P. It has been shown that the pair (S, P) is a Γ-contraction if and only if the operator equation

$$S - S^*P = (1 - P^*P)^{\frac{1}{2}} X (1 - P^*P)^{\frac{1}{2}}$$

has a unique solution X acting on $\overline{\text{Ran}}(1-P^*P))^{\frac{1}{2}}$ with numerical radius of X being not greater than 1. This leads to explicit construction of dilation and a unitary invariant, see [54] and [162].

• The tetrablock, roughly speaking, is the set of all linear fractional maps that map the open unit disc to itself. The study of triples of commuting bounded operators (A, B, P) which have the tetrablock as a spectral set is initiated. The two domains are related intricately. Given a triple (A, B, P) as above, a pair (F_1, F_2), called its fundamental operators, is associated with it. It is shown that (A, B, P) dilates if the fundamental operators F_1 and F_2 satisfy certain commutativity conditions. Whether these commutativity conditions are necessary too is not known. En route, the structure of a tetrablock unitary (this is the candidate as the dilation triple) and a tertrablock isometry (the restriction of a tetrablock unitary to a joint invariant subspace) are completely deciphered. The method involved obtaining new results about Γ-contractions and applying them to tetrablock contractions. The question of whether all tetrablock contractions dilate or not is unresolved, see [161].

• Invariant subspaces of the Hardy space of the polydisk were studied. The structure of those invariant subspaces when the restriction of the canonical multiplication operators to the orthocomplement are doubly commuting were completely characterized, see [312].

• The defect sequence for a contractive tuple of Hilbert space operators is introduced and its properties investigated. The defect sequence is a sequence of numbers, called defect dimensions associated with a contractive tuple. We show that there are upper bounds for the defect dimensions. The tuples for which these upper bounds are obtained, are called maximal contractive tuples. The upper bounds are different in the non-commutative and in the commutative case. It is shown that the creation operators on the full Fock space and the co ordinate multipliers on the Drury-Arveson space are maximal. Pure tuples are studied to see how the defect dimensions play a role in their irreducibility, see [102].

• The Birkhoff-James orthogonality is a generalization of Hilbert space orthogonality to Banach spaces. This notion of orthogonality is investigated when the Banach space has more structures. It is first done for the Banach space of square matrices moving gradually to all bounded operators on a Hilbert space, then to an arbitrary C^*-algebra and finally a Hilbert C^*-module, see [104].

• Let F and G be two bounded operators on two Hilbert spaces. Let their numerical radii be no greater than one. It is investigated when there is a Γ-contraction (S, P) such that F is the fundamental operator of (S, P) and G is the fundamental operator

of (S^*, P^*). A necessary and sufficient condition on F and G for them to be the fundamental operators of (S, P) and (S^*, P^*) respectively in a certain special case. The general case is also investigated. Some of the results obtained for Γ-contractions earlier are then applied to tetrablock contractions to figure out when two pairs (F_1, F_2) and (G_1, G_2) acting on two Hilbert spaces can be fundamental operators of a tetrablock contraction (A, B, P) and its adjoint (A^*, B^*, P^*) respectively.

• Three new things relating geometry of the symmetrized bidisk $\mathbb{G} = \{(z_1 + z_2, z_1 z_2) : |z_1|, |z_2| < 1\}$ to function theory have been proved.

1. The Realization Theorem: Every f in the norm unit ball of $H^\infty(\mathbb{G})$ is of the form $f(s,p) = A + (2\alpha p - s)B\big((2 - \alpha s) - (2\alpha p - s)D\big)^{-1}C$ where α is in the open unit disk and $V = \begin{pmatrix} A & B \\ C & D \end{pmatrix}$ is an isometry on $\mathbb{C} \oplus H$ for a Hilbert space H.
2. The Interpolation Theorem: Nevanlinna-Pick interpolation theorem is proved for data from the symmetrized bidisk and a specific formula is obtained for the interpolating function.
3. The Extension Theorem: A characterization is obtained of those subsets V of the open symmetrized bidisk $\mathbb{G}$ that have the property that every function f holomorphic in a neighbourhood of V and bounded on V has an H^∞-norm preserving extension to the whole of $\mathbb{G}$.

Harmonic Analysis

• Riesz transforms and multipliers for the Grushin operator were studied. An analogue of Hörmander-Mihlin multipliplier theorem for the Grushin operator was established.

• Wave equation associated to the Grushin operator was studied and L^p estimates obtained. Certain $L^p - L^2$ estimates for the same Grushin wave equation were also established.

• The subcritical case of Beurling's theorem for the Euclidean Fourier transform was studied in detail.

• Characterizations of Weyl transform and the group Fourier transform on the Heisenberg group were also obtained.

• Two integral geometry problems on symmetric space of noncompact type were studied. One, over level sets of the heat kernel and other over geodesic spheres. Injectivity results were proved for L^p functions.

• Hypergeometric functions associated to arbitrary roots systems were studied. These functions, introduced by Heckman and Opdam, coincides with the spherical functions defined by Harish-Chandra for certain multiplicity functions. Using the Harish-Chandra series for these functions, bounded hypergeometric functions were characterized. This is an analogue of the celebrated theorem of Helgason and Johnson in the geometric case. As a consequence, a hypergeometric Fourier transform was defined for L^p functions and holomorphic properties of this transform were studied.

• We studied the dimension free boundary of Riesz transforms of higher order associated to Heisenberg groups and Grushin operators. We have proved a multiplier theorem for the Grushin operator and studied the L^p mapping properties of solutions of the Grushin wave operator. We have obtained characteristics of higher order Reisz transofrms on

Heisenberg groups, Weyl tranforms and the group Fourier transform on Heisenberg groups.

• An analogue of Bochner's theorem for Heckman-Opdam hypergeometric transform of a class of measures was established. A characterization of the spherical transform of K-invariant positive finite measures on G/K was obtained.

• We have proved weighted norm inequalities for Weyl multipliers and as a consequence proved that the R-boundedness of the derivative of the multiplier is not necessary for the L^p boundedness of operator valued Fourier multipliers.

• We have proved mixed weighted norm inequalities for various operators such as Riesz transforms associated to Dunkl harmonic oscillators and Hermite multipliers.

• L^p harmonic analysis associated with Heckman-Opdam's hypergeometric functions in certain line bundle situations corresponding to root system BC_n was studied.

• A Paley-Wiener type theorem for the inverse spherical transform on $SU(p,q)$ was established.

• We have proved that the Riesz transforms on the Heisenberg group and the group $SU(2)$ satisfy the mixed norm estimates. By using these mixed norm estimates we have deduced some vector valued inequalities for sequences of Laguerre Riesz transforms and Jacobi Riesz transforms respectively.

• We have studied the chaotic behavior of the heat semigroup generated by the Dunkl-Laplacian. We have given the complete picture of chaotic behavior of the heat semigroup generated by the standard Laplacian on weighted L^p spaces.

• We have obtained the Hecke-Bochner identity for the Dunkl-Hermite projections and we have proved the mixed norm inequalities for the Cesáro means associated with Dunkl-Hermite expansion.

• We have obtained sufficient conditions on the kernel of an operator M which is already known to be bounded on $L^2(\mathbb{R}^n)$ so that it satisfies the weighted L^p estimates. As an application we have proved L^p boundedness of Hermite pseudo-multipliers.

• We have proved Hardy inequalities for the conformally invariant fractional powers of the sub-Laplacian on the Heisenberg group. We have proved two versions of such inequalities depending on whether the weights involved are non-homogeneous or homogeneous. In the first case, we have proved the sharpness of the constant involved.

Hyperbolic Equations and Nonlinear Waves

Fermat's Principle and Huygens' Wavefront Construction: According to Fermat's principle a ray, in wave propagation in a medium, going from one point P_0 to another point P_1 in space chooses a path such that the time of transit is stationary. Given initial position of a wavefront Ω_0, we can use rays to construct the wavefront Ω_1 at any time t_1. Huygens' method states that all points of a wavefront Ω_0 at $t = 0$ can be considered as point sources of spherical secondary wavelets and after time t_1 the new position Ω_1 of the wavefront is an envelope of these secondary wavelets. The equivalence of the two methods of construction of a wavefront Ω in a medium governed by a general hyperbolic system of equations does not seem to have been proved. We have discussed this still open (as far as I know) problem with some new results for a general hyperbolic system and briefly indicate proof (by Prasad and Russo) of the equivalence for a particular case when the medium is governed by Euler equations of a polytropic gas.

Integral Equations

• A class of Mixed Boundary Value Problems arising in the study of scattering of surface water waves has been handled for complete analytical solutions by utilizing the Fourier Analysis and Singular Integral Equations.

• Varieties of irrotational channel flow problems of Fluid Mechanics occurring in Atmospheric and Ocean Sciences have been analyzed in the lights of both linear as well as weakly linear theories , by using integral transforms and by solving a class of generalized KdV type of non-linear partial differential equations, respectively.

• Integral equations involving unknown ranges ranges of integration, arising in the study of Free Boundary Value Problems associated with Laplace's equation , are under investigation

• New analytical and numerical methods of solution of regular as well as Singular Integral Equations have been developed [123,62].

Large Dimensional Random Matrix

In [110], the spectral properties in the bulk for finite diagonal large dimensional random and non-random Toeplitz type matrices have been studied. We investigate this using the joint convergence of matrices in an appropriate non-commutative probability set-up and method of moments. As a consequence we revisit the famous limit theorem of Szegö for non-random symmetic Toeplitz matrices.

Mathematical Finance

• The pricing of a defaultable corporate bond in a structural model is studied. Since the debt instruments have long tenures, the market parameters are not likely to remain constant over the duration of the loan. The market parameters are assumed to follow a continuos time Markov chain. The price of a defaultable bond is derived as a solution of partial differential equations [48].

• Pricing credit derivatives in a Markov modulated market using reduced form model is studied. Several credit derivatives are priced. Credit spreads are computed.In this model and the one above it is demonstrated that phenomenon such as the effects of business cycles, effect on the spread of rare adverse states etc. can be easily captured. The model also gives higher spreads than the usual models [107].

Nonlinear Dynamical Systems

A novel mechanism for amplitude death in coupled nonlinear dynamical systems on a complex network having interactions with a common environment like external system was presented [86]. A general stability analysis that is valid for any network topology was carried out. Threshold values of coupling constants for the onset of amplitude death were obtained. An important outcome of the study was a universal relation between the critical coupling strength and the largest nonzero eigenvalue of the coupling matrix. The above results were fully supported by the detailed numerical analysis for different network topologies.

Another route to oscillator death was investigated in coupled identical oscillators on a network [114]. An array of identical maps with Ising symmetry was studied. The network has both positive and negative couplings. Presence of couplings of both signs induces frustration and led to oscillator death. Though not studied extensively, it is known that negative and positive couplings could co-exist in several networks such

as neuronal networks and ecological webs and in laboratory systems such as coupled lasers. With negative coupling, anti-synchronization can occur as well. Both anti-synchronization and oscillator death was studied in this system. The oscillators were divided into two groups. Positive intra-group and negative inter-group couplings led to an antisynchronized state with same stability properties as synchronized state for all positive couplings. These states were shown to have the same stability properties as the synchronized state obtained for all negative couplings, or the anti-synchronized state for negative intra-group and positive inter-group couplings. When the condition of having uniform signs for intra-group or inter-group couplings was relaxed, the synchronized or anti-synchronized state did not exist. Further increasing the randomness in signs of these couplings led to reduction of eigenvalues and oscillator death. This is essentially a frustration-induced phenomenon. These observations were explained by carrying out a stability analysis of this state using the recently developed theory of random matrices with nonzero mean.

Using the intrinsically disordered oncoprotein Myc as an example, we presented [237] a mathematical model to help explain how protein oscillatory dynamics can influence state switching. Earlier studies had demonstrated that, while Myc overexpression can facilitate state switching and transform a normal cell into a cancer phenotype, its downregulation can reverse state-switching. A fundamental aspect of the model is that a Myc threshold determines cell fate in cells expressing p53. We demonstrate that a non-cooperative positive feedback loop coupled with Myc sequestration at multiple binding sites can generate bistable Myc levels. Normal quiescent cells with Myc levels below the threshold can respond to mitogenic signals to activate the cyclin/cdk oscillator for limited cell divisions but the p53/ Mdm2 oscillator remains nonfunctional. In response to stress, the p53/Mdm2 oscillator is activated in pulses that are critical to DNA repair. But if stress causes Myc levels to cross the threshold, Myc inacti- vates the p53/Mdm2 oscillator, abrogates p53 pulses, and pushes the cyclin/cdk oscillator into overdrive sustaining unchecked proliferation seen in cancer. However, if Myc is downregulated, the cyclin/cdk oscillator is inactivated and the p53/Mdm2 oscillator is reset and the cancer phenotype is reversed.

Numerical Analysis and Computation

• The boundary value problem for Monge-Ampere equation is a fully nonlinear problem that occurs in optimal transport problems. The numerical approximation of this fully nonlinear problem is quite delicate and non-variational. The method developed in [11] is consistent and convergent and designed based on a L^2 projection approach but merely using Lagrange finite element spaces. This is the simplest efficient numerical method for the fully nonlinear Monge-Ampere equation.

• Boundary value problems on non-convex polygonal domains exhibit low regular solutions. This loss of regularity stimulate difficulties in the convergence of multigrid algorithms for finite element methods. However using graded meshes the convergence of multigrid methods for discontinuous Galerkin methods has been derived in [12]. Babuska' penalty method is revisited and multi-grid algortihms are developed with a diagonal preconditioner in [168]. This has interest applications in Dirichlet boundary optimal control problem.

• Kirchhoff type nonlocal nonlinear problem generally can not be treated as standard equation since it involves a global integral as a coefficient. This nonlocal coefficient stimulates a major difficulty in solving them numerically by using Newton-Raphson

method since its Jacobian results in a full matrix. Obviously, storing this Jacobian requires a huge memory and involves excessive floating point operations. Using a constrained formulation, the difficulty has been remedied efficiently so that the solution process can be treated just as in the case of point-wise equations [69]. This work can be treated as a base for developing finite element based numerical methods for many other nonlocal problems of Kirchhoff type both stationary and evolutionary.

• Discontinuous Galerkin (DG) methods have became popular numerical techniques over the past decade and half due to their inherent properties that they exhibit. For higher order problem, DG method outperform the classical methods. However the proof of convergence of these methods require much more additional regularity on the solution which may not be realistic in general. The analysis, which is called medius analysis [60,118,19,156] overcomes the difficulties and proves that the DG methods converge to the correct solution. A C^0 interior penalty method have also been developed and analyzed for a fourth order extended Fisher-Kolmogorov (EFK) equation [119]. Since the EFK equation is a singularly perturbed fourth order equation, a regularity result in [119] plays a major role in showing the method is indeed robust and optimal. Another application of C^0 interior penalty method and the medius analysis has been carried out to an optimal control problem for plates in [170]. A unified approach for the error analysis of discontinuous Galerkin methods for control constrained optimal control problems is derived in [223].

• In [281], an alternative energy space approach for the Dirichlet boundary control problem is proposed and subsequently a finite element method is designed and analyzed. There are various approaches in the literature to define the Dirichlet control problem. This includes seeking the control from $L^2(\partial\Omega)$ or $H^{1/2}(\partial\Omega)$ spaces, where $\partial\Omega$ is the boundary of the domain Ω. If the control is sought from the L^2 space, then the state and control are less regular compared with the control and state when $H^{1/2}$ space is used. In [1], we have proposed to seek the control as a trace of an $H^1(\Omega)$ function which is harmonic in the interior. There it is shown that the $H^1(\Omega)$ norm is equivalent to the $H^{1/2}(\partial\Omega)$ norm and hence the energy minimized is equivalent . The control and state are shown to be sufficiently regular and optimal order error estimates in both the energy and the L^2 norms are derived. The L^2 norm error estimate is derived by using an auxiliary control problem and by constructing an appropriately post-processed control. Further a posteriori error estimates are also derived and illustrated with numerical experiments.

• The first *a posteriori* error analysis of discontinuous Galerkin methods for elliptic obstacle problems has been derived in [171,172]. This work forms a foundation for the a posteriori error analysis of elliptic variational inequalities. The result in [267] finds the simplest and efficient a posteriori error estimator for the Signorini problem. A C^0 interior penalty method for a frictional plate problem is analyzed in [268]. A reliable residual based error estimator of quadratic fem for obstacle problem is obtained for the first time in [226].

• The convergence of adaptive finite element methods is not a trivial consequence of the standard interpolation theory. This is simply because the mesh size in the computations does not decay uniformly to zero. There were many works recently in the literature proving the convergence of adaptive finite element methods including DG methods. Unlike in the other articles, remarkably the result in [169] proves the convergence of DG methods under the realistic assumptions on stabilizing parameters.

Partial Differential Equations

Homogenization

• The homogenization of distributed optimal control problem associated with the Laplacian in domain with rapidly oscillating boundary has been investigated. The problem has been studied for two different types of cost functionals. Appropriate corrector estimates are also presented. A problem in the same spirit, but the system is governed by Stokes equations, was also studied. The homogenized limit of the Stokes system as well as its adjoint system arising from the optimal control problem was obtained.

• The homogenization of optimal control problem with controls acting on the boundary of the domain associated with the Laplacian in a domain with rapidly oscillating boundary has been investigated [127]. Dirchlet type and L^2 cost functional are considered. Asymptotic analysis together with appropriate corrector estimates are also presented. In the same spirit, also studied a Stokes system in such a domain and obtained homogenized system [184]. Also employed a recent method of unfolding to study similar problems [128]. In yet another work [124], an exact controllability problem has been studied in an oscillatory domain and we have obtained the limit exact controllability problem. The problem has also been studied with Neumann condition which produces more interesting result [231].

The homogenization of an initial- and boundary-value problem for a doubly-nonlinear system in the context of maximal monotone operators has been studied [234]. The novelty is that the inclusions are formulated as null-minimization principles via the theory of Fitzpatrick. In the limiting case, a two-scale formulation is obtained and a (single-scale) homogenized problem is then retrieved. The method of unfolding is used to study optimal control problem in a domain with oscillating boundary. Considered Neumann condition on the oscillating part of the boundary and the result is more interesting than the Dirichlet condition [233]. Here the limit problem consists of two parts, namely in the lower part and upper part with appropriate interface conditions. Considered two cost functionals, namely L^2 and Dirichlet cost functional in [238]. Interior and boundary unfolding operator are introduced in the process. Another work in this direction is also done.

Schrodinger Equation

Strichartz-type estimates for a generalized Hermite-Schrödinger equation associated to a family of differential-difference operators involving the Dunkl Laplacian and unbounded potentials were obtained. This family includes the Hermite and Laguerre differential operators in particular. The study relies on the analysis of the so-called (k, a)-generalized semigroup. Moreover, it is proved that homogeneous Strichartz estimates for the Schrödinger equation associated to the Dunkl Laplacian can be obtained from those for the generalized Hermite-Schrödinger equation.

Tomography

• It is a study of obtaining physical properties inside a domain or tissue from boundary measurements which has applications in many areas including medicine. We have continued the mathematical and computational aspects of image reconstruction. For example, recovery of mechanical and optical properties has tremendous applications including in bio-medical sciences. As a long term investigation in this direction, the inverse problem associated with the propagation of field autocorrelation of light through a highly scattering object like tissue has obtained. The mathematical analysis and the error estimates were presented in another publication.

• Proposed a novel numerical method [120] based on a generalized eigenvalue decomposition for solving the diffusion equation governing the correlation diffusion of photons in turbid media. Medical imaging modalities such as diffuse correlation tomography and ultrasound modulated optical tomography have the (elliptic) diffusion equation parameterized by a time variable as the forward model. Hitherto, for the computation of the correlation function, the diffusion equation is solved repeatedly over the time parameter. It is shown that the use of a certain time-independent generalized eigenfunction basis results in the decoupling of the spatial and time dependence of the correlation function, thus allowing greater computational efficiency in arriving at the forward solution. Besides presenting the mathematical analysis of the generalized eigenvalue problem based on spectral theory, we put forth the numerical results which compare the proposed numerical method with the standard technique for solving the diffusion equation.

Continued the study in tomography and demonstrated a direct recovery of elasticity distribution from ultrasound-modulated optical tomography data gathered at a single detector. The reconstructions are seen to be of good quality and the convergence of the algorithm quick. We have en route devised a means to estimate the Jacobian needed for this reconstructions which uses both the equations of correlation transport and momentum balance [126].

Probability Theory and Stochastic Processes

Discrete Probability theory

• In [155], a natural family of Markov chains on linear extensions of partially-ordered sets, or posets was studied. An explicit formula for the stationary distribution for any poset was given. Moreover, for a special class of posets, explicit formulas for the eigenvalues of the transition matrices were proved.

• In [154], significant progress was made on conjectures by T. Lam and L. Williams related to random walks in affine root systems.

• In continuation of the previous work in [155], mixing time results for the Markov chains on linear extension were proved in [193].

• In continuation of the previous work in [271], an open conjecture of T. Lam's on the limiting direction of a natural random walk in the affine root system $\tilde{A}_n$ was solved.

• In [213], two families of nonabelian sandpile models on directed trees were studied and results about their stationary distribution, eigenvalues and mixing times were obtained.

• In [212], a model of juggling with arbitrary throw probabilities was studied. Several theorems were proved concerning their stationary probability distribution. Several theorems about generalisations with infinite number of balls, as well as with fluctuating number of balls were proved.

• In [272], a conjecture for the spectral gap of a large class of shuffling Markov chains on posets was stated and partial results in several special cases were proved.

• Several multispecies extensions of previous work [212] on juggling processes was formulated in [303] and explicit formulas for the stationary distribution were proved.

• In general it is rather difficult to prove the asymptotic properties of a multivariate kernel density estimator when the bandwidth vector is a function of the data, obtained by some algorithm. In [319], it is shown that if the search for bandwidth along each

coordinate direction is confined to a suitable compact interval with its boundary points proportional to the sample interquartile range along that direction, the resulting estimator is L_1 consistent for a number of different bandwidth selectors. In fact we prove that the expected L_1 distance between the estimator and the density goes to zero with increasing sample size. In particular, we observe significant improvement in the finite sample performance of the least squares cross validation based estimator.

Zeros of random functions

• The probability that a Gaussian process does not change signs over a long stretch of time was studied. Results are yet to be made into a paper.

• Limit distributions of singular points of random matrix-valued analytic functions wre successfully found. A preprint is under preparation yet.

• An idea of counting the number of real zeros of a random polynomial using Descartes' rule of sign was thought up. The intended goal was to prove a conjecture of Shepp that this number is not more than the logarithm of the degree of the polynomial. Based on this idea, the conjecture was successfully proved by other researchers.

• Persistence probability of stationary Gaussian processes on lattices was studied. Processes with unexpected rapid decay of the persistence probability were exhibited and general lower bounds were given under conditions on the spectral measure.

Random geometric graphs

• Random Geometric Graphs (RGGs) provide an excellent framework for modeling in wireless communication. A RGG $G_n(r_n)$ consists of n independent vertices distributed randomly according to a density f with edge between any two pair of nodes at most r_n apart.

• Consider RGGs with two type of nodes A and B. Two A nodes can communicate with each other only if there is another B node in its vicinity. This model has applications in secure communications in wireless networks. Percolation and connectivity thresholds results in such graphs were derived [73].

• For non-uniform node distributions it is not efficient for all nodes to transmit with equal power. Sufficient conditions for the graphs to be asymptoticaly connected was derived. Derived the critical radius for the number of isolated nodes to converge to a Poisson limit. Limit laws for the maximum and minimum vertex degrees were also derived [72].

• Consider the coverage of a region by a backbone sensor network. The network consists of randomly dispersed backbone nodes that can relay information over long distances. Sensor nodes collect information in a small neighborhood of the sensor location and relay it to a backbone node. Two models of sensor deployment are considered. One results in a Poisson-Poisson cluster network and the other in a dependently thinned Poisson process. Strong and weak law asymptotic results are derived for the fraction of area that is covered by the sensors [106].

• Limit laws for coverage in a Poisson-Boolean model with non-uniform distribution and location dependent radii were derived. The difficulty in deriving these results stem from the fact that the infimum of the density can be zero. Tight conditions on the rate of decay of the density for the central limit theorem to hold were derived.

• A continuum percolation model consisting of two types of nodes, namely legitimate and eavesdropper nodes, distributed according to independent Poisson point processes

(PPPs) in $\mathbb{R}^2$ of intensities λ and λ_E respectively was studied. A directed edge from one legitimate node A to another legitimate node B exists provided the strength of the *signal* transmitted from node A that is received at node B is higher than that received at any eavesdropper node. The strength of the received signal at a node from a legitimate node depends not only on the distance between these nodes, but also on the location of the other legitimate nodes and an interference suppression parameter γ. The graph is said to percolate when there exists an infinite connected component. It was shown that for any finite intensity λ_E of eavesdropper nodes, there exists a critical intensity $\lambda_c < \infty$ such that for all $\lambda > \lambda_c$ the graph percolates for sufficiently small values of the interference parameter. Furthermore, for the sub-critical regime, it was shown that there exists a λ_0 such that for all $\lambda < \lambda_0 \leq \lambda_c$ a suitable graph defined over eavesdropper node connections percolates that precludes percolation in the graphs formed by the legitimate nodes [191].

• A model for cascades on random networks in which the cascade propagation at any node depends on the load at the failed neighbor, the degree of the neighbor as well as the load at that node is studied. Each node in the network bears an initial load that is below the capacity of the node. The trigger for the cascade emanates at a single node from some external shock. Upon failure, the load at the failed node gets divided randomly and added to the existing load at those neighboring nodes that have not yet failed. Subsequently, a neighboring node fails if its accumulated load exceeds its capacity. The failed node then plays no further part in the process. The cascade process stops as soon as the accumulated load at all nodes that have not yet failed is below their respective capacities. The model is shown to operate in two regimes, one in which the cascade terminates with only a finite number of node failures. In the other regime there is a positive probability that the cascade continues indefinitely. Upper and lower bounds are obtained on the critical value of the parameter where the phase transition occurs [285].

• In wireless networks, where each node transmits independently of other nodes in the network (the ALOHA protocol), the expected delay experienced by a packet until it is successfully received at any other node is known to be infinite for the signal-to-interference-plus-noise-ratio (SINR) model with node locations distributed according to a Poisson point process. Consequently, the information velocity, defined as the limit of the ratio of the distance to the destination and the time taken for a packet to successfully reach the destination over multiple hops, is zero, as the distance tends to infinity. A nearest neighbor distance based power control policy is proposed to show that the expected delay required for a packet to be successfully received at the nearest neighbor can be made finite. Moreover, the information velocity is also shown to be non-zero with the proposed power control policy. The condition under which these results hold does not depend on the intensity of the underlying Poisson point process [322].

Statistical Physics

• In joint work with Priyanka and K. Jain in [186], an exclusion process where the particle hopping depends on the number of holes in front was studied. Exact results about the partition function and two-point correlations were obtained. Approximate calculations and numerical studies were also performed.

• A finite variant of the Toom model was formulated in [211] and various correlation functions were calculated exactly. All eigenvalues of the generator were determined and

a conjecture for the partition function was posed.

• In a long-range totally asymmetric exclusion process in a finite one-dimensional lattice, the current of particle motion was investigated in [304]. The joint large deviation function was obtained and the quasistationary distribution of rare fluctuations was calculated.

Stochastic control

• Risk sensitive control of continuous time Markov chains is studied. The problem is studied on both finite and infinite horizon. On infinite horizon both discounted and average cost criteria are studied. Under certain conditions, the existence of optimal control is established for relevant cases. Optimal controls are obtained via the minimizing selectors of appropriate Hamiltonians in cases of finite horizon and infinite horizon discounted costs. For infinite horizon average cost a policy improvement algorithm is developed to find an optimal control

• A linear programming formulation for semi-Markov decision processes with discounted cost is carried out. This is done by using a twisted discounted occupation measure. Under certain conditions it is shown that both primal and dual problems are feasible, and there is no duality gap.

• An alternative apriori and aposteriori formulation has been derived for the discrete linear quadratic regulator (DLQR) in a manner analogous to that used in the discrete Kalman filter. It has been shown that the formulation seamlessly fits into the available formulation of the DLQR and the equivalent terms in the existing formulation and the proposed formulation have been identified. Thereafter, the significance of this alternative formulation has been interpreted in terms of the sensitivity of the controller performances to any changes in the states or to changes in the control inputs. The implications of this alternative formulation to adaptive controller tuning have also been discussed.

• A mean-reverting stochastic model is developed to study the political business cycle. Using the LQG framework, optimal unemployment level is determined via the corresponding Hamilton-Jacobi-Bellman equations.

Stochastic dynamic games

• Zero-sum risk sensitive stochastic differential games on infinite horizon with discounted and average cost criteria are studied. Under certain conditions, the existence of saddle point equilibria are established. Optimal strategies are obtained via the minimizing/maximizing selectors of appropriate Hamiltonians.

• Stochastic differential games of mixed type with both control and stopping times are addressed. Under standard assumptions it is shown that the value of the game can be characterized as the unique viscosity solution of corresponding Hamilton-Jacobi-Isaacs (HJI) variational inequalities.

• Risk-sensitive stochastic games for continuous time controlled Markov chains are studied. Both zero-sum and nonzero-sum cases are considered. Saddle point and Nash equilibria are established for relevant cases.

• Risk-sensitive stochastic games for discrete time controlled Markov chains are studied. Both zero-sum and nonzero-sum cases are considered. Saddle point and Nash equilibria are established for relevant cases.

Stochastic processes and probability models

• Stochastic processes with age dependent transition rates are studied. A typical example of such a process is a semi-Markov process which is completely determined by the holding time distributions in each state and the transition probabilities of the embedded Markov chain. The process thus constructed generalizes semi-Markov processes. One important feature of this process is that unlike semi-Markov processes the transition probabilities of this process are age dependent. Under certain conditions, the Feller property of the process is established. Finally the limiting distribution of the process is computed.

• A scheme for stabilizing stochastic approximation iterates by adaptively scaling the step sizes was proposed and analyzed. This scheme led to the same limiting differential equation as the original scheme and therefore had the same limiting behavior, while avoiding the difficulties associated with projection schemes. The proof technique requires only that the limiting differential equation descend a certain Lyapunov function outside an arbitrarily large bounded set.

Time series analysis

• Multisensor recordings are becoming commonplace. When studying functional connectivity between different brain areas using such recordings, one defines regions of interest, and each region of interest is often characterized by a set (block) of time series. Presently, for two such regions, the interdependence is typically computed by estimating the ordinary coherence for each pair of individual time series and then summing or averaging the results over all such pairs of channels (one from block 1 and other from block 2). The concept of coherence was generalized so that it can be computed for two blocks of non-overlapping time series. This quantity, called block coherence, was shown mathematically to have properties similar to that of ordinary coherence, and then applied to analyze local field potential recordings from amonkey performing a visuomotor task. It was found that an increase in block coherence between the channels from V4 region and the channels from prefrontal region in beta band leads to a decrease in response time.

• An approximation for thickness of Quaternary sediment and late Quaternary? early Tertiary topography for the part of lower reaches of Narmada valley was proposed in a systematic way using the shallow seismic method, that records both horizontal and vertical components of the microtremor (ambient noise) caused by natural processes. The measurements of microtremors were carried out at 31 sites spaced at a grid interval of 5 km s using Lennartz seismometer (5 s period) and City shark-II data acquisition system. The signals recorded were analysed for horizontal to the vertical (H/V) spectral ratio using GEOPSY software. The thickness of unconsolidated sediments at various sites was calculated based on non-linear regression equations. The estimated thickness was used to plot digital elevation model and cross profiles correlating with geomorphology and geology of the study area.

Several Complex Variables

• All domains in complex surfaces that admit a noncompact holomorphic automorphism group with at least one orbit accumulating at a smooth real analytic finite type boundary point were classified in [92]

• Lipschitz CR mappings from an h-extendible (or semi-regular) hypersurface in $\mathbb{C}^n$ were studied. Under various assumptions on the target hypersurface, it was shown

that [105] such mappings must be smooth. A rigidity result for proper holomorphic mappings from strongly pseudoconvex domains was also proved.

• It was shown that [157] every hyperbolic rigid polynomial domain in $\mathbb{C}^3$ of finite type, with abelian automorphism group is equivalent to a domain that is balanced with respect to some weight.

• The old problem of determining the boundary behaviour of biholomorphims between a given pair of domains was revisited in [112] and [113]. It was shown that a biholomorphism between two bounded domains whose boundaries are piecewise smooth with generic corners and whose Bergman projections satisfy Condition R extends smoothly to the boundary. In the special case of product domains, such a biholomorphism splits as a product mapping.

• Two examples of non-degenerate entire self mappings of $\mathbb{C}^k$ ($k \geq 2$) with prescribed ranges were constructed in [308]. The first one is a finite mapping whose range misses a polydisc but contains a slightly larger concentric polydisc while the second one is a volume preserving self mapping whose range misses a given collection of disjoint polydics and other large open sets but at the same time also contains a prescribed collection of disjoint polydiscs. The order and type of entire maps that parametrise one dimensional unstable manifolds of shift like mappings were also studied and an analogue of Yoccoz's inequality was established.

• Estimates for the integrated Carathéodory, Kobayashi and Bergman metrics on a Levi corank one domain were established in [215]. A corollary is an understanding of the size of the balls in these metrics in terms of Euclidean data such as the distance to the boundary.

• A family of examples of quadrature domains in $\mathbb{C}^n$, $n > 1$ were constructed [227]. This is the first step towards understanding this class of domains in higher dimensions.

• It was shown that proper holomorphic self-maps of a class of smoothly-bounded balanced domains (a.k.a. complete circular domains) in $\mathbb{C}^n$, $n \geq 2$, are automorphisms [228]. This provides further support to an old conjecture that Alexander's theorem for the unit Euclidean ball holds true for bounded, balanced domains in $\mathbb{C}^n$, $n \geq 2$, with $\mathcal{C}^1$-smooth boundaries.

• A family of domains called the $\mu_{1,n}$-quotients was constructed with the aim of addressing some unsolved problems in H^∞ Control Theory [216]. The $\mu_{1,n}$-quotients are generalizations of the tetrablock. The equivalence between a certain interpolation problem arising in H^∞ Control Theory and a Nevanlinna–Pick-type interpolation problem in the $\mu_{1,n}$-quotients was proved. A necessary condition for the feasibility of the latter problem was derived.

3.2.2 Research Highlights in other areas

Combinatorial Topology

• The symmetric group $\mathrm{Sym}(d)$ acts on the Cartesian product $(S^2)^d$ by coordinate permutation, and the quotient space $(S^2)^d/\mathrm{Sym}(d)$ is homeomorphic to the complex projective space $\mathbb{CP}^d$. The case $d = 2$ of this fact was used to construct a 10-vertex triangulation of $\mathbb{CP}^2$ in [36]. In [94], it is constructed an 124-vertex simplicial subdivision $(S^2)^3_{124}$ of the 64-vertex standard cellulation $(S^2_4)^3$ of $(S^2)^3$, such that the $\mathrm{Sym}(3)$-action on this cellulation naturally extends to an action on $(S^2)^3_{124}$. Further, the $\mathrm{Sym}(3)$-action on $(S^2)^3_{124}$ is "good", so that the quotient simplicial complex

$(S^2)^3_{124}/\mathrm{Sym}(3)$ is a 30-vertex triangulation $\mathbb{CP}^3_{30}$ of $\mathbb{CP}^3$. In other words, a simplicial realization $(S^2)^3_{124} \to \mathbb{CP}^3_{30}$ of the branched covering $(S^2)^3 \to \mathbb{CP}^3$ is constructed.

• BISTELLAR program was ran on the input $\mathbb{CP}^3_{30}$, in order to reduce the number of vertices. The end result was an 18-vertex triangulation $\mathbb{CP}^3_{18}$ of $\mathbb{CP}^3$ [94]. Thus, there is an 18-vertex triangulation of $\mathbb{CP}^3$.

• Generalizing a result (the case $k = 1$) due to M. A. Perles, it is shown in [134] that any polytopal upper bound sphere of odd dimension $2k + 1$ belongs to the generalized Walkup class $\mathcal{K}_k(2k+1)$, i.e., all its vertex links are k-stacked spheres. This is surprising since it is far from obvious that the vertex links of polytopal upper bound spheres should have any special combinatorial structure. It has been conjectured that for $d \neq 2k + 1$, all $(k + 1)$-neighborly members of the class $\mathcal{K}_k(d)$ are tight. The result of [134] shows that the hypothesis $d \neq 2k + 1$ is essential for every value of $k \geq 1$.

• The k-stellated spheres and consider the class $\mathcal{W}_k(d)$ of triangulated d-manifolds all whose vertex links are k-stellated, and its subclass $\mathcal{W}^*_k(d)$ consisting of the $(k + 1)$-neighbourly members of $\mathcal{W}_k(d)$ are introduced in [194]. Also the mu-vector of any simplicial complex is introduced and shown that, in the case of 2-neighbourly simplicial complexes, the mu-vector dominates the vector of its Betti numbers componentwise; the two vectors are equal precisely for tight simplicial complexes.

• A lower bound theorem for 2-neighbourly member of $\mathcal{W}_k(d)$ for $d \geq 2k$ is proved [194]. It is shown that, when $d \neq 2k + 1$, all members of $\mathcal{W}^*_k(d)$ are tight. Also characterized the tight members of $\mathcal{W}^*_k(2k + 1)$ in terms of their k^{th} Betti numbers. These results more or less answer a recent question of Effenberger, and also provide a uniform and conceptual tightness proof for all except two of the known tight triangulated manifolds. It is shown that every tight member of $\mathcal{W}_1(d)$ is strongly minimal, thus providing substantial evidence in favour of a conjecture of Kühnel and Lutz asserting that tight triangulated manifolds should be strongly minimal.

• Introduced the class $\Sigma_k(d)$ of k-stellated (combinatorial) spheres of dimension d ($0 \leq k \leq d + 1$) and compare and contrast it with the class $\mathcal{S}_k(d)$ ($0 \leq k \leq d$) of k-stacked homology d-spheres. It is shown in [135] that $\Sigma_1(d) = \mathcal{S}_1(d)$, and $\Sigma_k(d) \subseteq \mathcal{S}_k(d)$ for $d \geq 2k - 1$. However, for each $k \geq 2$ there are k-stacked spheres which are not k-stellated. The existence of k-stellated spheres which are not k-stacked remains an open question.

• Considered the class $\mathcal{W}_k(d)$ (and $\mathcal{K}_k(d)$) of simplicial complexes all whose vertex-links belong to $\Sigma_k(d-1)$ (respectively, $\mathcal{S}_k(d-1)$). Thus, $\mathcal{W}_k(d) \subseteq \mathcal{K}_k(d)$ for $d \geq 2k$, while $\mathcal{W}_1(d) = \mathcal{K}_1(d)$. Let $\overline{\mathcal{K}}_k(d)$ denote the class of d-dimensional complexes all whose vertex-links are k-stacked balls. It is shown that for $d \geq 2k + 2$, there is a natural bijection $M \mapsto \overline{M}$ from $\mathcal{K}_k(d)$ onto $\overline{\mathcal{K}}_k(d+1)$ which is the inverse to the boundary map $\partial\colon \overline{\mathcal{K}}_k(d + 1) \to \mathcal{K}_k(d)$.

• Walkup's class $\mathcal{K}(d)$ consists of the d-dimensional simplicial complexes all whose vertex links are stacked $(d-1)$-spheres. According to a result of Walkup, the face vector of any triangulated 4-manifold X with Euler characteristic χ satisfies $f_1 \geq 5f_0 - \frac{15}{2}\chi$, with equality only for $X \in \mathcal{K}(4)$. Kühnel observed that this implies $f_0(f_0-11) \geq -15\chi$, with equality only for 2-neighborly members of $\mathcal{K}(4)$. For $n = 6, 11$ and 15, there are triangulated 4-manifolds with $f_0 = n$ and $f_0(f_0-11) = -15\chi$. Found [340] triangulated 4-manifolds with $f_0 = 21, 26$ and 41 which satisfy $f_0(f_0 - 11) = -15\chi$. All these triangulated manifolds are tight and strongly minimal.

• Found [143] an explicit construction of vertex-transitive tight triangulated d-manifolds for $d \geq 2$. More explicitly, for each $d \geq 2$, found two $(d^2 + 5d + 5)$-vertex neighborly triangulated d-manifolds whose vertex-links are stacked spheres. The only other non-trivial series of such tight triangulated manifolds currently known is the series of non-simply connected triangulated d-manifolds with $2d+3$ vertices constructed by Kühnel. These new manifolds are strongly minimal. For $d \geq 3$, they are also tight neighborly. Like Kühnel's complexes, these manifolds are orientable in even dimensions and non-orientable in odd dimensions.

• For each $d \geq 3$, the $(d + 2)$-vertex triangulation of the d-sphere S^d is the tight neighborly triangulation with $\beta_1 = 0$. Similarly for each $d \geq 3$, there is a unique $(2d + 3)$-vertex simplicial complex which triangulates a S^{d-1}-bundle over S^1. These complexes were obtained by Kühnel in 1986. Kühnel's complexes are tight neighborly with $\beta_1 = 1$. In [210], it was shown that there does not exist a tight neighborly triangulated manifold with $\beta_1 = 2$.

• Found a short proof of the uniqueness of Kühnel's complex for $d \geq 4$, under the assumption $\beta_1 \neq 0$ [210].

• In [35], it was constructed a 15-vertex $\mathbb{Z}_2$-tight triangulation of $(S^3 \tilde{\times} S^1)^{\#3}$ whose vertex-links are stacked 3-spheres. Recently, one more such $\mathbb{Z}_2$-tight triangulation of $(S^3 \tilde{\times} S^1)^{\#3}$ is constructed [266]. Also found ten 15-vertex triangulations of $(S^3 \times S^1)^{\#3}$. All are tight. It was shown that there are exactly 12 such triangulated 4-manifolds with $\mathbb{Z}_3$ symmetry.

• In [135], the sigma-vector $(\sigma_0(X), \ldots, \sigma_d(X))$ of a d-dimensional simplicial complex X is introduced. In [251], it is shown that if X is an n-vertex triangulation of the 2-sphere S^2, then $\sigma_0(X) \leq (n-8)(n+1)/20$, with equality if and only if X is a stacked 2-sphere. Using this characterization of stacked 2-spheres, the outstanding 3-dimensional case of the Lutz-Sulanke-Swartz conjecture that 'tight neighborly triangulated manifolds are tight' is settled. For dimension $d \geq 4$, the conjecture follows from results of Novik-Swartz and Effenberger.

• The following two results are proved in [338]: (a) every stacked triangulation of a connected manifold with or without boundary is obtained from a simplex or the boundary of a simplex by certain combinatorial operations; (b) for a connected closed manifold M of dimension $d \geq 4$, if the ith homology group vanishes for $1 < i < d - 1$, then any tight triangulation of M is stacked. These results give affirmative answers to questions posed by Novik and Swartz and by Effenberger.

• It is well known that a triangulation of a closed 2-manifold is tight with respect to a field of characteristic two if and only if it is neighbourly; and it is tight with respect to a field of odd characteristic if and only if it is neighbourly and orientable. No such characterization of tightness was previously known for higher dimensional manifolds. It is shown that a triangulation of a closed 3-manifold is tight with respect to a field $\mathbb{F}$ if and only if it is neighbourly, $\mathbb{F}$-orientable and stacked [269, 333]. In consequence, the Kühnel-Lutz conjecture is valid in dimension three.

• Tight triangulations are exotic objects in combinatorial topology. Tight triangulations are conjectured to be strongly minimal, and proven to be so for dimension at most three. However, in spite of substantial theoretical results about such triangulations, there are precious few examples. In fact, apart from dimension two, it is not known if there are infinitely many of them in any given dimension. A computer friendly combinatorial

scheme to obtain tight triangulations, and present new examples in dimensions three, four and five presented in [336]. Furthermore, obtained a family of tight triangulated d-manifolds, with $2^{d-1}\lfloor d/2\rfloor!\lfloor (d-1)/2\rfloor!$ homeomorphic but isomorphically distinct members for each dimension $d \geq 2$.

• For a simplicial complex, deciding tightness has a straightforward exponential time algorithm, but efficient methods to decide tightness are only known in the trivial setting of triangulated surfaces. In [332], a new polynomial time procedure to decide tightness for triangulations of 3-manifolds is presented – a problem which previously was thought to be hard. Furthermore, obtained an algorithm to decide general tightness in the case of 4-dimensional combinatorial manifolds which is fixed parameter tractable in the treewidth of the 1-skeletons of their vertex links, and we present an algorithm to decide F2-tightness for weak pseudomanifolds M of arbitrary but fixed dimension which is fixed parameter tractable in the treewidth of the dual graph of M.

• Quasitoric manifolds, introduced by M. Davis and T. Januskiewicz in 1991, are topological generalizations of smooth complex projective spaces. In 1992, Banchoff and Kühnel constructed a 10-vertex equilibrium triangulations of $\mathbb{CP}^2$. This construction for quasitoric manifolds is generalized and constructed some equilibrium triangulations of 4-dimensional quasitoric manifolds in [339]. In some cases, these constructions give vertex minimal equilibrium triangulations.

• The notion of equilibrium triangulations for small covers is introduced and studied equilibrium and vertex minimal $\mathbb{Z}_2^2$-equivariant triangulations of 2-dimensional small covers in [247]. Constructed vertex minimal equilibrium triangulations of $\mathbb{RP}^3\#\mathbb{RP}^3$, $S^1 \times \mathbb{RP}^2$ and a nontrivial S^1-bundle over $\mathbb{RP}^2$.

• In [198], introduced the weight of a group which has a presentation with number of relations is at most the number of generators. It is shown that the number of facets of any contracted pseudotriangulation of a connected closed 3-manifold M is at least the weight of $\pi(M, *)$. This lower bound is sharp for the 3-manifolds $\mathbb{RP}^3$, $L(3,1)$, $L(5,2)$, $S^1 \times S^1 \times S^1$, $S^2 \times S^1$, $S^2 \tilde{\times} S^1$ and S^3/Q_8, where Q_8 is the quaternion group. Moreover, there is a unique such facet minimal pseudotriangulation in each of these seven cases.

• In [198], contracted pseudotriangulations of $L(kq-1, q)$ with $4(q+k-1)$ facets for $q \geq 3$, $k \geq 2$ and $L(kq+1, q)$ with $4(q+k)$ facets for $q \geq 4$, $k \geq 1$. By a recent result of Swartz, these pseudotriangulations of $L(kq+1, q)$ are facet minimal when $kq+1$ are even. In 1979, Gagliardi found presentations of the fundamental group of a manifold M in terms of a contracted pseudotriangulation of M. Any of the above mentioned construction are the converse of this, namely, given a presentation of the fundamental group of a 3-manifold M, we construct a contracted pseudotriangulation of M. So, these constructions of contracted pseudotriangulations of 3-manifolds are based on presentations of the fundamental groups of the manifolds and they are computer-free.

• Written an algorithm to construct crystallizations of 3-manifolds from presentations of fundamental groups of 3-manifolds. This algorithm provides minimal crystallization of a 3-manifold by choosing appropriate presentation of the fundamental group of that 3-manifold. Using this algorithm, some new crystallizations of 3-manifolds are constructed [295].

• Obtained a minimal crystallization of the standard pl K3 surface. This yields minimal crystallizations of all simply connected pl 4-manifolds of "standard" type, that is, all connected sums of $\mathbb{CP}^2$, $S^2 \times S^2$, and the K3 surface. In particular, obtained minimal crystallizations of a pair of homeomorphic but non-pl-homeomorphic 4-manifolds [296].

• In [335], obtained new upper bounds for regular genus and gem-complexity of manifold bundles over circle. The bound for regular genus is attained by manifold bundles over circle for some manifolds. In particular, it is shown that there exists an orientable $(S^2 \times S^1)$-bundle over S^1 with regular genus 6. This disproves an old conjecture.

Combinatorics

• A new model of magnetic monopoles and current loops was studied for arbitrary planar graphs in [241].

• A generalization of the map coloring problem to higher dimensions is proposed in [136].

• Let $s(n)$ be the maximum size of a collection of permutations such that the sum of any two distinct permutations of $\mathbb{Z}_n$ in the collection is again a permutation of $\mathbb{Z}_n$, and let $t(n)$ the maximum size of a collection of permutations of $\mathbb{Z}_n$ such that the sum of any two distinct permutations in the collection is not a permutation of $\mathbb{Z}_n$. The case when n is even is trivial in both the cases, with $s(n) = 1$ and $t(n) = n!$. The following are proved in [202]. (i) If n is odd, then $s(n) \geq (n\varphi(n))/2^k$ where k is the number of distinct prime divisors of n. (ii) If n is an odd prime then $s(n) \leq \frac{e^2 n}{\pi}(\frac{n-1}{e})^{(n-1)/2}$. (iii) If n is odd then $2^{(n-1)/2} \times (\frac{n-1}{2})! \leq t(n) \leq 2^k \times \frac{(n-1)!}{\varphi(n)}$.

Commutative Algebra and Algebraic Geometry

• In the article [346], we shall prove the classical theorem of Burnside which asserts that the canonical Burnside mark homomorphism of the Burnside algebra $\mathrm{Br}(G)$ of a finite group G into the product $\mathbb{Z}$-algebra of rank $\#\,\mathfrak{C}_G$ is injective, where $\mathfrak{C}_G$ denote the set of conjugacy classes of the subgroups of G. $\mathbb{Z}^{\mathfrak{C}_{\mathbf{Z}_G}} \to \mathbb{Z}^{\mathfrak{C}_G}$ maps the Burnside algebra $\mathrm{B}(\mathbf{Z}_G)$ of a finite cyclic group $\mathbf{Z}_G$ of order $\#\,G$ into the Burnside algebra $\mathrm{B}(G)$. We deduce quite a few elementary, but important results in finite group theory by using this canonical algebra homomorphism. Finally We describe the defining equations of the Burnside algebra $\mathrm{Br}(\mathbf{Z}_{p^n})$ of the finite cyclic p-group $\mathbf{Z}_{p^n}$ over $\mathbb{Z}$, where p is a prime number and $n \in \mathbb{N}^*$. This explicit description of the defining equations is then used to prove that the spectrum $\mathrm{Spec}\,\mathrm{Br}(\mathbf{Z}_{p^n})$ has exactly $n+1$ irreducible components. Finally, these results are used to prove that the spectrum of the Burnside algebra of a finite abelian group is connected.

• In the joint ongoing research project on the computational aspects of Burnside algebras of finite groups, we propose to investigate the algebraic geometric properties of the Burnside algebra $\mathrm{B}(G)$ of a finite group G. A key ingredient of this investigation will be the construction of explicit efficient algorithms for computing Burnside rings and checking their properties, thereby enabling the computation of complicated examples and providing new insights.

• The Burnside ring encapsulates information about the G-sets of the group and carries a lot of combinatorial information, and also lends itself for the analysis of more sophisticated G-posets, or more generally, simplicial G-sets. Many theorems have been proved about the Burnside rings using its prime spectrum and primitive idempotents by several researchers. However, there are still many open problems as well as many new interesting questions have been formulated and using computational algebra packages one can make systematic experiments and deal with more complicated examples and make new discoveries.

• The Burnside ring $B(G)$ of a finite group G, a classical tool in group theory and representation theory, is studied from the point of view of computational commutative algebra. Starting from a table of marks, we describe efficient algorithms for computing a presentation, the image of the mark homomorphism, the prime ideals and the prime ideal graph, the singular locus, the conductor in its integral closure, the connected components of its spectrum, and its idempotents. On the way, we provide methods for identifying p-residual subgroups, direct products of subgroups of coprime order, commutator subgroups, and perfect subgroups.

• In [150] we survey some of the major results about Normal Hilbert polynomial of an m-primary ideal in a local ring (R, m).

• In [259] we have discussed sharp upper bound for the minimal number of generators of the tangent cone in terms of second difference operator of the Hilbert function. Let (S, n) be a regular local ring and $I \subseteq n^2$ be a perfect ideal of S. Sharp upper bounds on the minimal number of generators of I are known in terms of the Hilbert function of $R = S/I$. Starting from the information on the ideal I we have given sharp upper bound on the minimal number of generators of I^* which defines the tangent cone of R.

• In [245], we consider the algebraic geometry of schemes over symmetric monodical categories. In particular, we consider the derived category of quasi-coherent sheaves over such a (not necessarily) Noetherian scheme. Then, we show that the derived category of quasi-coherent sheaves carries a closed symmetric monodical structure.

• In [293], we construct the exponential morphism $e^D : A \longrightarrow A$ corresponding to a nilpotent derivation D on a monoid A in a symmetric monoidal category. Further, we show that the kernel of D is identical to the subobject of A invariant under e^D. Finally, we study how to extend a locally nilpotent derivation on A to its localization A_S, where $S \subseteq Hom_{AMod}(A, A)$ is a multiplicatively closed subset.

• Let K be a field of characteristic zero and let Sm/K be the category of smooth and separated schemes over K. For an ind-scheme $\mathcal{X}$ (and more generally for any presheaf of sets on Sm/K), we define its Chow groups $\{CH^p(\mathcal{X})\}_{p\in\mathbb{Z}}$. We also introduce Chow groups $\{\mathcal{CH}^p(\mathcal{G})\}_{p\in\mathbb{Z}}$ for a presheaf with transfers $\mathcal{G}$ on Sm/K. Then, we show that we have natural isomorphisms of Chow groups $CH^p(\mathcal{X}) \cong \mathcal{CH}^p(Cor(\mathcal{X}))\ \forall\ p \in \mathbb{Z}$ where $Cor(\mathcal{X})$ is the presheaf with transfers that associates to any $Y \in Sm/K$ the collection of finite correspondences from Y to $\mathcal{X}$. Additionally, when $K = \mathbb{C}$, we show that Saito's filtration on the Chow groups of a smooth projective scheme can be extended to the Chow groups $CH^p(\mathcal{X})$ and more generally, to the Chow groups of an arbitrary presheaf of sets on $Sm/\mathbb{C}$. Similarly, there exists an extension of Saito's filtration to the Chow groups of a presheaf with transfers on $Sm/\mathbb{C}$. Finally, when the ind-scheme $\mathcal{X}$ is ind-proper, we show that the isomorphism $CH^p(\mathcal{X}) \cong \mathcal{CH}^p(Cor(\mathcal{X}))$ is actually a filtered isomorphism.

Differential Geometry

• Stability and local minimizing properties of the Riemannian functional $g \to \int_M |R|^p dv_g$ defined on the space of Riemannian metrics on a closed manifold were investigated. Riemannian metrics with constant curvature and products of such metrics are critical points of this functional. It was proved that these metrics are strictly stable for this functional and the functional has strict local minima at each of these metrics.

• In [248], it was proved that compact Ricci-flat 4-manifolds are flat if the sectional curvatures satisfy a suitable pinching hypothesis. No global hypothesis on diameter or

volume, which can be arbitrarily large, is necessary for this conclusion.

• In [146], it was proved that an isometric (with respect to the Kobayashi distance) embedding between convex domains, possibly of different dimensions, is necessarily holomorphic or anti-holomorphic.

• In [341], it was proved that the class of convex domains containing holomorphic discs in their boundaries are not Gromov hyperbolic for the Kobayashi metric.

• The existence or nonexistence of Kahler metrics with either nonnegative or nonpositive holomorphic bisectional curvature on Quot schemes associated to compact Riemann surfaces was investigated [137], [200].

• In [93] restrictions, in terms of fundamental groups of compact 3-manifolds, on the fundamental groups of compact Kahler manifolds were proved.

• In [302], a partial classification result for curvature cones preserved by the Ricci flow was proved. A new Ricci flow invariant condition in dimension 4, related to positive isotropic curvature, was studied.

Low Dimensional Topology

• In [97], spaces of geosphere laminations for the the connected sum $M = \sharp_n S^2 \times S^1$ of n copies of $S^2 \times S^1$ were constructed and studied. These spaces were constructed as analogues of geodesic laminations on surfaces, in the sense that they can be thought of as limits of disjoint unions of spheres in $\sharp_n S^2 \times S^1$, much like geodesic laminations on surfaces can be thought of as limits of simple multicurves. The space of geosphere laminations admits an action of the outer automorphism group of the free group F_n. It was proved that this space, when given an appropriate topology, is compact. In particular, by analogy to mapping class groups, iterates of geosphere laminations under outer automorphisms of free groups have limit points in the space of geosphere laminations.

• The Desargues theorem was shown to be equivalent to integrability [144]. Concretely, consider an almost complex structure J on $\mathbb{C}P^2$, which is tamed by the standard symplectic form ω, i.e., such that $\omega(v, Jv) > 0$ for all non-zero tangent vectors v. Then, by theorems of Gromov, we can associate a projective plane (we recall definitions below) to J, with points the points of $\mathbb{C}P^2$ and lines holomorophic curves Σ such that the corresponding homology class $[\Sigma] \in H_2(\mathbb{C}P^2, \mathbb{Z})$ is the positive generator (i.e., the generator on which the integral of ω is positive). Ghys asked whether the Theorem of Desargues for such a projective plane implies that J is integrable, or equivalently standard. It was shown that this is indeed the case.

• Given a surface Σ, the Goldman bracket is a Lie Algebra structure on the free Abelian group $\mathbb{Z}[\hat{\pi}(\Sigma)]$ with basis the set $\hat{\pi}(\Sigma)$ of free homotopy classes of closed curves in Σ. It was shown in [39] that a homotopy equivalence between compact surfaces is homotopic to a homeomorphism if and only if it commutes with the Goldman bracket. The result reformulates a classical result of Nielsen giving a characterization in terms of preserving peripheral structures, but has the advantage of making no a priori reference to the boundary and being based on a structure with analogues in higher dimensions and for symplectic manifolds.

• A key ingredient in many problems in low-dimensional topology, and other areas of mathematics, is minimal intersection and self-intersection numbers of curves on surfaces. While these are easy to define, they are hard to understand as they are not readily

described in terms of a structure. The intersection and self-intersection numbers were characterised in terms of the Goldman bracket of powers.

• A fundamental problem regarding any Lie algebra is to characterize its center. The center of the Goldman Lie Algebra was shown to be trivial in the case of closed surfaces and the sub-algebra generated by peripheral curves in the case of compact surfaces with (in general non-empty) boundary.

• A result of Vershik shows that metric measure spaces are determined, up to measure-preserving isometries, by the corresponding distributions on infinite square matrices. In [115], an effective version of this result was given. Namely, there exists a natural correspondence between the set of all distance matrices and the family of finite metric measure spaces. It was shown that this correspondence is bi-Lipschitz if the distance between metric measure spaces is the Gromov-Prokhorov metric.

• Basic properties of distance measure spaces, generalizations of metric measure spaces allowing infinite distances were shown. These included a compactness theorem. It was shown that the Deligne-Mumford compactification of Riemann surfaces can be described as metric completion in our framework. A version of the Deligne-Mumford compactification for measured laminations was proved.

• The set of shortest geodesics on a hyperbolic surface was studied. It was shown that there is an equivalent combinatorial formulation of the question of realizability of a graph in terms of shortest geodesics. It was deduced that there are infinitely many minimally non-realizable graphs.

Number Theory

• Iwaniec and Sarnak (Ann. of Math.(2), 141 (1995), no. 2, 301–320) investigate the supermum norm of real-analytic eigenfunctions on a compact arithmetic surface. We take up the case of holomorphic forms in [254], a joint work with J. Sengupta. Note that the convexity or 'trivial' bound in this case is $\|f\|_\infty \ll k^{\frac{1}{2}+\epsilon}$. We break the convexity estimate for the sup-norm of L^2-normalized holomorphic modular forms of weight k on the upper half plane, with respect to the unit group of a quaternion division algebra over $\mathbb{Q}$. More precisely we show [254] that when the L^2 norm of an eigenfunction f is one,

$$\|f\|_\infty \ll k^{\frac{1}{2}-\frac{1}{33}+\varepsilon}$$

for any $\varepsilon > 0$ and for all k sufficiently large.

• The Resnikoff-Saldana conjecture is a statement about an optimal estimate of Fourier coefficients of cuspidal Siegel modular forms, which is out of reach at present, but there have been results towards it. Given some evidence towards the conjecture in the case of degree 2, by proving it for a restricted infinite set of Fourier coefficients [351].

• In [253], a multiplicity-one type result for quasi-modular forms was derived; and along the way, a complete classification of the set of quasi-modular eigenforms of level one was described.

• Answered affirmatively, and in much more generality a question asked by S. Böcherer on the possibility of the removal of one differential operator from the well-known finite collection of classical differential operators used to embed spaces of Jacobi forms in to those of elliptic modular forms [252].

• In continuation of our previous work [201] on characterizing Siegel cusp forms by the growth of their Fourier coefficients, in [297] presented a novel and much more flexible approach to the problem, and solve it for arbitrary congruence subgroups of the Siegel modular group $Sp_n(\mathbb{Z})$ for any $n \geq 1$ and for 'large' weights, with the assumption of the growth condition at *any* given cusp.

• In [298], it is answered the question of characterizing Siegel cusp forms by the growth of their Fourier coefficients in the case of 'small' weights for the groups $\Gamma_0^n(N)$ by using the main result in [297] and two methods: employing the so-called Witt-operator on modular forms and by using the Fourier-Jacobi expansion along a Klingen Parabolic.

• In [256], it is proved that given a Hecke-Maass form f on $SL_2(\mathbb{Z})$ and a sufficiently large prime q, there exists a primitive Dirichlet character χ of conductor q such that the 'central' L-values $L(1/2, f \otimes \chi)$ and $L(1/2, \chi)$ do not vanish simultaneously. We expect the same method to work for any large integer q.

• Prove a nonvanishing result for Koecher-Maass series attached to Siegel cusp forms of weight k and degree n in certain strips on the complex plane. When $n = 2$, we prove such a result for forms orthogonal to the space of the Saito-Kurokawa lifts 'up to finitely many exceptions', in bounded regions. These results can be thought of as a higher dimensional analogue of W. Kohnen's result describing the 'Riemann Hypothesis on average' for the family of level one elliptic modular L-functions in the context of Fourier coefficients [255].

• Motivated by a question of Serre, it is shown in [299] that there are infinitely many primitive modular cusp forms f of weight 2 with the property that for all X large enough, every interval $(X, X + cX^{1/4})$, where $c > 0$ is a constant that depends only on the form, contains an integer n such that the n-th Fourier coefficient of f is nonzero. The proof uses elliptic curves and their 4-torsion points.

Representation Theory

• The Centralizer algebras of a matrix consists of the set of matrices that commute with it. The article [96] explores the basic representation theoretic invariants like radical, projective indecomposable modules, injective indecomposable modules, simple modules and Cartan matrix of these finite dimensional algebras. With the help of the Cartan matrix calculations it was proved that almost all of these are of infinite global dimension.

• Let R be a principal ideal local ring of length two, for example, the ring $R = \mathbf{Z}/p^2\mathbf{Z}$ with p prime. In [263] a theory of normal forms was developed for similarity classes in the matrix rings $M_n(R)$ by interpreting them in terms of extensions of $R[t]$-modules. Using this theory, a description of the similarity classes in $M_n(R)$ for $n \leq 4$, along with their centralizers was given. Among these, characterization of those classes which are similar to their transposes was explored. Non-self-transpose classes are shown to exist for all $n > 3$. When R has finite residue field of order q, the similarity classes and the cardinalities of their centralizers as polynomials in q were enumerated. Further investigations showed that the number of similarity classes in the endomorphism algebra of a finite module over a discrete valuation ring is a positive polynomial function of the order of the residue field in a large number of cases.

• In [101] it was proved that the number and dimensionas of irreducible representations of the special linear groups, symplectic groups and unitary groups over principal ideal local rings of length two depend only on the residue field.

• Let F be a non-archimedean local field and let $\mathcal{O}$ be its ring of integers. In [209] a complete description of the irreducible constituents of the restriction of the unramified principal series representations of $\mathrm{GL}_3(F)$ to $\mathrm{GL}_3(\mathcal{O})$ was given.

• The abstract homomorphisms of the special linear group $\mathrm{SL}_n(\mathcal{O}_p)$ over complete discrete valuation rings with finite residue field into the general linear group $\mathrm{GL}_m(\mathbb{R})$ over the field of real numbers are studied. In [270], it is shown that for $m < 2n$, every such homomorphism factors through a finite index subgroup of $\mathrm{SL}_n(\mathcal{O}_p)$. For $\mathcal{O}_p$ with positive characteristic, this result holds for all $m \in \mathbb{N}$.

• In [242], a structure theory for the representations of a class of monoids was developed and applied to Markov chains.

Role of Intrinsically Disordered Proteins in Cancer

Genetic alterations that occur at random are generally thought to be the key, and often the only, drivers in evolution and cancer. In other words, it is generally held that information transfer in evolution and cancer is unidirectional that is, from genotype to phenotype. It was proposed [149] that information could also be transferred from phenotype to genotype and that, this reverse flow is mediated by proteins especially, intrinsically disordered proteins (IDPs) that can rewire protein regulatory networks (PRNs). Most IDPs have an intrinsic ability to rapidly transition from disorder to order upon binding to a biological target affording them remarkable flexibility and stochasticity. A mathematical model demonstrating that such stochastic interactions enable the system to search through numerous iterations of network interactions and select those that impact increased fitness was studied. Thus, by exploring the search space in which evolution operates, PRNs enable the organism to learn to adapt to perturbed environments while facilitating the transfer of acquired information to guide evolution.

Teichmüller Theory

Let S be a closed oriented surface of genus $g \geq 2$. The Teichmüller space $\mathcal{T}_g$ is the space of marked complex structures on S, or equivalently, via the Uniformization Theorem, the space of hyperbolic structures on S. Teichmüller theory is concerned with understanding the geometry of $\mathcal{T}_g$, and using that to study moduli spaces of other geometric structures on surfaces. This involves an interaction between topology, complex analysis and differential geometry.

The following are some highlights of this research:

• In [206], the asymptoticity of grafting rays and Teichmüller rays was established in almost all directions. Grafting rays are the projection to $\mathcal{T}_g$ of certain deformations of complex projective structures on surfaces, introduced in its most general form by Thurston. Teichmüller rays are (real) geodesics with respect to the Teichmüller (or Kobayashi) metric on $\mathcal{T}_g$. In [257] this asymptoticity was proved for all directions.

• In [71], it was shown that the holomorphic family of complex earthquakes and complex Teichmüller geodesics for Strebel (or "pinching") directions, are asymptotic in a certain sense.

• The asymptoticity result and the fact that the Teichmüller flow is ergodic, implied a density result (see [206]) for the conformal structures underlying complex projective structures with a fixed Fuchsian holonomy. Found a generalization of this result to an arbitrary holonomy representation in [243] (announced in [347]).

• The work in [207] proves an existence theorem for meromorphic quadratic differentials with poles of higher order and connected critical graph on a given Riemann surface, that arise as Gromov-Hausdorff limits of Riemann surfaces along Teichmüller rays. An ongoing project with Shinpei Baba, aims to use such limits to establish criteria for when a pair of Teichmüller rays is asymptotic.

• In [342], the full parameter space of meromorphic quadratic differentials with higher order poles and connected critical graph, was described. This generalizes classical work of K. Strebel for such differentials with poles of order two. This also introduces a notion of Teichmüller spaces of punctured surfaces with "higher" decoration at the punctures.

• The Hubbard-Masur Theorem relates holomorphic quadratic differentials and "measured foliations" on surfaces, and is an important bridge between complex-analytical and topological aspects of Teichmüller theory. In [343], this theorem was generalized to the case of meromorphic quadratic differentials with poles of order two.

3.2.3 Publications

(i) Research Papers in Refereed Journals

Year	Thrust Area	Other Areas	Total
2011	34	12	46
2012	46	09	55
2013	32	20	52
2014	39	18	57
2015	29	27	56
2016	02	02	04
Accepted for publication	20	12	32
Submitted for Publication	29	15	44
Total	**231**	**115**	**346**

(i.a) Published during April 2011- March 2016

2011

• In the identified thrust area

1. Ali, S, T., Bhattacharyya, T. and Roy, S, S.: Coherent states on Hilbert modules, *Journal of Physics A* **44** (2011), 275–292.

2. Athreya, K. B., Athreya, S. and Iyer, S. K.: Supercritical age dependent branching Markov processes and their scaling limits, *Bernoulli* **17(1)** (2011), 138–154.

3. Banerjea, S., Dutta, B. and Chakrabarti, A.: Solution of singular integral equations involving logarithmically singular kernel with application in a water wave problem, *ISRN Appl. Math.* **2011** (2011), Art. ID 341564, 16 pp.

4. Basak, G. K., Ghosh M. K. and Goswami A.: Risk minimizing option pricing for a class of exotic options in a Markov modulated market, *Stochastic Analysis and Appl.* **29** (2011), 259–281.

5. Basak, G. K., Ghosh, M. K. and Mukherjee, D.: Influence of big traders in stock markets: theory and simulation, *Dynamic Games and Appl.* **1** (2011), 220–252.

6. Bharali, G.: Polynomial approximation, local polynomial convexity, and degenerate CR singularities – II, *Internat. J. Math.* **22** (2011), 1721–1733.

7. Bharali, G., and Gorai, S.: Uniform algebras generated by holomorphic and close-to-harmonic functions, *Proc. AMS* **139** (2011), 2183–2189.

8. Bhattacharyya, T. and Sasane, A.: Coherence of the real symmetric Hardy algebra, *Operators and Matrices* **5** (2011), 303–308.

9. Bora, S. N., Martha, S. C. and Chakrabarti, A.: Scattering of surface waves by small undulation on a porous seabed: a Fourier transform approach, *J. Assam Acad. Math.* **4** (2011), 1-?7.

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13. Chakrabarti, A. and Martha, S. C.: A review on the mathematical aspects of fluid flow problems in an infinite channel with arbitrary bottom topography, *J. of Appl. Math. Inform.* **29** (2011), 1583–1602.

14. Deraux, M. and Seshadri, H.: Almost quarter-pinched K?hler metrics and Chern numbers, *Proc. AMS* **139** (2011), 2571–2576.

15. Ghosh, M. K. and Saha, S.: Stochastic processes with age dependent transition rates, *Stochastic Analysis and Appl.* **29** (2011), 511–522.

16. Gorai, S.: Local polynomial convexity of the union of two totally-real surfaces at their intersection, *Manuscripta Math.* **135** (2011), 43–62.

17. Gorla, R. S. R. and Kumari, M.: Mixed convective boundary layer flow over a vertical wedge embedded in a porous medium saturated with a nanofluid: entire regime, Proceedings of the Institution of Mechanical Engineers, Part N: *J. Nanoengg. Nanosystems* **225** (2011), 55–66.

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19. Gudi, T. and Neilan, M.: An interior penalty method for a sixth-order elliptic equation, *IMA J. Numer. Anal.* **31** (2011), 1734–1753.

20. Guionnet, A., Krishnapur, M. and Zeitouni, O.: The single ring theorem, *Ann. Math.* **174** (2011), 1189–1217.

21. Gupta, H, S. and Prasad, P.: A bicharacteristic formulation of the ideal MHD equations, *J. Plasma Physics* **77** (2011), 169–191.

22. Gupta, P.: Two extension theorems of Hartogs-Chirka type involving continuous multifunctions, *Michigan Math. J.* **60** (2011), 673–685

23. Iyer, S. K., Manjunath, D. and Sundaresan, R: In-network computation in random wireless networks: A PAC approach to constant refresh rates with lower energy costs, *IEEE Trans. on Mobile Computing* **10** (2011), 146–155.

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2. Bhattacharyya, T., Horn, R. and Rao, T. S. S. R. K. (Editors): In The Matrix Mould, Hindustan Book Agency, New Delhi, 2012.

3. Ding, M. and Rangarajan, G.: Parametric spectral analysis, in *Encyclopedia of Computational Neuroscience: SpringerReference* eds. D. Jaeger and R. Jung (Springer-Verlag, Berlin Heidelberg, 2015).

4. Patil, D. P. and Storch, U.: Introduction to Algebraic Geometry and Commutative Algebra, an Indian Edition Published by Cambridge University press India Pvt. Ltd. 2012 (Originally IISc Lecture Notes Series, No. 1, 2010 IISc Press/World Scientific Publications Singapore/Chennai).

3.3 Human resource training

3.3.1 The National Mathematics Initiative (NMI)

An Institute-wide Mathematics Initiative was started a few years ago. Thirty Five faculty members (including 6 from Mathematics Department) spread across 16 Departments are participating in the Initiative. A focus area of current interest to both mathematicians and scientists/engineers is identified every year. During this period, experts in the focus area (both from India and abroad) are invited to visit the Institute. Post-doctoral fellows are appointed in that area. Workshops and seminars are organized to catalyze interdisciplinary collaborations. Scientists and engineers from national laboratories and industry are encouraged to take part in these activities. An Institute Mathematics Colloquium is organized every semester.

During the academic year 2012-2013, the focus area was "Probability: Theory and Applications". Apart from running short courses and seminars on these (and related topics), workshops and conference were organized.

The list of events under the programme:

- School on Network Science in Electrical Engineering and Computer Science (January 02 - 06, 2012)
- Workshop on Network Science in Electrical Engineering and Computer Science (January 09 - 13, 2012)
- School on Networks in Biology, Social Science and Engineering (July 02 - 11, 2012)
- International Conference on Networks in Biology, Social Science and Engineering (July 12 - 14, 2012) Workshop on Limit Theorems in Probability (January 2-9, 2013)
- Conference on Limit Theorems in Probability (January 2-9, 2013)
- School on Stochastic Processes in Engineering (March 11 - 15, 2013)
- Conference on New Directions in Probability (May 30 - June 04, 2013)

During the academic year 2013-2014, the focus area was "Integrable Systems". Apart from running short courses and seminars on these (and related topics), workshops and conference were organized.

The list of events under the programme:

- Workshop on Quantum Integrable Systems (December 02 - 06, 2013)
- Workshop on Geometry of Mechanics and Control Theory (January 02 - 10, 2014)
- Workshop on Nonlinear Integrable Systems and their Applications (February 24 - March 01, 2014)
- Workshop on Discrete Integrable Systems (June 09 - 14, 2014)
- Conference on Symmetries and Integrability in Difference Equations (SIDE 2014) (June 16 - 21, 2014)

During the academic year 2014-2015, the focus area was "Machine Learning and Data Mining". Apart from running short courses and seminars on these (and related topics), workshops and conference were organized.

The list of events under the programme:

- Conference on Stochastic Systems and Applications (September 08 - 11, 2014)
- Symposium on Learning, Algorithms and Complexity (January 05 - 09, 2015)
- Workshop on Learning sparse representations for Signal Processing (February 20 - 22, 2015)
- Workshop on Machine Learning and Complex Networks (February 28 - March 07, 2015)
- Workshop on Advances in Reinforcement learning (March 23 - 28, 2015)
- Workshop on Non-convex Optimization for Machine Learning (June 10 - 19, 2015)

During the academic year 2015-2016, the focus area is "Game Theory and Optimization". Apart from running short courses and seminars on these (and related topics), workshops and conference were organized.

The list of events under the programme:

- Workshop on Static and Dynamic Mechanism Design (August 01 - 04, 2015)
- Workshop on Networks and Games (December 07 - 09, 2015)

3.3.2 Mathematical Olympiad

This is a unique department of mathematics in the country, which hosts the Mathematical Olympiad (MO) Cell jointly under the National Board for Higher Mathematics (NBHM), Department of Atomic Energy, Government of India, and Homi Bhaba Centre for Science Education (HBCSE), Tata Institute of Fundamental Research (TIFR), and funded by NBHM. The aim is to spot and nurture mathematics talent in India and train them for the International Mathematical Olympiads (IMO). The first MO in the country was organized by this department in 1968 for the students of Bangalore. Today, MO is a national activity for which all academic work is done by the MO Cell. The MO Cell members have authored 8 books meant for olympiads and one of them has authored 7th standard Geometry for Andhra Pradesh Govt. and another is a coauthor of and editor for 7th and 8th standard Mathematics text books for Karnataka. They are also bringing out a Mathematics Journal (Samasya) since 1994 meant for High School students. The MO Cell members have organized camps all over country to train teachers in material suitable for nurturing mathematics talent. Members of MO cell with the help this department faculty have organised/participated in 25 IMO-Training Camps either at the IISc, Bangalore or at BARC/HBCSE, Mumbai. So far India has sent 144 (24 teams of six members each) students to participate in IMOs held in different countries where Indian students have bagged 11 Gold Medals, 58 Silver Medals and 51 Bronze Medals. The cell members have been acting as leaders and deputy leaders of Indian teams since 1991. The MO Cell members acted as resource persons in the refresher courses (i) for College teachers, (ii) for High School and PU (plus 2) teachers and (iii) for High School student programmes. The cell members have been involved in paper-setting, evaluation and selection of teams since 1989 for the regional, national and international MO's. They have

also set papers for the NTS, KVPY and NEST. They have guided students under different projects. They have refereed theses for Ph.D. candidates and set papers for different universities. They have been proposing and solving problems for Mathematics journals such as the American Mathematical Monthly and Crux Mathematicorum and published research articles as well as general articles in various journals. they are working as editors for science magazines. India hosted IMO-1996 in Mumbai. Problem Short-listing was done in Bangalore during May 1996. All MO Cell members were organisers. Institute Mathematics faculty members have acted as coordinators for all KRMO's since late 70's. 18 problems proposed by the cell members were short-listed in various IMO's and 3 of them were selected for the final IMO.

3.3.3 Olympiad training camps

Every year during the second/third week of January, the department organizes a 5-day training camp for the "Karnataka Regional Mathematical Olympiad" awardees to prepare them for the National level talent search examination. These awardees are selected by a written test conducted through out Karnataka.

3.3.4 Visiting summer students

Every summer there are several students of different universities and colleges do their summer training under the guidance of the faculty members of the department. Here is a list of such students :

2011

1. Mr. Biswajyoti Saha, Hyderabad University, did summer project under the guidance of T. Bhattacharyya in May-June 2011 (Academy Fellowship).

2. Ms. Ekata Saha, Hyderabad University, did summer project under the guidance of T. Bhattacharyya in May-June 2011(JNCASR).

3. Mr. Varun Karamshetty, did summer project under the guidance of M. K. Ghosh in May - June 2011 (Academy fellowship).

4. Ms. Nancy Mathur, IISER Mohali, did summer project under the guidance of T. Gudi in May-July 2011.

5. Mr. Subhabrata Sen, ISI Kolkata, did summer project under the guidance of Manjunath Krishnapur in June-July 2011 and Nov 2011 (Academy fellowship).

6. Mr. Suryateja Gavva, IIT Mumbai, did summer project under the guidance of Manjunath Krishnapur in June-July 2011.

7. Mr. Vishal, IITR, did summer project with A. K. Nandakumaran in June 2011 (KVPY).

8. Ms. Aiswarya, IISER, Trivandrum, did summer project under the guidance of A. K. Nanadakumaran in June-July 2011 (INSPIRE).

9. Ms. Reshma Soman IISER, Trivandrum, did summer project under the guidance of A. K. Nandakumaran in June-July 2011 (INSPIRE).

10. Mr. Ashish Pandey, NISER, did summer project under the guidance of S. Thangavelu in May-June 2011 (Academy Fellowship).

11. Ms. Sneha Chuabey, NISER, did summer project under the guidance of S. Thangavelu in May-June 2011 (Academy Fellowship).

12. Mr. Sandeepan Parekh, ISI did summer project under the guidance of S. Thangavelu in May-June 2011 (KVPY).

2012

13. Mr. Anwesh Pokkuluri, for an IASc-INSA-NASI Summer Research Fellowship for two months in 2012.

14. Mr. Chandrasekhar Raju, for a JNCASR Summer Research Fellowship for two months in 2012.

15. Ms. Remya Teja, MSc.and B. Tech., Bits Pilani, Goa Campus (May 24 - July 29, 2012), Short term student (Inspire) and did (KVPY) project under the gudance of A. K. Nandakumaran..

16. Mr. Joseph Kunnathoor, BS, IISc., Bangalore (June- July, 2012), did (KVPY) project under the gudance of A. K. Nandakumaran.

17. Ms. Gayathri, MSc, NSS College, Chanagassery, Kerala (August 25- November 25, 2012), Short term visitor to A. k. Nandakumaran.

18. Ashish Chandra, CBS, Mumbai, did summer project under the guidance of Manjunath Krishnapur in June-July 2012.

19. Sourav Sarkar, ISI, Kolkata, did summer project under the guidance of Manjunath Krishnapur in June-July 2012.

20. Hitesh Gakhar, IISER, Mohali, did summer project under the guidance of Manjunath Krishnapur in June-July 2012.

21. Mr. M S Suraj Krishna, Univ. of Hyderabad, did his IASc-INSA-NASI summer project under the guidance of B. Datta during May 08 – July 03, 2012.

2013

22. Mr. Arman Khan, BITS Hyderabad, did his IASc-INSA-NASI summer project under the guidance of T. Gudi during June-July 2013.

23. Mr. Sreelakshmi Ammanoor, NIT Calicut, did her IASc-INSA-NASI summer project under the guidance of T. Gudi during June-July 2013.

24. Mr. Nitesh Kumar Chaudhary, LNMIIT Jaipur did his IASc-INSA-NASI summer project under the guidance of T. Gudi during June-July 2013.

25. Mr. Soumyajit Saha, IIT Kanpur, did his IASc-INSA-NASI summer project under the guidance of B. Datta during May 16 – July 10, 2013.

26. Ms. Nimisha Pahuja, St. Stephen College, Delhi, did her IASc-INSA-NASI summer project under the guidance of B. Datta during May 22 – July 16, 2013.

27. Mr. G. K. Chaithanya, Mangalore University, did his JNCASR summer project under the guidance of T. Bhattacharyya in May-June, 2013.

28. Pratyay Datta, ISI, Kolkata, did his IASc-INSA-NASI summer project under the guidance of Manjunath Krishnapur in May-July 2013.

29. Rushil Nagda, IIT, Rourkee, did his IASc-INSA-NASI summer project under the guidance of Manjunath Krishnapur in May-July 2013.

30. Tanya Goyal, IIT, Guwahati, did a summer project under the guidance of Manjunath Krishnapur in May-June 2013.

31. Mr. Kaustav Dey, 2nd yr IISER Pune (IAS-SRF); under the guidance of A. K. Nandakumaran, Period June 03 - July 29, 2013

32. Ms. Hemasri Sai, 2nd year completed in Int- MSc., Hyderabad, (IAS-SRF); under the guidance of A. K. Nandakumaran, Period: May 06 - June 30, 2013.

33. Ms. Ashwathy Joshy, IISER, Trivandrum, under the guidance of A. K. Nandakumaran, Period: May 15 - July 29, 2013.

34. Mr. Shayan Banerjee, UG Sem II, IISc (KVPY- SA), under the guidance of A. K. Nandakumaran, Period: May 01- July 31, 2013.

35. Mr. Saibal De, UG Sem II, IISc (KVPY- SA), under the guidance of A. K. Nandakumaran, Period: May 01- July 31, 2013.

36. Mr. Rahul Singh, UG Sem II, IISc. under the guidance of A. K. Nandakumaran, Period: June-July, 2013.

37. Kunjakanan Nath, Ramjas College, University of Delhi did his JNCASR sponsored summer project under the guidance of Soumya Das in May-July 2013.

38. Soumyo Biswas, UG student at IISc. Bangalore, did a summer project under the guidance of Soumya Das in May 2013-January 2014.

2014

39. Sanjeev Kumar Tiwari, did his IASc-INSA-NASI summer project under the guidance of T. Bhattacharyya in May-July 2014.

40. Ramlal Debnath, did his IASc-INSA-NASI summer project under the guidance of T. Bhattacharyya in May-July 2014.

41. Shaunak Mukherjee, did his JNCASR summer project under the guidance of T. Bhattacharyya in May-July 2014.

42. Chaitanya G.K, did his JNCASR summer project under the guidance of T. Bhattacharyya in May-July 2014.

43. Debaprasanna Kar, did his IASc-INSA-NASI summer project under the guidance of T. Gudi in May-July 2014.

44. R. V. Chethana, did her IASc-INSA-NASI summer project under the guidance of T. Gudi in May-July 2014.

45. S. Yaazhini, did her IASc-INSA-NASI summer project under the guidance of T. Gudi in May-July 2014.

46. Nimisha Sharath, did her IASc-INSA-NASI summer project under the guidance of M. K. Ghosh in May-July 2014.

47. Pratishtha Shukla did her IASc-INSA-NASI summer project under the guidance of A. Ayyer in May-July 2014.

48. Saswata Chatterjee did his KVPY summer project under the guidance of A. Ayyer in May-July 2014.

49. Agniva Dasgupta did his KVPY summer project under the guidance of A. Ayyer in May-July 2014.

50. S. Hamilton Samraj did his Inspire summer project under the guidance of A. Ayyer in May-July 2014.

51. Harsha Gurnani did her Inspire summer project under the guidance of A. Ayyer in May-July 2014.

52. Thibaut Gascuel (a student of INSA, Rennes, France) did his summer internship under the guidance of A. Ayyer in Aug-Nov 2014.

53. François Nunzi (a Ph. D. student at Université Paris Diderot, France) won the Raman-Charpak Fellowship to work under the guidance of A. Ayyer in Jan-Mar 2015.

54. Sen Abhijit, IIT Kanpur, did his project under the guidance of Pooja Singla in May-July 2014.

55. Swar Raj Chandan, NISER, Bhubaneswar, did his project under the guidance of Pooja Singla in May-July, 2014.

56. Ms. Nimisha Pahuja, St. Stephen College, Delhi, did her IASc-INSA-NASI summer project under the guidance of B. Datta during May 24 – July 18, 2014.

57. Ms. Rubayya Yusuf, Pondicharry Univ., did her IASc-INSA-NASI summer project under the guidance of B. Datta during May 12 – July 06, 2014.

58. Mr. Anurag Sharma, IIT Kanpur, did his KVPY summer project under the guidance of B. Datta during May 06 – June 06, 2014.

59. Mr. Dheer Noal Sunil Desai, NISER Bhubaneswar, did his KVPY summer project under the guidance of B. Datta during May 11 – July 11, 2014.

60. Ms. Ashwathy Joshy, IISER Trivundrum, did her Summer Project under the guidance of S. Das during May-June 2014.

61. Ms. Shashikala R, REAP Student of JNP, (Long Term, 1 year), Topic: Anamorphic Art, under the guidance of A. K. Nandakumaran, Period of Visit: 2013-2014.

62. Mr. YOGESH RAMESH, Integrated M.Sc Physics, PONDICHERRY UNIVERSITY (IASc-INSA-NASI Summer Research Fellowship),Topic: Advanced Calculus (Line, Surface Integrals etc.), under the guidance of A. K. Nandakumaran during May 15 - July 10, 2014.

63. Ms. Swati Gupta, Ramjas College, University of Delhi, (IASc-INSA-NASI Summer Research). Topic: Multi-variable Calculus (Inverse-Implicit Function Theorems and applications) under the guidance of A. K. Nandakumaran; Period of Visit: May 25 - July 20, 2014.

64. Mr. Prayagdeep Parija, Bsc 3rd year Institute of Mathematics and Applications, Bhubaneswar, (IASc-INSA-NASI Summer Research Fellowship in 2014), Topic: ODE (Stability Analysis of Linear and Nonlinear Systems), under the guidance of A. K. Nandakumaran; Period of Visit: May 16 - July 12, 2014

65. Ms. Revathy J M, Second year BS, IISER Thiruvananthapuram, Topic: Analysis and ODE, under the guidance of A. K. Nandakumaran; Period of Visit: May 09 - July 08, 2014.

66. Ms. Arathi K Nair, MSc in Mathematics at CHRIST UNIVERSITY Bangalore Topic: Fixed Point Theorems and Applications to ODE, under the guidance of A. K. Nandakumaran; Period of Visit: April 21 - June 06, 2014.

67. Ms. Eva Cherian, BS 3rd Year, IISc., Topic: First Order PDE, under the guidance of A. K. Nandakumaran; Period of Visit: May 01- 2014(KVPY).

68. Ms. Prajaktha Bedekar, NISER, did her summer project under the guidance of S. Thangavelu in the summer of 2014.

2015

69. Ms. P. A. Akila did her summer project under the guidance of T. Gudi in the summer of 2015.

70. Ms Jaismeen Kaur did her summer project under the guidance of T. Gudi in the summer of 2015.

71. Ms. Smriti Prakash Suman did her KVPY summer project under the guidance of T. Bhattacharyya in the summer of 2015.

72. Mr. Pranav Nuti did his KVPY summer project under the guidance of T. Bhattacharyya in the summer of 2015.

73. Mr. Sarvesh Ravichandran Iyer did his KVPY summer project under the guidance of T. Bhattacharyya in the summer of 2015.

74. Mr. S. Aravindan did his summer project under the guidance of T. Bhattacharyya in the summer of 2015.

75. Mr. Anuj Kumar did his summer project under the guidance of T. Bhattacharyya in the summer of 2015.

76. Mr. Himanshu Yadav did his summer project under the guidance of T. Bhattacharyya in the summer of 2015.

77. The following students did their summer project under the Guidance of A. K. Nandakumaran: 1. Ms. Akila, Christ Unvisersity; 2. Ms. Snajana, Christ Unvisersity; 3. Ms. Merlyn Maria Anotny, St. Stephen (scheme IAS), 4. Mr. Jagadeesan KSR College, Tiruchenkode (scheme IAS); 5. Mr. Saibal De, BS, IISc. (Scheme KVPY).

78. Mr. Biswajit Nag did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

79. Mr. Mukul RaiChoudhuri did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

80. Mr. Pranjal Srivastava did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

81. Mr. Prateek Singh did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

82. Mr. P. S. Ganesh Subramanian did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

83. Mr. Rohan Das did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

84. Mr. Dushyant Sapre did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

85. Mr. Siddhartha Saha did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

86. Mr. Soumya Biswas did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

87. Mr. Supratim Bain did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

88. Mr. Varun Prasad did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

89. Mr. Peshal Agarwal did his IASc-INSA-NASI summer project under the guidance of A. Ayyer in the summer of 2015.

90. Mr. Madhur Bhattad did his IASc-INSA-NASI summer project under the guidance of A. Ayyer in the summer of 2015.

91. Mr. Sridhar Venkatesh from Chennai Mathematical Institute (CMI) did his KVPY summer project under the guidance of M. Krishnapur in the summer of 2015.

92. Mr. Bhavya Teja from IISc did his KVPY summer project under the guidance of M. Krishnapur in the summer of 2015.

93. Mr. Ishan Banerjee did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

94. Mr. Karthik Wagmare did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

95. Mr. Sayantan Khan did his KVPY summer project under the guidance of A. Ayyer in the summer of 2015.

96. Ms. Karthika Rajeev, IISER Mohali, did her IASc-INSA-NASI summer project under the guidance of B. Datta during May 11 – July 03, 2015.

97. Mr. Mohit Upmanyu, CMI, Chennai, did his KVPY summer project under the guidance of B. Datta during May 18 – July 03, 2015.

98. Mr. Ashwin Govindan, IISER MOhali, did his summer project under the guidance of S. Das during June-July, 2015.

99. Ms. Nayana S.D., IISER MOhali, did his summer project under the guidance of S. Das during June-July, 2015.

100. Ms. Parvathy, IISER MOhali, did his summer project under the guidance of S. Das during June-July, 2015.

101. Mr. Agniva DasGupta, IISc, Bangalore, did his KVPY summer project under the guidance of S. Das during summer 2015.

102. Mr. N. Vignesh, IISc, Bangalore, did his summer project under the guidance of S. Das during summer 2015.

4 Resource generation

1. **Ayyer, Arvind:** Indian Principal Investigator in Indo-Swedish (DST-VR) Joint Project (funded by DST, India & VR, Sweden).

   Project Title : Algebraic and Probabilistic Combinatorics

   Duration : 2015-2017.

   Grant : Rs. 23.07 lakhs.

2. **Bharali, Gautam :** Sole investigator in a DST Project.

   Project Title : SwarnaJayanti Fellowship.

   Duration : 2015-2019.

   Grant : Rs. 56.7 lakhs.

3. **Bhattacharyya, Tirthankar and Narayanan, E. K. :** Principal Investigator and Co-Investigator in a DST project.

   Project Title : Function spaces on product domains.

   Duration : 3 years

   Grant : 4.66 lakhs.

4. **Das, Soumya :** Inspire research grant

   Duration : 2012-2017.

   Grant : Rs 35 lakhs.

5. **Datta, Basudeb :** Indian Principal Investigator in Indo-Australian (AISRF) Joint Project (funded by DST, India & DIICCSRTE, Australia).

   Project Title : Bulding triangulations for fast topological computing.

Duration : October 2013 – October 2016.

Grant : Rs. 609,500 + $ 295,972.

6. **Gudi, Thirupathi :** Principal Investigator in DST Fast Track project.

   Project Title : Convergence and optimality of adaptive finite element methods.

   Duration : 3 years

   Grant : 12.66 lakhs.

7. **Iyer, S. K. :** Principal Investigator in DRDO project.

   Project Title : Coverage ad connectivity in random geometric graphs.

   Duration : 2 years and 3 months

   Grant : 1.6 lakhs.

8. **Misra, G. :** Principal investigator from India in a collaborative project with Swedish Research Council.

   Project Title : Hilbert modules, operator theory and complex analysis.

   Grant : SEK. 185,000

   Duration : 2009-2011.

9. **Misra, G. :** Coordinator from IISc in the Marie Curie IRSES Network, Indo-European Collaboration on Moduli Spaces-MODULI, 2014-2017

   Project Title : MODULI Indo European collaboration on Moduli spaces

   Grant : Euro. 724,500

   Duration : 2013-2017.

10. **Misra, G. :** Sole investigator in a DST project.

    Project Title : J C Bose Fellowship

    Duration : 2008-2012.

    Grant : Rs. 40 lakhs.

11. **Narayanan, E. K. :** Principal investigator in a CEFIPRA project.

    Project Title : Hypergeometric functions: Harmonic analysis and representation theory.

    Duration : 2014-2017.

    Grant : 10.69 lakhs.

12. **Nandakumaran, A. K. :** Principal Investigator in a CSIR Project

    Project Title : Quantitative Imaging Using Ultra sound Assisted Optical Tomography: Mathematical and Numerical implementation.

    Duration : 2011-2014.

    Grant : Rs. 4.25 Lakhs.

13. **Nandakumaran, A. K. :** Sole investigator in a DST project.

Project Title : Homogenization in Domains with Oscillating Boundaries and Interface Problems

Duration : 2014-2017.

Grant : Rs. 4.32 lakhs.

14. **Nandakumaran, A. K. :** Co-Principal investigator in a DST Project.

    Project Title : DST Centre for Mathematical Biology Phase II.

    Duration : 2013-2018.

    Grant : .

15. **Rangarajan, G. :** Principal investigator in a DST Project.

    Project Title : Indian Institute of Science Mathematics Initiative.

    Duration : 2007-2012.

    Grant : Rs. 2.28 crores.

16. **Rangarajan, G. :** Director in a DST-CNRS Project.

    Project Title : Indo-French Centre for Applied Mathematics.

    Duration : 2013-2017.

    Grant : Rs. 5.66 crores + matching grant from French side.

17. **Rangarajan, G. :** Principal Coordinator in a DST-NSF Project.

    Project Title : Indo-US Virtual Institute for Mathematical and Statistical Sciences.

    Duration : 2012-2014.

    Grant : Rs. 2.76 crores + matching grant from US side.

18. **Rangarajan, G. :** Principal investigator in a DST Project.

    Project Title : National Mathematics Initiative.

    Duration : 2012-2017.

    Grant : Rs. 3.52 crores.

19. **Rangarajan, G., Gadgil, S., and Nandakumaran, A.K. :** Principal investigator and Co-investigators in a DST Project.

    Project Title : DST Centre for Mathematical Biology.

    Duration : 2007-2013.

    Grant : Rs. 4.22 crores.

20. **Rangarajan, G. :** Co-investigator in a DST Project.

    Project Title : IRHPA Centre for Neuroscience.

    Duration : 2010-2015.

    Grant : Rs. 13.74 crores.

21. **Rangarajan, G. :** Sole investigator in a DST project.

Project Title : J C Bose Fellowship

Duration : 2011-2016.

Grant : Rs. 68 lakhs.

22. **Rangarajan, G. :** Principal investigator in a DST Project.

    Project Title : DST Centre for Mathematical Biology Phase II.

    Duration : 2013-2018.

    Grant : Rs. 2.77 crores.

23. **Rangarajan, G. :** Principal investigator in a DST Project.

    Project Title : National Network of Mathematical and Computational Biology.

    Duration : 2013-2016.

    Grant : Rs. 4.43 crores.

24. **Rangarajan, G. :** Co-investigator in a Tata Trust Project.

    Project Title : Tata Trust Grant on Alzheimer's Research

    Duration : 2014-2019.

    Grant : Rs. 75 crores.

25. **Singla, Pooja :** Inspire research grant

    Duration : 2012-2017.

    Grant : Rs 35 lakhs.

26. **Thangavelu, S. :** Sole investigator in a DST project.

    Project Title : J C Bose Fellowship

    Duration : 2008-2012.

    Grant : Rs. 40 lakhs.

27. **Verma, K :** Sole investigator in a DST Project.

    Project Title : SwarnaJayanti Fellowship.

    Duration : 2009-2014.

    Grant : Rs. 48.85 lakhs.

5 Others

5.1 Awards/Honours/Fellowships/Distinctions

5.1.1 Awards

- S. Das was selected for the 'Bharat Jyoti Award' by IIFS for the year 2013.
- M. K. Ghosh was awarded Prof. Rustom Choksi Award for excellence in research for Science, IISc for the year 2014.

- G. Misra was selected for the Biju Patnaik Award for Scientific Excellence, Odisha Bigyan Academy, 2013
- G. Misra was chosen for the Mathematician of the year Award, 2014, by the Ponnala Trust.
- K. Verma was awarded the S. S. Bhatnagar prize in Mathematical Sciences in 2014.

5.1.2 Fellowships

- A. Ayyer was elected as an Associate of the Indian Academy of Sciences, Bangalore, 2014-2017.
- A. Banerjee was elected as an Associate of the Indian Academy of Sciences, Bangalore, 2015-2019.
- G. Bharali was awarded a Swarna Jayanti Fellowship in 2013 for the period 2015-2020 by DST.
- T. Bhattacharyya was elected as a Fellow of the Indian Academy of Science, Bangalore in 2016.
- S. Das was awarded the INSA Medal for Young Scientists by the Indian National Science Academy, New Delhi in 2014.
- B. Datta was elected as a Fellow of the National Academy of Sciences, India in 2014.
- T. Gudi was elected as an associate of the Indian Academy of Sciences, Bangalore, 2011-2014.
- G. Misra was elected as a Fellow of the National Academy of Sciences, India in 2012.
- G. Misra was awarded J. C. Bose National Fellowship for the period 2008-2012 by DST.
- G. Rangarajan was awarded J. C. Bose National Fellowship for the period 2011-2016 by DST.
- S. Thangavelu was awarded J. C. Bose National Fellowship for the period 2008-2012 by DST.
- K. Verma was awarded a Swarna Jayanti Fellowship for the period 2009-2014 by DST.
- K. Verma was elected as a Fellow of the Indian Academy of Science, Bangalore in 2015.

5.1.3 Other Distinctions

- B. Datta delivered '26^{th} P. L. Bhatnagar Memorial Award Lecture' in the 78^{th} Annual Conference of Indian Math. Society at BHU, Varanasi during January 22 - 25, 2013.
- G. Misra has been the Visitor's nominee to IIT - Guahati (2011 - 2013), IIT - Kanpur (2014 –) and IIT - Patna (2015 –).
- A. K. Nandakumaran, Chairman, Board of Governors, Technical Education Quality Improvement Program (TEQIP II), Govt. Engg. College, Palakkad.

- G. Rangarajan, Platinum Jubilee Award Lecture, 100th Indian Science Congress.
- G. Rangarajan, Honorary Professor of the Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore.
- S. Thangavelu, member of council of INSA.

5.2 In Editorial Boards

- A. Chakrabarti, Member of the Editorial Board, the Bulletin of Calcutta Mathematical Society since 1998.
- B. Datta, Member of the Editorial Board, Lecture Notes Series, Ramanujan Mathematical Society from 2005 to 2013.
- M. K. Ghosh, Associate editor of Differential Equations and Dynamical Systems, Associate editor of Stochastic Analysis and Applications.
- Manjunath Krishnapur, Member of the Editorial Board, *Little Mathematical Treasures* published by the Ramanujan Mathematical Society.
- G. Bharali, Member of the Editorial Board, Newsletter of the Ramanujan Mathematical Society.
- G. Bharali, Member of the Editorial Board, Lecture Notes Series, Ramanujan Mathematical Society.
- G. Rangarajan, Member of the editorial board, International Journal of Nonlinear Sciences and Numerical Simulation (Publisher: De Gruyter).
- G. Rangarajan, Past Member of the Editorial Board, Pramana (Publisher: Indian Academy of Sciences).
- G. Rangarajan, Associate Editor, Current Science (Publisher: Current Science Association).
- G. Misra, Editor, Indian Journal of Pure & App Math, 2015 –
  (Memeber, Editorial Board, 2013 - 2014)
- G. Misra, Editor of the Proceedings of the Indian Academy of Sciences (Math. Sci.) 2005-2012.
  (Memeber, Editorial Board, 2000- 2004 and 2015 –)
- G. Misra, Editor in Chief, IISc Lecture Notes Series, IISc Press since 2008.
- G. Misra, Member of the Editorial Board, Research Monograph Series, IISc Press since 2008.
- G. Misra, Associate Editor of the Journal of Complex Analysis and Operator Theory since 2006.
- G. Misra, Memeber, Editorial Board, Banach Journal of Mathematical and Analysis
- G. Misra, Memeber, Editorial Board, Operators and Matrices

- G. Misra, Memeber, Editorial Board, Mathematics Student, Indian Mathematical Society
- G. Misra, Member of the Editorial Board of Current Science since 2008 - 2012.
- A. K. Nandakumaran, Member of the editorial board of Journal Nonlinear Studies.
- A. K. Nandakumaran, Member of the Editorial Board, Journal of the Korea Society Mathematics Education (Series B) since 2005.
- D. P. Patil, Member of the Editorial Board of the journal Beiträge zur Algebra und Geometrie since 1998.
- D. P. Patil, An Associate Editor, Editorial board of the Science Education Journal - *Resonance* since January 2003.
- P. Prasad, Member of the Editorial Board, Indian Journal of Pure and Applied Mathematics since 2003.
- P. Prasad, Member of the Editorial Board, Proceedings of the Indian Academy of Sciences from 1985 to 2014.
- S. Thangavelu, Associate editor of J. Ramanujan Math. Soc.
- S. Thangavelu, Member of the Editorial Board, Birkhauser book series on 'Pseudodifferential Operators: theory, applications and related topics', 2008.
- S. Thangavelu, Member of the Editorial Board, Journal of pseudodifferential operators and applications, Birkhauser, since 2010.
- S. Thangavelu, Member of the Editorial Board, The Journal of Analysis, since 2010.
- K. Verma, Member of the Editorial Board, Proceedings of the Indian Academy of Sciences (Math. Sci.)

5.3 Other Activities

1. A. Ayyer was involved in grading the Mathematical Statistics question paper for JAM (2014).
2. A. Ayyer was involved in setting the Mathematical Statistics question paper for JAM (2015).
3. A. Ayyer was a co-organiser of the workshop *Sage Days 60* in IMSc, Chennai in August, 2014.
4. G. Bharali was nominated in 2015 to, and is currently serving on, the Executive Committee of Indian Women and Mathematics (IWM), a programme funded by the National Board for Higher Mathematics (NBHM).
5. G. Bharali served as an independent expert for the National Science Center, Poland, for the review of project proposals in pure mathematics in 2015.
6. T. Bhattacharyya was a member of Ph.D. student selection committee, ISI Bangalore.

7. T. Bhattacharyya was an external examiner of a Ph.D. thesis of IIT Madras.

8. S. Das was involved in setting the mathematics question paper for KVPY examination 2015.

9. S. Das was a part of the internal review committee for the PhD. thesis evaluation of a student in the Department of Computer Science and Automation, IISc Bangalore.

10. B. Datta was a moderator for some of the Mathematics papers for B. Math. and M. Math. at ISI, Bangalore in the Final Semester Examinations 10-11 and in the 1st Semester Examinations 2011-12.

11. B. Datta was an expert in the Selection Committee for the appointment of Lectures in Mathematics of Kannur University, Kannur in May, 2011.

12. B. Datta is an expert member in the Board of Studies in Mathematics, Faculty of Science, M. S. University of Baroda, Vadodara from September 01, 2011.

13. B. Datta was the chief paper setter of the paper 'Mathematics' for the examination GATE-2013.

14. B. Datta was a Subject Expert in the Faculty short-listing committee of Mathematics at NISER, Bhubaneswar in February, 2015.

15. B. Datta was a member of the faculty selection committee in mathematics at NISER, Bhubaneswar in December, 2015.

16. B. Datta was a member of the Selection Committee for the faculty positions in the Department of Mathematics of IIT Ropar in December, 2015.

17. B. Datta was an IISc Coordinator at Delhi Centre for the KVPY Interviews - 2015.

18. S. Gadgil was a member of a faculty selection committee at IISER, Bhopal.

19. S. Gadgil was a member of an internal review committee for the Mathematics department at IISER, Bhopal.

20. M. K. Ghosh was an examiner for a thesis of a student from IITG.

21. M. K. Ghosh was an examiner for a thesis of a student from IITB

22. T. Gudi was an expert member of the Curriculum Committee for an undergraduate programme in Computational Science at Dhirubhai Ambani Institute of Information Technology, Gandinagar.

23. T. Gudi, Faculty Selection Committee, Rajiv Gandhi University of Knowledge Technologies, Hyderabad.

24. T. Gudi was an expert member of the Faculty applicant seminar committee, 2015.

25. T. Gudi is an external examiner for a PhD student at IIST Trivandram.

26. S. K. Iyer is a member of the Board of Governors of the Institute of Financial and Management Research, Chennai.

27. M. Krishnapur was an examiner at the thesis defense of a student at ISI Kolkata in 2011.

28. M. Krishnapur went twice to the teacher's training programme run by IISc at its Chitradurga campus to teach mathematics to PUC/Class XI-XII teachers.

29. M. Krishnapur was involved in organizing a workshop and conference on limit theorems in probability in January 2013 as part of the NMI thematic year in *Probability: theory and applications*.

30. M. Krishnapur was an examiner for a thesis of a student at ISI, Delhi in 2013.

31. M. Krishnapur participated in setting the mathematics question paper for GATE (2012) and KVPY (multiple times) and JAM (2015, Mathematical statistics).

32. M. Krishnapur was a thesis reviewer for a Ph.D. thesis written in the department of mathematics, Tel-Aviv university (2014).

33. M. Krishnapur was an invited speaker at a summer school on point processes and complex analysis in Buenos-Aires, Argentina (2015), a spring school at Trondheim (2013), a summer school at VIASM, Vietnam (2013) and a workshop at ICTP Trieste (2013), at the Bernoulli world congress at Istanbul, Turkey (2012).

34. M. Krishnapur was an organizer of the conference *Lectures on probability and stochastic processes-X* during 13-16, December, 2015.

35. G. Misra, Co-Convener, KVPY (2011 - 2013)

36. G. Misra, Co-Convener, UGC-CSIR NET examination (2010 –)

37. G. Misra, member, National Board for Higher Mathematics (2005 –)

38. G. Misra, Convener, Sectional Committee (Mathematics), Indian Academy of Sciences, 2013 - 2015

39. A. K. Nandakumaran, Thesis Examiner, TIFR-CAM, Bangalore; IITR, Roorkee; IITK, Surathkal, Mangalore; IMSc., Chennai;

40. A. K. Nandakuaran was an expert member of Board of Studies, Department of Mathematics and Physcs, Amritha Viswavidyapeetham, Ettimada, Coimbatore.

41. A. K. Nandakumaran was an expert member of Board of Studies, Department of Mathematics, Bharathiar University.

42. A. K. Nandakumaran was an expert member of Board of Studies, Department of Mathematics, Christ College, Bangalore.

43. A. K. Nandakumaran was a member, Faculty Selection Committee(Mathematics), IIT Jodhpur, Rajastan; Pondicherry University; IIST, Trivandrum; Punjab University..

44. A. K. Nandakumaran, Expert Member, Selection Committee, Kerala Young Scientist, 2013, 2014.

45. A. K. Nandakumaran, Chairman, Board of Governors, TEQIP (technical Education Quality Improbvement Program, GEC, Palaghat, Kerala

46. D. P. Patil, Faculty Selection Committee, NIT Silcher; University of Pune; Rajiv Gandhi University of Knowledge Technologies, Hyderabad.

47. D. P. Patil, Thesis Examiner, IIT Bombay; IIT Kanpur; University of Pune; University of Nagpur.

48. G. Rangarajan, Member, Faculty Selection Committee, IIT Kanpur, IISER Pune, IIT Kharagpur, IIT Indore, IIT Rajasthan, Delhi University, University of Hyderabad, Pondicherry University, Central University of Orissa, IISER Trivandrum, IISER Kolkata, NISER Bubaneswar.

49. G. Rangarajan, Member, Governing Board, Centre for Brain Research.

50. G. Rangarajan, Founder Member, Centre for Brain Research Society.

51. G. Rangarajan, Member, Mathematics Review Committee for IIT Kanpur.

52. G. Rangarajan, Member, Board of Management of the Centre for Interdisciplinary Research in Basic Sciences, Jamia Millia Islamia.

53. G. Rangarajan, Member, DST Project Advisory Committee on Computer, Electronics and Mathematics (international projects).

54. G. Rangarajan, Member, Subject Expert Committee on Mathematical Sciences for DST FIST Programme.

55. G. Rangarajan, Member, PG Board of Studies, School of Mathematics & Computer Sciences, University of Pondicherry.

56. G. Rangarajan, Member, Pavate Cambridge Fellowship Selection Committee.

57. G. Rangarajan, Member, DST Planning Commission Task Force on Development of Higher Mathematics for Applications (XII Plan).

58. G. Rangarajan, Member, DST Planning Commission Sub-Group on Strengthening Basic Research and Expanding R & D Base, Human Capacity (XII Plan).

59. G. Rangarajan, Member, National Board for Higher Mathematics, Department of Atomic Energy.

60. G. Rangarajan, Member, Programme Management Board for PURSE, Department of Science and Technology.

61. G. Rangarajan, Member, Mathematical Sciences Research Committee, Council of Scientific & Industrial Research.

62. G. Rangarajan, Member, Scientific Committee of Indo-French Institute of Mathematics.

63. G. Rangarajan, Member, DST-DAE Joint Programme Steering Committee on Accelerator Science and Technology.

64. G. Rangarajan, Member, Indian National Committee for International Mathematical Union.

65. G. Rangarajan, Member, Inter-Academy Advisory Panel on INSPIRE Internship.

66. G. Rangarajan, Director, Indo-French Centre for Applied Mathematics (IFCAM).

67. G. Rangarajan, Member, DBT Committee on Star Colleges.

68. G. Rangarajan, Member, Short-listing Committee for Director of CEFIPRA.

69. G. Rangarajan, Member, S&T Planning Commission Workgroup on Enrichment of the Knowledge Base (XII Plan).

70. G. Rangarajan, Member, Advisory Committee of the UGC SAP of Department of Mathematics, Visva-Bharati University.

71. G. Rangarajan, Member, Indo-US Research Fellowships Award Committee.

72. G. Rangarajan, Member, Planning Committee of DST SERC Schools on Nonlinear Dynamics.

73. G. Rangarajan was an examiner for a thesis of a student from IIT Kanpur, Andhra University, Cochin University of Science and Technology.

74. P. Singla participated in setting the mathematics question paper for GATE(2012)

75. P. Singla was an examiner for a master thesis of a student from BGU, Israel

76. P. Singla was a moderator for some of the Mathematics papers for B.Math and M.Math at ISI Bangalore(multiple times)

77. P. Singla was co-organizer of the Young Women and Mathematics meeting held at IISER, Pune in July 2014.

78. P. Singla went to the Indian Women and Mathematics teacher's training programme held at Vellelar College for women, Erode(Tamilnadu) funded by NBHM to teach mathematics to college and university women teachers.

79. P. Singla was a co-organizer of the two day event *Worshop on Probability and Representation Theory* along with A. Ayyer and E. K. Narayanan during 6-7, March, 2015.

80. S. Thangavelu, Member, School Board, University of Hyderabad.

81. S. Thangavelu, member, SERB, DST.

82. S. Thangavelu, member, Faculty Selection Committee, ISI Kolkata, NIT Surathkal, TNCU, IISER Thiruvananthapuram

5.4 Lecture Series in the Department

1. Prof. G. B. Folland, University of Washington, USA, gave a series of lectures on "Some representations of the discrete Heisenberg group" during 22nd Jan to 9th Feb 2012.

2. Prof. Jyoti Sengupta, TIFR, Mumbai, gave series of lectures on "Representation theory of semisimple Lie groups" during 19th Feb. to 28th Feb 2012.

3. Prof. Raju George, IIST, Trivandrum, gave a series of lectures on "Semigroup Theory and Controllability" during 23rd Jan to 29th Jan 2012.

4. Prof. K. Parthasarathy, Ramanujan Institute of Advanced Study Chennai, gave a series of three lectures on "Martingale representation theorem for Levy Processes" during 16.04.2012-18.04.2012.

5.5 Seminars/Colloquia in the Department

Seminars in the Department during April 2011- March 2012

1. Prof. Kalyan B. Sinha, JNCASR, Bangalore gave a talk on "Quantum Field Theory – the Mathematics in it"on 1-4-2011.

2. Prof. Ritabrata Munshi, TIFR, Mumbai, gave a talk on "Bounds for L-functions" on 20-4-2011.

3. Prof. Michael Dritschel, Newcastle University, UK, gave a talk on "Noncommutative analogues of the Fejér-Riesz Theorem" on 25-4-2011.

4. Mr. Koushik Saha, Bidhannagar Government College, Kolkata, gave a talk on "Spectral properties of large dimensional random circulant type matrices" on 29-4-2011.

5. Prof. Sunil K. Chebolu, Illinois State University, USA, gave a talk on "On a small quotient of a huge absolute Galois group" on 20-5-2011.

6. Prof. Koushik Pal, UC, Berkeley, USA, gave a talk on "Model Theory and a few Applications" on 22-6-2011.

7. Dr. Pooja Singla, Ben Gurion University, Israel, gave a talk on "Representation of linear groups over local rings" on 28-6-2011.

8. Dr. Arvind Ayyer, University of California, Davis, USA, gave a talk on "Two Species Semipermeable Exclusion Processes" on 30-6-2011.

9. Dr. D. Yogeshwaran, Ecole Normale Superieure - INRIA, France, gave a talk on "Clustering, Percolation and directionally convex ordering of point processes" on 13-7-2011.

10. Prof. Subhroshekhar Ghosh, UC Berkeley, gave a talk on "What does a point process outside a domain tell us about what's inside?" on 13-7-2011.

11. Dr. Debashish Bose, IMSc, Chennai, gave a talk on "On the Structure of the Spectrum for n intervals" on 20-7-2011.

12. Mr. Jonathan F Fernandes, Dept of Mathematics, IISc, gave a talk on "Fourier Analysis on Number Fields and the Global - Functions" on 22-7-2011.

13. Mr. Gururaja, H. A, Dept of Mathematics, IISc, gave a talk on "RICCI Flow and Isotropic Curvature" on 25-7-2011.

14. Ms. Amita Malik, Dept of Matematics, IISc, gave a talk on "An Algorithmic Approach to Crystallographic Coxeter Groups" on 29-7-2011.

15. Prof. Rajendra Bhatia, ISI Delhi, gave a talk on "Loewner matrices" on 5-8-2011.

16. Mr. Abhinav Verma, Dept of Mathematics, IISc, gave a talk on "Irreducible Representations of the Symmetric Group and the General Linear Group" on 12-8-2011.

17. Prof. Siddhartha Gadgil, Dept of Matematics, IISc, gave a talk on "The Goldman Bracket and Intersection Numbers II" on 17-8-2011.

18. Prof. Keith Burns, Northwestern University, gave a talk on "Ergodicity of the geodesic flow of the Weil-Petersson metric" on 19-8-2011.

19. Dr. Debashis Mondal, University of Chicago, USA, gave a talk on "Wavelet variance analysis for gappy time series data" on 25-8-2011.

20. Prof. Rajesh P. N. Rao, University of Washington Seattle, USA, gave a talk on "Controlling Objects by Thought: Invasive and Non-Invasive Approaches to Brain-Computer Interfacing" on 26-8-2011

21. Prof. Imran Biswas, TIFR CAM, Bangalore, gave a talk on "Regularization by 1/2-Laplacian and Vanishing Viscosity Limit for HJB Equations" on 16-9-2011.

22. Prof. Amritanshu Prasad, IMSc, Chennai, gave a talk on "Representations of Symmetric Groups via the RSK Correspondence" on 23-9-2011.

23. Prof. Arup Bose, ISI Kolkata, gave a talk on "Limiting behaviour of sample autocovariance matrix" on 18-10-2011.

24. Prof. Sivananthan Sampath, Radon Institute for Computational and Applied Mathematics Linz, Austria, gave a talk on "Sampling and meta-learning for function reconstruction – Case study: blood glucose prediction" on 19-10-2011.

25. Prof. Anjishnu Banerjee, Duke University, USA, gave a talk on "Challenges in high dimensional Bayesian nonparametrics and some possible solutions" on 20-10-2011.

26. Mr. Sourav Pal, Dept of Mathematics, IISc, gave a talk on "Dilations, functional model and a complete unitary invariant of a Γ-contraction" on 1-12-2011.

27. Prof. Jean-Pierre Demailly, Institut Fourier, Universite de Grenoble, France, gave two talks on "Holomorphic Morse inequalities and the Green-Griffiths-Lang conjecture" on 23-11-2011 and 24-11-2011.

28. Ms. Saswati Dana, Dept of Mathematics, IISc, gave a talk on "Computational Studies of Uncertainty in Intra-Cellular Biochemical Reaction Systems" on 7-12-2011.

29. Prof. Kashyap Rajeevsarathy, IISER, Bhopal, gave a talk on "Roots of Dehn twists" on 13-12-2011

30. Prof. Anuradha Garge, Centre for Excellence in Basic Sciences, Mumbai, gave a talk on "A nice group structure on certain orbit spaces of unimodular rows" on 15-12-2011.

31. Prof. Jay Gopalakrishnan, Portland State University, USA, gave a talk on "An overview of discontinuous Petrov-Galerkin stabilization techniques" on 19-12-2011.

32. Prof. Angela Pasquale, Universite Paul Verlaine - Metz, France, gave a talk on "The Cos^{λ} transform as intertwining operator between generalized principal series representations of $SL(n+1,K)$" on 23.12.2011

33. Prof. T. R. Ramadas, ICTP, Trieste, Italy, gave a talk on "The chiral boson and function theory on the unit disc" on 4-1-2012.

34. Prof. Raju K. George, IIST, Trivandrum, gave a talk on "Semigroup Theory and Controllability" on 23-1-2012.

35. Dr. Alessio Martini, University of Kiel, Germany, gave a talk on "Joint spectral multipliers on nilpotent Lie groups" on 25-1-2012.

36. Prof. Alessio Martini, University of Kiel, Germany, gave a talk on "Commuting differential operators on Lie groups and spectral multipliers" on 27-1-2012.

37. Prof. Gerald B. Folland, University of Washington, USA, gave a talk on "Some representations of the discrete Heisenberg group" on 30-1-2012.

38. Prof. Varadharaj Ravi Srinivasan, Catholic University of America, USA, gave a talk on "Liouvillian Extensions and the Galois Theory of Linear Differential Equations" on 30-1-2012.

39. Prof. Vidar Thomee, Chalmers University of Technology, Gothenburg, Sweden, gave a talk on "On the lumped mass finite element method for parabolic problems" on 8-2-2012.

40. Prof. Jyoti Sengupta, TIFR, Mumbai gave a series of talks on "Representation theory of semisimple groups" in Feb 2012.

41. Prof. S. S. Sritharan, Center for Decision, Risk, Controls & Signals Intelligence Naval Postgraduate School Monterey, California, USA, gave a talk on "An invitation to large deviation theory" on 23-2-2012.

42. Dr. Abhishek Banerjee, Ohio State University, USA, gave a talk on "Lifting of model structures to fibred categories" on 27-2-2012.

Seminars in the Department during April 2012- March 2013

43. Mr. Gururaja, H. A., Dept of Mathematics, IISc, Bangalore, gave a talk on "RICCI Flow and Isotropic Curvature Speaker" on 23.04.2012

44. Dr. Shyam Sundar Ghoshal, Dept of Mathematics, IISc, Bangalore, gave a talk on "Structure of the entropy solution of a scalar conservation law with strict convex flux" on 24.05.2012

45. Mr. Sourav Pal, Dept of Mathematics, IISc, gave a talk on "functional model and a complete unitary invariant of a Γ - contraction" on 25.04.2012

46. Mr. Prahllad Deb, Dept of Mathematics, IISc, Bangalore, gave a talk on "Curvature calculations of the operators in the Cowen-Douglas class" on 30.04.2012

47. Mr. Amit Samanta, Dept of Mathematics, IISc, Bangalore, gave a talk on "Joint eigenfunctions on the Heisenberg group and support theorems on $\mathbb{R}^n$" on 15.05.2012

48. Prof. S. Sundar, ISI Delhi, gave a talk on "Inverse semigroups and the Cuntz-Li algebras" on 15.05.2012

49. Prof. N. Mohan Kumar, Washington Univ in St Louis, USA, gave a talk on "Projective modules and complete intersection - a brief survey" on 18.05.2012

50. Mr. Rahul Garg, Dept of Mathematics, IISc, gave a talk on "On the role of the Bargmann transform in unceretainty principles" on 21.05.2012

51. Ms. Soma Maity, Dept of Mathematics, IISc, Bangalore, gave a talk on "On the stability of certain Reimannian functionals" on 22.05.2012

52. Ms. Eliza Philip, Dept of Mathematics, IISc, Bangalore, gave atlak on "Function Theory on non-compact Riemann surfaces" on 23.05.2012

53. Ms. Choiti Bandyopadhyay, Dept of Mathematics, IISc, Bangalore, gave a talk on "The role of potential theory in complex dynamics" on 23.05.2012

54. Dr. Shyam Sundar Ghoshal, TIFR CAM, Bangalore, gave a talk on "Structure of the entropy solution of a scalar conservation law with strict convex flux" on 24.05.2012

55. Dr. K. R. Arun, RWTH, Aachen, Germany, gave talk on "An asymptotic preserving all-Mach-number scheme for inviscid compressible flows" on 24.05.2012

56. Mr. Indrajit Jana, Dept of Mathematics, IISc, Bangalore, gave a talk on "Matchings between point processes" on 31.05.2012

57. Ms. Jotsaroop Kaur, Dept of Mathematics, IISc, Bangalore, gave talk on "Grushin multipliers and Toeplitz operators" on 31.05.2012

58. Prof. Mikiya Masuda, Osaka City University, Japan, gave a talk on "Face numbers of simplicial cell manifolds" on 08.06.2012

59. Dr. Kunal Mukherjee, IMSc, gave a talk on "Chennai Masas and Bimodule Decompositions of ll_1 factors" on 28.06.2012

60. Prof. G. V. Ravindra, Univ of Missouri, St Louis, USA, gave talk on "Extension theorems for subvarieties and vector bundles" on 10.07.2012

61. Dr. Subojoy Gupta, California Institute of Technology, USA, gave talk on "Complex projective structures and dynamics in moduli space" on 12.07.2012

62. Mr. Dheeraj Kulkarni, Dept of Mathematics, IISc, Bangalore, gave talk on "Relative Symplectic Caps, 4-Genus and Fibered Knots" on 13.07.2012

63. Dr. Anish Ghosh, University of California, Berkeley, USA, gave talk on "Homogeneous dynamics and number theory" on 17.07.2012

64. Mr. Chandan Biswas, Dept of Mathematics, IISc, gave talk on "Analytic continuation in several complex variables" on 17.07.2012

65. Prof. Rama Mishra, IISER, Pune, gave talk on "Some applications of polynomial knots" on 25.07.2012

66. Prof. S. S. Sritharan, Center for Decision, Risk, Controls and Signals Intelligence, Monterey, CA, gave a talk on "The Martingale Problem of Stroock and Varadhan and the Navier-Stokes equation" on 30.07.2012

67. Prof. S. S. Sritharan, Center for Decision, Risk, Controls and Signals Intelligence, Monterey, CA, gave a talk on "On the Mathematical Legacy of S.Chandrashekar" on 30.07.2012

68. Prof. Sarif Hassan, Instt of Mathematics and Applications, Bhubaneshwar, gave a talk on "Some Elementary Mathematics of Integral Value Transformations (IVTs) and its Associated Dynamical Systems" on 30.07.2012

69. Prof. Pabitra Pal Choudhury, ISI, Kolkata, gave a talk on "Birth of Integral Value Transformation and Some observations in Mathematics and Genomics" on 31.07.2012

70. Dr. Pratyoosh Kumar, gave a talk on "Introduction to Harmonic analysis on NA groups" on 08.08.2012

71. Ms. Choiti Bandyopadhyay, Dept of Mathematics, IISc., Bangalore, gave a talk on "The role of potential theory in complex dynamics" on 17.08.2012

72. Dr. Chandrakant Aribam, Heidelberg University, Germany, gave talk on "Rational points on Elliptic curves and congruences between modular forms" on 24.08.2012

73. Mr. Indrajit Jana, Dept of Mathematics, IISc, gave a talk on "Matchings between point processes" on 24.08.2012

74. Prof. Phoolan Prasad, Dept of Mathematics, IISc, gave talk on "Early Work of P. L. Bhatnagar" on 28.08.2012

75. Prof. Angela Pasquale, Retd, Dept. of Mathematics, IISc, gave a tlak on "P. L. Bhatnagar's work on Fluid Dynamics" on 28.08.2012

76. Prof. Chanchal Uberoi, Retd, Dept of Mathematics, IISc, gave a talk on "P. L. Bhatnagar's work on Plasma Physics" on 28.08.2012

77. Prof. Ajay Kumar, University of Delhi, Delhi, gave talk on "Operator space projective tensor product" on 03.09.2012

78. Prof. Ewa Damek, Univ of Wroclaw, Poland, gave a talk on "Asymptotic behaviour of Poisson kernels on NA groups" on 04.09.2012

79. Prof. Ewa Damek, Univ of Wroclaw, Poland, gave a talk on "Asymptotic behaviour of Poisson kernels on NA groups" on 05.09.2012

80. Prof. Srikanth Iyer, Dept of Mathematics, IISc, gave a talk on "Pricing credit derivatives in a Markov Modulated Market" on 10.09.2012

81. Prof. B. S. R. V. Prasad, V I T University, Vellore, gave a talk on "Dynamics of additional food provided predator-prey system with applications to biological control" on 20.09.2012

82. Mr. Tapan Kumar Hota, Dept of Mathematics, IISc, gave a talk on "Subnormality and Moment Sequences" on 26.09.2012

83. Mr. Prahllad Deb, Dept of Mathematics, IISc, gave a talk on "Curvature calculations of the operators in the Cowen-Douglas Class" on 26.09.2012

84. Prof. Siddhartha Gadgil, Dept of Mathematicds, IISc, Bangalore, gave a talk on "A Google course-builder course-Hyperbolic Spaces and Groups" on 05.10.2012

85. Dr. Micah Miller, Dept of Mathematics, IISc, gave a talk on "The String topology loop product through twisting cochains" on 09.10.2012

86. Ms. Jotsaroop Kaur, Dept of Mathematics, IISc, gave a talk on "Grushinmultipliers and Toeplitz operators" on 11.10.2012

87. Mr. Rahul Garg, Dept of Mathematics, IISc, gave a talk on "On the role of the B Bargmann transform in uncertainty principles" on 29.10.2012

88. Mr. Sanjay P. K., Dept of Mathematics, IISc, gave a talk on "Riesz transforms associated with Heisenberg groups and Grushin operator" on 29.10.2012

89. Mr. Subhamay Saha, Dept of Mathematics, IISc, gave a talk on "Risk-sensitive control of continuous time Markov chains" on 22.10.2012

90. Dr. Debarghya Ghosh Dastidar, Computer Science & Automation, IISc, gave a talk on "On some Statistical Properties of Multivariate q-Gaussian Distribution and its application tro Smoothed Functional Algorithms" on 22.10.2012

91. Prof. Radha Ramakrishnan, IIT Chennai, gave talk on "Shift invariant spaces on the real line and on compact" on 30.10.2012

92. Dr. David Farris, Dept of Mathematics, IISc, gave talk on "The Whitney-Grauert theorem via contact geometry" on 06.11.2012

93. Dr. Thomas Richard, IISc, gave talk on "Ricci flow of non-smooth spaces" on 15.11.2012

94. Mr. T. V. H. Prathamesh, Dept of Mathematics, IISc, gave talk on "Contruction of Jones Polynomial for knots" on 27.11.2012

95. Dr. Herve Gaussier, Institut Fourier. Grenoble, gave a tlak on "Two studies of almost comoplex manifolds" on 29.11.2012

96. Mr. Dinesh Kumar Keshari, Dept of Mathematics, IISc, gave a talk on "Curvature inequalities for operators in the Cowen-Douglas class" on 03.12.2012

97. Mr. Ravi Prakash, Dept of Mathematics, IISc, gave a talk on "Homogenization of Optimal Control Problems in a domain with oscillating boundary" on 18.12.2012

98. Dr. Chitrabhanu Chaudhuri, Northwestern University, gave a talk on "Affine Stratification Number and Moduli Space of Curves" on 19.12.2012

99. Prof. Amos Nevo, Technion, Isreal, gave a talk on "Mean ergodic theorems : from amenable to non-amenable groups" on 31.12.2012

100. Prof. Suhas Jaykumar Pandit, ICTP, Trieste, Italy, gave a talk on "The complex of HNN-extensions associated to the Free group of rank n" on 17.01.2013.

101. Prof. Ferit Ozturk, Bogazic Univ, gave a talk on "Real analytic maps and stable Hamiltonian structures" on 28.01.2013.

102. Dr. Pranav Pandit, University if Vienna, gave a talk on "Derived Geometry and Topological String Theory" on 07.02.2013.

103. Prof. Badal Joshi, Univ. of Minnesota, gave a talk on Switching in biological networks" on 11.02.2013.

104. Prof. M. K. Ghosh, IISc, gave a talk on "Pricing Defaultable Bonds in a Markov Modulated Market" on 11.02.2013.

105. Prof. Sreekar Vadlamani, TIFR CAM, Bangalore, gave a talk on "Random Fields on sphere : an application to cosmology" on 11.02.2013.

106. Prof. Siddhartha Gadgil, IISc, gave a talk on "Surface diagrams and 4-manifolds" on 12.02.2013.

107. Mr. Sanjay, P. K., Dept of Mathematics, IISc, gave a talk on "Riesz transforms associated with Heisenberg groups and Grushin Operator" on 12.02.2013.

108. Prof. Krishna Maddaly, IMSc, Chennai, gave a talk on "About the density of states in Random Operators" on 12.02.2013.

109. Mr. Sumit Kumar, Dept of Mathematics, IISc, gave a talk on "Normal Spectrum of a subnormal operator" on 15.02.2013.

110. Dr. Dinesh, P. A., M. S. Ramaiah Instt of Technology, Bangalore, gave a talk on "Solutions for differential equations in fluid mechanics by different techniques" on 15.02.2013.

111. Prof. Ritabrata Munshi, TIFR Mumbai, gave a talk on "Maass forms with a focus on the conjectures of Ramanujan and Selberg" on 19.02.2013.

112. Prof. B. V. Limaye, IIT Bombay, Mumbai, gave a talk on "On condition numbers of a basis" on 19.02.2013.

113. Prof. Ritabrata Munshi, TIFR Mumbai, gave a talk on "Maass forms with a focus on the conjectures of Ramanujan and Selberg" on 20.02.2013.

114. Prof. R. D. Giri, Nagpur University, gave a talk on "Languages and Generalized Code Chains" on 20.02.1013.

115. Prof. Ritabrata Munshi, TIFR Mumbai, gave a talk on "Maass forms with a focus on the conjectures of Ramanujan and Selberg" on 21.02.2013.

116. Dr. Prasanna Varadarajan, Schlumberger Gould Research, Cambridge, gave a talk on "Geometrical shock dynamics and Shock vortex interaction" on 21.02.2013.

117. Prof. Ritabrata Munshi, TIFR Mumbai, gave a talk on "Maass forms with a focus on the conjectures of Ramanujan and Selberg" on 22.02.2013.

118. Dr. Yogeshwaran D, Technion, Isreal, gave a talk on "Comparison of clustering properties of point processes and Applications to random geometric models" on 18.03.2013.

119. Ms. Madhushree Basu, IMSc, Chennai, gave a talk on "Continuous minimax theorems" on 18.03.2013.

120. Dr. Dhanya, Dept of Mathematics, IISc, gave a talk on "On the variational methods for nonlinear elliptic PDE's" on 20.03.2013.

121. Ms. Atreyee Bhattacharya, Dept of Mathematics, IISc, gave a talk on "On an ODE related to the Ricci flow" on 28.03.2013.

Seminars in the Department during April 2013- March 2014

122. Prof. Siddhartha Gadgil, Dept of Mathematics, IISc, gave a talk on "Metric Measure spaces and Random matrices" on 02.04.2013.

123. Prof. Manjunath Krishnapur, Dept of Mathematics, IISc, gave a talk on "Littlewood-Offord problem" on 05.04.2013.

124. Dr. Thomas Richard, Dept of Mathematics, IISc, gave a talk on "Systollic Inequalities" on 16.04.2013.

125. Mr. Ravi Prakash, Dept of Mathematics, IISc, gave a talk on "Homogenization of Optimal Control Problems in a Domain with Oscillating Boundary" on 16.04.2013.

126. Prof. Debargha Banerjee, Australian National University, gave a talk on "Differential Modular forms on Shimura curves over totally real fields" on 02.05.2013.

127. Prof. Philip Roe, University of Michigan, gave a talk on "Geometric treatment of geometric shock waves" on 10.05.2013.

128. Prof. Philip Roe, University of Michigan, gave a talk on "A new class of high order finite volume schemes" on 13.05.2013.

129. Mr. Tapan Kumar Hota, Dept of Mathematics, IISc, gave a talk on "Subnormality and Moment Sequences" on 14.05.2013.

130. Mr. Jaikrishnan J, Dept of Mathematics, IISc, gave a talk on "Proper holomorphic mappings between bounded symmetric domains" on 15.05.2013.

131. Prof. Kingshook Biswas, Vivekananda University, Howrah, gave a talk on "Moebius and conformal maps between boundaries of CAT(-1) spaces" on 16.05.2013.

132. Prof. Kingshook Biswas, Vivekananda University, Howrah, gave a talk on "Renormalization and revwerse renormalization in the dynamics of germs of holomorphic diffeomorphisms in $\mathbb{C}$" on 17.05.2013.

133. Mr. Tamal Banerjee, Dept of Mathematics, IISc, gave a talk on "Analyzing Credit Risk Models in a Regime Switching Market" on 17.05.2013.

134. Prof. Agnid Banerjee, Purdue University, USA, gave a talk on "Gradient bounds for p-harmonic systems with vanishing Neumann data in a convex domain" on 20.05.2013.

135. Prof. Johnny Guzman, Borwn Univ., Providence, USA, gave a talk on "Using rational bubble functions to in finite element methods" on 22.05.2013.

136. Mr. Samaya Kumar Ray, Dept of Mathematics, IISc, gave a talk on "Grothendieck Inequality " on 06.06.2013.

137. Prof. Siddhartha Gadgil, Dept of Mathematics, IISc, gave a talk on "Glimpses of HOTT : Logic and Topology make elegant" on 26.06.2013.

138. Prof. Siddhartha Gadgil, Dept of Mathematics, IISc, gave a talk on "Glimpses of HOTT : Logic and Topology make elegant" on 01.07.2013.

139. Dr. Sarang Sane, University of Kansas, USA, gave a talk on "The Euler characteristic, projective modules and the Gersten-Witt complex" on 02.07.2013.

140. Dr. Micah Miller, Dept of Mathematics, IISc, gave a talk on "A-Infinity algebras and the homotopy transfer theorem" on 04.07.2013.

141. Prof. Siddhartha Gadgil, Dept of Mathematics, IISc, gave a talk on "Induction, equality, spaces, types, $A_infinity$: An Introduction to HOTT" on 08.07.2013.

142. Prof. Victor Anandam, IMSc, Chennai, gave a talk on "Potential theory on infinite graphs" on 12.07.2013.

143. Prof. Siddhartha Gadgil, Dept of Mathematics, IISc gave a talk on "The Hopf map, higher linking and friends" on 18.07.2013.

144. Mr. Sumit Kumar, Dept of Mathematics, IISc, gave a talk on "Normal Spectrum of a subnormal operator" on 17.07.2013.

145. Prof. Jayadev Athreya, University of Illinions, Champaign, gave a talk on "Gap Distributions and Homogeneous Dynamics" on 05.08.2013.

146. Prof. Ankik Kumar Giri, RICAM, Austria, gave a talk on "Weak solutions and convergence analysis of numerical methods for coagulation-fragmentation equations" on 07.08.2013.

147. Dr. Mousomi Bhakta, Technion, Isreal, gave a talk on "Semilinear elliptic equations admitting similarity transformations" on 13.08.2013.

148. Dr. Anup Biswas, Technion, Isreal, gave a talk on "Control of a queuing system under the moderate deviation scaling" on 12.08.2013.

149. Prof. Malabika Pramanik, UBC, Canada, gave a talk on "Needles, bushes, hairbruches and polynomials" on 14.08.2013.

150. Dr. Vijay Kumar Sohani, Dept of Mathematics, IISc, gave a talk on "Nonlinear Schrodinger equation and the twisted Laplacian" on 16.08.2013.

151. Dr. Gourab Ray, Univ of British Columbia, Canada, gave a talk on "Unicellular maps in high genus" on 19.08.2013.

152. Prof. Santosh Pattanayak, Weizmann Institute of Science, Isreal, gave a talk on "Projective normality of G. I. T. quotient varieties modulo Finite solvable groups and Weyl groups" on 21.08.2013.

153. Prof. Nitin Nitsure, TIFR, Mumbai, gave a talk on "Descent and Cohomological Descent" on 23.08.2013.

154. Prof. Nikhil Srivastava, Microsoft research India, gave a talk on "Mixed Characteristic polynomials and the Kadison-Singer problem " on 23.08.2013.

155. Prof. Nitin Nitsure, TIFR, Mumbai, gave a talk on "Descent and Cohomological Descent" on 26.08.2013.

156. Prof. Paul ZINN-JUSTIN, Universite Pierre et Marie-Curie, Paris, France, gave a talk on "Discrete holomorphichy and quantized affine algebras" on 10.09.2013.

157. Dr. K. Srinivasa Rao, IMSc, Chennai, gave a talk on "Ramanujan and hypergeometric series" on 12.09.2013.

158. Dr. Franck Djiideme, University of Benin, gave a talk on "Mean curvature method :Homotpy-type of Hamiltonian Diffeomorphisms group" on 18.09.2013.

159. Mr. Subhamay Saha, Dept of Mathematics, IISc, gave a talk on "Single and Multi-player Stochastic Dynamic Optimization" on 23.09.2013.

160. Prof. Siva Athreya, ISI, Bangalore, gave a talk on "One-dimensional voter Model Interface revisited" on 23.09.2013.

161. Prof. C. S. Aravinda, TIFR CAM, Bangalore, gave a talk on "Homotopy type and volume of locally symmetric spaces" on 23.10.2013.

162. Prof. Jaydeb Sarkar, ISI, Bangalore, gave a talk on "Beurling-Lax-Halmos Theorem and Operator theory" on 25.10.2013.

163. Dr. Manish Kumar, ISI, Bangalore, gave a talk on "On Abhyankar's inertia conjecture" on 08.11.2013.

164. Prof. D. Manjunath, IIT Bombay, Mumbai, gave a talk on "Admission Prices and Welfare in Queues" on 11.11.2013.

165. Prof. Apoorva Khare, Standford University, USA, gave a talk on "Preserving positivity for rank-constrained matrices" on 28.11.2013.

166. Prof. Harald Upmeier, University of Marburg, Germany, gave a talk on "New directions in complex analysis on symmetric" on 04.12.2013.

167. Prof. Mahan Mj, R K M Vivekananda University, Howrah, gave a talk on "Low dimensional projective groups" on 10.12.2013.

168. Mr. Jaikrishnan J, Dept of Mathematics, IISc, gave a talk on "On the structure of proper holomorphic mappings" on 11.12.2013.

169. Prof. Todd Quinto, Tufts University, gave a talk on "Microlocal Analysis and Tomography" on 12.12.2013.

170. Prof. Aniruddha Venkata, Centre for Excellence in Basic Scs, Mumbai, gave a talk on "On Frankl's conjecture" on 12.12.2013.

171. Prof. Sandeep Juneja, TIFR, Mumbai, gave a talk on "Concert Queue Arrivals Game : An overview" on 18.12.2013.

172. Prof. Sudesh K Khanduja, IISER, Mohali, gave a talk on "On some generalizations and applications of Eisenstein-Dumas and Schonemann Criteria" on 19.12.2013.

173. Mr. Santanu Sarkar, Dept of Mathematics, IISc, gave a talk on "Some Problems in Multivariable Operator Theory" on 13.01.2014.

174. Prof. Krishna Athreya, Iowa State Univ, USA, gave a talk on "Estimation of integrals over infinite measure spaces" on 17.01. 2014.

175. Dr. Nisheeth Vishnoi, Microsoft Research, Bangalore, gave a talk on "Approximation Theory and the Design of Fast Algorithms" on 17.01. 2014.

176. Prof. Sumanta Sarkar, ISI, Kolkata, gave a talk on "Constructions of Boolean Functions that are Significant in Cryptography and Coding Theory" on 20.01. 2014.

177. Prof. T. E. S. Raghavan, Univ. of Illinoise at Chicago, USA, gave a talk on "Policy improvement algorithm for zero sum two person Stochastic games of perfect information in Cesaro payoffs" on 28.01. 2014.

178. Prof. T. E. S. Raghavan, Univ. of Illinoise at Chicago, USA, gave a talk on "An algorithm for locating the nucleolus of assignment games" on 29.01. 2014.

179. Prof. Rizwanur Khan, Texas A & M University, Qatar, gave a talk on "L-4 norms of cusp forms in the level aspect" on 30.01.2014.

180. Prof. Arijit Chakraborty, ISI, Delhi, gave a talk on "From random matrices to long range dependence" on 10.02.2014.

181. Prof Konstantin Khanin, Univ of Toronto, gave a talk on "On weak universality for directed polymers" on 10.02.2014.

182. Prof Konstantin Khanin, Univ of Toronto, gave a talk on "On weak universality for directed polymers" on 10.02.2014.

183. Prof. Shanta Laishram, ISI, Delhi, gave a talk on"in products of terms of Pell's and Pell-Lucas Sequences" on 12.02.2014.

184. Prof. S. Thangavelu, Dept of Mathematics, IISc, gave a talk on "How to integrate entire functions in polar coordinates ?" on 14.02.2014.

185. Prof. Bhaskar Bagchi, ISI, Bangalore, gave a talk on "Tight triangulated manifolds" on 14.02.2014.

186. Dr. Umesh Dubey, Dept of Mathematics, IISc, gave a talk on "Support data and Balmer spectrum" on 21.02.2014.

187. Dr. Atul Dixit, Tulane University, gave a talk on "A series identity, possibly connected with a divisor problem, in Ramanujan's Lost Notebook" on 05.03.2014.

188. Prof. Herve Gaussier, Fourier Instt. Grenoble, France, gave a talk on "On the Gromov hyperbolicity of convex domains" on 05.03.2014.

189. Prof. Gerard Besson, Fourier Instt. Grenoble, France, gave a talk on "On open three - manifolds" on 07.03.2014.

190. Prof. Dr. Guido Kanschat, University of Heidelberg, gave a talk on "Discontinuous Galerkin methods for Diffusion-Dominated Radiative transfer problems" on 11.03.2014.

191. Dr. Dhanya, Dept of Mathematics, IISc, gave a talk on "Critical Growth Elliptic problem with singular Discontinuous Nonlinearity in R^2" on 14.03.2014.

192. Dr. Esha Chatterjee Ghosh, Dept of Mathematics, IISc, gave a talk on "On the global character of the solutions of Some nonlinear difference equations " on 21.03.2014.

193. Prof. Kaushal Verma, Dept of Mathematics, IISc, gave a talk on "Quadrature domains - an introduction" on 28.03.2014.

194. Prof. Satadal Ganguly, ISI, Kolkata, gave a talk on "Recent progress towards the twin prime conjecture" on 28.03.2014.

Seminars in the Department during April 2014- March 2015

195. Dr. Lakshmi Lavanya, Dept of Mathematics, IISc, gave a talk on "A characterization of the Fourier transform on the Heisenberg group" on 11.04.2014.

196. Prof. M. Vanninathan, TIFR CAM, Bangalore, gave a talk on "Optimal Design problems" on 25.04.2014.

197. Prof. Harish Seshadri, Dept of Mathematics, IISc, gave a talk on "Gromov hyperbolicity and the Kobayashi metric" on 25.04.2014.

198. Mr. Chandramouli K, Dept of Mathematics, IISc, gave a talk on ": Homogeneous Operators and some Irreducible representations of the mobius group" on 28.04.2014.

199. Prof. B. Rajeev, ISI, Bangalore, gave a talk on "Brownian excursions into an interval" on 30.04.2014.

200. Dr. Navin Kashyap, Dept of Mathematics, IISc, gave a talk on "Phase transitions in the pattern maximum likelihood problem and its Bethe variant" on 30.04.2014.

201. Prof. Santanu Sarkar, CMI, Chennai, gave a talk on "Cryptanalysis of R S A variants and Implicit Factorization" on 01.05.2014.

202. Mr. Avijit Pal, Dept of Mathematics, IISc, gave a talk on "Contractivity and Complete Contractivity" on 02.05.2014.

203. Dr. Chandan Singh Dalwat, HRI, Allahabad, gave a talk on "Roots of Units or A sum worthy of Gauss" on 06.05.2014.

204. Mr. Diwakaran D, Dept of Mathematics, IISc, gave a talk on "Compactness theorem for the spaces of distance measure Spaces and Reimann surface laminations" on 23.05.2014.

205. Mr. Samrat Sen, Dept of Mathematics, IISc, gave a talk on "Addressing the Nehari problem" on 27.05.2014.

206. Mr. Hassain M, Dept of Mathematics, IISc, gave a talk on "Representations and conjugacy classes of $GL_2(\mathbb{Z}/(p^k\mathbb{Z}))$" on 27.05.2014.

207. Mr. Anwoy Maitra, Dept of Mathematics, IISc, gave a talk on "Automorphism groups of domains in $\mathbb{C}^n$ and the Wong-Rosay theorem" on 27.05.2014.

208. Prof. Rukmini Dey, HRI, Allahabad, gave a talk on "Geometric Quantization and Coherent States" on 30.05.2014.

209. Prof. Gopal K Basak, ISI, Kolkata, gave a talk on "A dynamic model of capital inflow and financial crisis in a two country and multi-country framework over infinite time horizon" on 02.06.2014.

210. Prof. Sivaram Ambikasaran, Courant Instt of Mathematical Scs, NYU, USA, gave a talk on "Analysis based fast algorithms for applied mathematics" on 12.06.2014.

211. Mr. Devang S Ram Mohan, Dept of Mathematics, IISc. gave a talk on "An Introduction to Minimal Surfaces" on 10.07.2014.

212. Ms. Kamana Porwal, Dept of Mathematics, IISc, gave a talk on "A Posteriori Error Analysis of Discontinuous Galerkin Methods For Elliptic Variational Inequalities" on 14.07.2014.

213. Dr. Chaitanya Senapathi, TIFR CAM, Bangalore, gave a talk on "Morse theory on the space of paths on Homogeneous spaces" on 11.07.2014.

214. : Prof. Victor Anandam, IMSc, Chennai, gave a talk on "Potential theory on infinite graphs" on 12.07.2014.

215. Dr. Sundar Sethuraman, University of Arizona, USA, gave a talk on "introduction to preferential attachment schemes" on 15.07.2014.

216. Dr. Subhojoy Gupta, Caltech, USA, gave a talk on "Thurston-Teichmuller theory and the dynamics of grafting" on 16.07.2014.

217. Prof. P P Divakaran, CMI, Chennai, gave a talk on "The Beginnings of Mathematics in India" on 17.07.2014.

218. Mr. Bidyut Sanki, Dept of Mathematics, IISc, gave a talk on "Shortest length geodesics on closed hyperbolic surfaces" on 17.07.2014.

219. Dr. Subhojoy Gupta, Caltech, USA, gave a talk on "Holonomy fibers of complex projective structures" on 17.07.2014.

220. Prof. Rahul Roy, ISI, Delhi, gave a talk on "On the rank of symmetric random matrices" on 17.07.2014.

221. Prof. Charles Bordenave, Universite de Toulouse, gave a talk on "Non-backtracking spectrum of random graphs" on 24.07.2014.

222. Prof. Snigdhayan Mahanta, University of Muenster, gave a talk on "Homotopy and Homology of noncommutative spaces" on 28.07.2014.

223. Prof. Emmanuel Kwame Essel, Univ. of Cape Coast, Ghana, gave a talk on "Homogenization of quasilinear parabolic problems by the Method of Rothe and two scale convergence" on 30.07.2014.

224. Prof. Alladi Sitaram, Dept of Mathematics, IISc, gave a talk on "Harish-Chandra (1923 - 1983)" on 07.08.2014.

225. Dr. Koushik Ramachandra, ISI, Bangalore, gave a talk on "Asymptotic behavior of positive harmonic functions in Some unbounded domains" on 18.08.2014.

226. Dr. Subhroshekar Ghosh, Univ of Princeton, USA, gave a talk on "Large deviations for random polynomials exponential Coefficients" on 18.08.2014.

227. Prof. Luz Roncal, Univ de La Rioja, Logrono, Spain, gave a talk on "Semigroups and Harmonic Analysis" on 19.08.2014.

228. Prof. Siddhartha Gadgil, Dept of Mathematics, IISc, gave a talk on "Dynamics via quassi-homomorphisms" on 22.08.2014.

229. Dr. Gourab Ray, Univ of British Columbia, Canada, gave a talk on "Unicellular maps in high genus" on 19.08.2013.

230. Prof. Manjunath Krishnapur, Dept of Mathematics, IISc, gave a talk on "The Littlewood-Offord and related problems" on 22.08.2014.

231. Prof. Radouan Daher, Univ of Hassan, Casablanca, Morocco, gave a talk on "On a theorem of Titchmarsh" on 26.08.2014.

232. Mr. Jaikrishnan J, Dept of Mathematics, IISc, gave a talk on "Complexity theory and Complex Dynamics" on 28.08.2014.

233. Prof. Gautam Bharali, Dept of Mathematics, IISc, gave a talk on"Proper holomorphic maps between bounded symmetric domains" on 19.09.2014.

234. Mr. J. Jaikrishnan J, Dept of Mathematics, IISc, gave a talk on "Proper holomorphic maps between bounded symmetric domains" on 19.09.2014.

235. Prof. Ali Baklouti, Universite of Sfax, Tunisia, gave a talk on "Harmonic Analysis on exponential homogeneous spaces And differential operators" on 02.09.2014.

236. Prof. Srikanth Tupurani, IMSc, Chennai, gave a talk on "An interesting result about finite dimensional complex Semi-simple" on 22.09.2014.

237. Ms. Samarpita Ray, Dept of Mathematics, IISc, gave a talk on"Derived Category of N-complexes" on 22.09.2014.

238. Dr. Rahul Garg, Technion, Haifa, Isreal, gave a talk on "Riesz potentials and Sobolev embedding theorems" on 23.09.2014.

239. Prof. Parameswaran Sankaran, IMSc, Chennai, gave a talk on "The BNS invariant and its application to twisted conjugacy" on 14.10.2014.

240. Prof. T. Bhattacharyya, Dept of Mathematics, IISc, gave a talk on "Shining a Hilbertian lamp on the polydisc" on 24.10.2014.

241. Prof. E. K. Narayanan, Dept of Mathematics, IISc, gave a talk on "Shining a Hilbertian lamp on the polydisc" on 24.10.2014.

242. Prof. Benjamin A. Burton, The University of Queensland, Australia, gave a talk on "Knots, algorithms and linear programming: the quest to solve Unknot recognition in polynomial" on 7.11.2014.

243. Dr. Jonathan Speer, The University of Queensland, Australia, gave a talk on "The GAP package simpcomp - A toolbox for simplicial Complexes" on 7.11.2014.

244. Mr. Pradeep Boggarapu, Dept of Mathematics, IISc, gave a talk on "Mixed norm estimates in Dunkl setting and chaotic Behavior of heat semigroups " on 17.11.2014.

245. Prof. Krishna Maddaly, IMSc, Chennai, gave a talk on "Statistics in the Anderson Model" on 19.11.2014.

246. Mr. Avijit Pal, Dept of Mathematics, IISc, gave a talk on "Contractivity, Complete Contractivity and Curvature Inequalities" on 19.11.2014.

247. Prof. Divakar Viswanath, University of Michigan, USA, gave a talk on "Optimal differentiation on arbitrary grids" on 24.11.2014.

248. Prof. Manjunath Krishnapur, Dept of Mathematics, IISc, gave a talk on "An anti-concentration Inequality" on 24.11.2014.

249. Prof. Jean-Baptiste Gatsinzi, University of Namibia, Namibia, gave a talk on "Rational loop space homology of homogeneous spaces" on 05.12.2014.

250. Prof. Hari Shankar Mahato, University of Eriangen-Nornberg, gave a talk on "Homogenization of a system of multi-species semilinear diffusion - Reaction equations and moving boundary problems " on 08.12.2014.

251. Dr. Atul Dixit, Tulane University, LA, gave a talk on "Zagier polynomials and modified Nörlund polynomials" on 23.12.2014,.

252. Prof. Alladi Sitaram, Dept of Mathematics, IISc, gave a talk on "Some "qualitative" uncertainty principles revisited" on 19.12.2014.

253. Prof. Nayantara Bhatnagar, Univ. of Delaware, gave a talk on " Lengths of Monotone Subsequences in a Mallows Permutation" on Jan. 5, 2015.

254. Prof. Elchanan Mossel, Univ. of Pennsylvania, USA, gave a talk on "From Trees to Seeds on the inference of the seed from large random trees" on Jan. 5, 2015

255. Prof. Mahesh Kakde, King's College London, UK, gave a talk on "Iwasawa Theory" on Jan. 5, 2015.

256. Prof. B. P. Purnaprajna, Univ. of Kansas, USA, gave a talk on "Geometry of algebraic surfaces and holomorphic convexity" on Jan. 9, 2015.

257. Prof. Prof. Alladi Sitaram, Dept of Mathematics, IISc, gave a talk on "Some Qualitative uncertainty principles revisited" on Jan.9, 2015.

258. Dr. Sandeep Varma, TIFR Mumbai, delivered a lecture on "On applying the Deligne-Kazhdan Philosophy to classical groups" on Jan. 29, 2015.

259. Mr. Samir Ch. Mandal, Dept of Mathematics, IISc, gave a talk on "Dilation Theory of Contractions and Nevanlinna-pick Interpolation Problem" on Jan. 29, 2015.

260. Prof. Christian Berg, Univ. of Copenhagen, gave a talk on "Indeterminate moment problems and growth of associated entire functions" on Feb. 6, 2015.

261. Prof. K. R. Parthasarathy, ISI Delhi, gave a talk on "What is Quantum stochastic Calculus?" on Feb. 13, 2015.

262. Dr. Arvind Ayyer, Dept of Mathematics, IISc, gave a talk on "The dimer model and generalizations" on Feb. 20, 2015.

263. Prof. Carsten Carstensen, Humboldt Univ, Berlin, Germany, delivered a lecture on "Axioms of Adaptivity " on Feb. 23, 2015.

264. Prof. Dr. Martin Kreuzer, Univ. of Passau, Germany, gave a talk on "Computational aspects of Bunside Algebras I" on Feb. 25, 2015.

265. Prof. Jerome Bertrand, Univ. Paul Sabatier, France, gave a talk on "Prescribing Gauss curvature using mass transport" on Feb. 25, 2015.

266. Prof. Martin Kreuzer, Univ. of Passau, Germany, gave a talk on "Computational aspects of Bunside Algebras II" on Mar. 2, 2015.

267. Prof. Amritanshu Prasad, IMSc Chennai, gave a talk on "Kronecker Coefficients, Integer Arrays and the RSK Correspondence" on Mar. 6, 2015.

268. Dr. Pooja Singla, Dept of Mathematics, IISc, gave a talk on "Generating a random transposition with Random permutations" on Mar. 6, 2015.

269. Prof. Steven Spallone, IISER Pune delivered a seminar on " Weyl's Integration Formula for Unitary Groups" on Mar. 6, 2015.

270. Prof. P. K. Ratnakumar, HRI, Allahabad, gave a talk on " Composition operators on Modulation Spaces and Application to Nonlinear Schrodinger Equation" on Mar. 12, 2015.

271. Prof. Ronald G. Douglas, Texas A& M University, USA, gave a talk on "Index theory and the Arveson Conjecture" on Mar. 13, 2015.

272. Mr. Biplab Basak, Dept of Mathematics, IISc, gave a talk on "Minimal Crystallizations on 3- and 4-manifolds" on Mar. 13, 2015.

273. Dr. Amita Malik, Univ. of Illinois at Urbana-Champaign, USA, gave a talk on "Arithmetic of Farey-Ford Packings" on Mar. 18, 2015.

274. Dr. Soumya Bhattacharya, CIRM Trento, Italy, gave a talk on "Factorization of holomorphic eta quotients" on Mar. 20, 2015.

Seminars in the Department during April 2015- March 2016

275. Prof. Srikanth K Iyer, Dept of Mathematics, IISc, gave a talk on "Achieving positive information velocity in wireless networks" on Apr. 6, 2015.

276. Dr. Yogeswaran D, ISI Bangalore, gave a talk on "Normal convergence of geometric functions of clustering point processes" on Apr. 6, 2015.

277. Prof. S. P. Arun, CNS, IISc, gave a talk on "Linearity in perceptual Space" on Apr. 10, 2015.

278. Prof. Rajesh Sundaresan, ECE, IISc, gave a talk on "Visual search as active sequential testing" on Apr. 10, 2015.

279. Dr. Swagata Sarkar, ISI Kolkata, gave a talk on "Equivariant Cobordism Classes of Minor Manifolds" on Apr. 28, 2015.

280. Ms. Senthil Raani, K. S. Dept of Mathematics, IISc, gave a talk on "L^p-Asymptotics of Fourier transform of fractal measures" on Apr. 23, 2015.

281. Prof. Siddhartha Gadgil, Dept of Mathematics, IISc, gave a talk on "Automated theorem proving using Learning : concepts and code" on May 15, 2015.

282. Prof. Basudeb Datta, Dept of Mathematics, IISc, gave a lecture on "Simplicial Homology and de Rham's theory" on May 19, 2015.

283. Mr. Subhajit Ghosh, Dept of Mathematics, IISc, gave a talk on "Properties of the Markov chain on S_n by transpositions" on May 22, 2015.

284. Mr. Puspendu Jana, Dept of Mathematics, IISc, gave a talk on "The Riesz representation theorem for linear functions on $C_c(X)$" on May 22, 2015.

285. Mr. Manish Kumar, Dept of Mathematics, IISc, gave a talk on "Heat flow and Berezin-Toeplitz estimates on Segal-Bargmann space" on May 22, 2015.

286. Mr. Sayantan Maitra, Dept of Mathematics, IISc, gave a talk on "Embedding smooth manifold in Euclidean spaces" on May 22, 2015.

287. Mr. Somnath Pradhan, Dept of Mathematics, IISc, gave a lecture on "The RICCATI equation" on May 22, 2015.

288. Prof. Alan Edelman, MIT, USA, gave a talk on " Random Matrices, Numerical Computation and Applications" on June 3, 2015.

289. Dr. Sudeshna Basu, ISI Kolkata, gave a talk on "Small Combination of Slices in Banach Spaces" on June 10, 2015.

290. Dr. Rizwanur Khan, gave a talk on "Non-vanishing of Dirichlet L-functions in Galois orbits I" on June 12, 2015.

291. Dr. Rizwanur Khan, gave a talk on "Non-vanishing of Dirichlet L-functions in Galois orbits" on June 19, 2015.

292. Prof. Sivaram Ambikkasaran, NYU, gave a talk on "Fast algorithms for data analysis and elliptic partial differential equations" on June 24, 2015.

293. Dr. Vamsi Pingali, Johns Hopkinds Univ, USA, gave a talk on "Some computational and analytic aspects of Chern-Weil forms" on July 2, 2015.

294. Ms. Ratna Pal, Dept of Mathematics, IISc, gave a talk on "Dynamics of skew products of Henon maps" on July 20, 2015.

295. Mr. Tulasi Ram Reddy, Dept of Mathematics, IISc, gave a talk on "On critical points of Random polybomials and spectrum of certain products of Ginibre matrices" on July 24, 2015.

296. Prof. Alladi Sitaram, Dept of Mathematics, IISc, gave a talk on "A transference result between radial Fourier multipliers and zonal multipliers on the unit sphere" on July 24, 2015.

297. Mr. T. V. H. Prathamesh, Dept of Mathematics, IISc, gave a talk on "Mechanisation of Knot Theory" on July 24, 2015.

298. Prof. Malabika Pramanik, Univ of British Columbia, Vancouver, Canada, gave a talk on "Finite configurations in sparse sets" on July 29, 2015.

299. Prof. Youssef Ouknine, Univ of Cadi Ayyed, Morocco, gave a talk on "Reflected Backward SDEs with General Jumps" on Aug. 7, 2015.

300. Prof. Angela Pasquale, Univ. de Lorraine, gave a talk on "Dual pairs and intertwining distributions" on Aug. 10, 2015.

301. Mr. Jonathan Fernandes, gave a talk on "An Introduction to Atlas : Basic Background and Applications" on Aug. 14, 2015.

302. Prof. Anita Naolekar, Stat-Math Unit, ISI Bangalore, gave a series of lectures on "Operads : An Introduction" Aug. 19, 2015.

303. Dr. Aparajita Dasgupta, EPFL, Lausanne, gave a talk on "Gohberg Lemma, Compactness and Essential Spectrum of Operators on Compact Lie Groups" on Aug. 20, 2015.

304. Dr. Jotsaroop Kaur, Univ. of Milano, Italy, gave a lecture on "Localisation theorems for Bochner-Riesz means" on Aug. 21, 2015.

305. Dr. Sujatha Ramdorai, Univ. of British Columbia, Canada, gave a lecture on "Iwasawa theory and the Birch and swinnerton - Dyer Conjecture" on Aug. 25, 2015.

306. Dr. Dheeraj Kulkarni, RKMVU, Kolkata, gave a talk on "Contact Structures and Contact Invariants in Heegaard Floer Homology" on Aug. 31, 2015.

307. Prof. M. S. Narasimhan, Dept of Mathematics, IISc, gave a series of lectures on "Complex manifold and differential geometry" on Sept. 2, 2015.

308. Prof. Siegfried Bocherer, Universitat Mannheim, gave a talk on "Maximal and extremal lattices" on Sept. 4, 2015.

309. Prof. Navin Goyal, Microsoft Research, Bangalore, gave a talk on "Algorithms for independent component analysis" on Sept. 4, 2015.

310. Prof. Sujatha Ramdorai, Univ. of British Columbia, Canada, gave a talk on "Iwasawa theory and the Birch and Swinnerton-Dyer conjecture" on Sept. 8, 2015.

311. Dr. Mousumi Mandal, Dept of Mathematics, IISc, gave a series of four lectures on "Elementary Introduction to Commutative Algebra" on Sept. 9, 2015.

312. Dr. Chandan Pal, Dept of Mathematics, IISc, gave a talk on "Risk-sensitive Ergodic Control of Continuous Time Markov Processes with Denumerable State Space" on Sept. 21, 2015.

313. Dr. Siva Athreya, ISI, Bangalore, gave a talk on Harnack inequality for non-local Schrodinger operators" on Sept. 21, 2015.

314. Prof. Aprameyan Parthasarathy, Univ. Paderborn, Germany, gave a talk on "The restriction of discrete series representations to minimal parabolic subgroups-the case of Spin(4,1)" on Sept. 30, 2015.

315. Prof. Safdar Quddus, NISER, Odisha, gave a talk on "Hochschild and cylic homology of algebraic non-commutative torus orbifold and Chern-Connes pairing" on Oct. 5, 2015.

316. Prof. K. Sandeep, TIFR CAM, Bangalore, gave a talk on "Nonlinear analysis and PDE" on Oct. 16, 2015.

317. Prof. Siddhartha Gadgil, Dept of Mathematics, IISc, gave a lecture on "Homotopy type theory" on Oct. 16, 2015.

318. Prof. Marie Kratz, ESSEC Business School, CREAR, gave a talk on " On Risk Concentration" on Oct. 26, 2015.

319. Prof. Sutanu Roy, Univ of Ottawa, Canada, gave a talk on "Landstad-Vaes theory for locally compact quantum groups" on Nov. 6, 2015.

320. Prof. Raphael Chetrite, Univsite Nice, Sophia Antipolis, gave a talk on "Non-equilibrium Markov processes conditioned on large deviations" on Nov. 5, 2015.

321. Prof. Benjamin A. Burton, The Univ. of Queensland, Australia, gave a talk on "Exploring parameterized complexity in computational topology" on Nov. 12, 2015.

322. Prof. Jonathan Speer, The Univ. of Queensland, Australia, gave a talk on "Alghorithms and complexity for Turaev-Viro Invariants" on Nov. 13, 2015.

323. Dr. Manish Mishra, Univ of Heidelberg, gave a talk on " Hecke algebras and the Langlands program" on Nov. 17, 2015.

324. Prof. Rajarama Bhat, ISI, Bangalore, gave a talk on " Endomorphisms of the algebras of all bounded operators on a Hilbert space" on Nov. 20, 2015.

325. Dr. Subhojoy Gupta, Dept of Mathematics, IISc, gave a talk on "Teichmuller space, harmonic maps and measured foliations" on Nov. 20, 2015.

326. Dr. Vikas Singh, Universite Paris Sud, France, gave a talk on "Existence of Nash equilibrium for chance-constrained games" on Nov. 26, 2015.

327. Prof. E. K. Narayanan, Dept of Mathematics, IISc, gave a talk on "Everywhere continuous, nowhere differentiable functions" on Nov. 29, 2015.

328. Prof. Amritanshu Prasad, IMSc, Chennai, gave a talk on "Platonic Solids: jewels of the mathematical world" on Nov. 29, 2015.

329. Prof. Somnath Jha, IIT Kanpur, gave a talk on "Functional equation for Selmer groups" on Nov. 30, 2015.

330. Prof. Ritwik Mukherjee, TIFR Mumbai, gave a talk on "Enumerative Geometry of rational rational cuspidal curves on del-Pezzo surfaces" on Dec. 1, 2015.

331. Prof. Ronnie Sebastian, IISER Pune, gave a talk on "Voevodsky's smash nilpotence Conjecture" on Dec. 10, 2015.

332. Prof. G. B. Folland, Univ of Washington, Seattle, USA, gave a six lectures on "Topics in the history of Harmonic Analysis " on Dec. 16, 2015.

333. Dr. Ravi Prakash, Univ. of Conception, Chile, gave a talk on "Homogenization of Periodic Optimal Control Problems in a Domain with highly Oscillating Boundary" on Dec. 18, 2015.

334. Dr. K. R. Arun, IISER Trivandrum, gave a talk on "Asymptotically accurate and stable Runge-Kutta schemes for the wave equation system in the low Mach Number limit" on Dec. 18, 2015.

5.6 List of Visitors in the Department

Visitors for the period April 2011-March 2012

1. Dr. Debraj Chakrabarti, IIT Bombay, from 20th April to 1st of May 2011.
2. Prof. Arup Bose, ISI, Kolkata, from 28th to 30h April 2011.
3. Dr. Sanjay Kumar Pant, Deen Dayal Upadhyay College, Delhi, from 22nd of May to 4th June 2011.
4. Prof. Michael Dritschel, Newcastle University, UK, from 12th to 27th April, 2011.
5. Prof. B. N. Mandal, ISI, Kolkata, from 15th to 22nd May, 2011.
6. Prof. Koushik Pal, UC Berkeley, USA, from 19th to 26th June 2011.
7. Dr. Sameer Kamal, TIFR Mumbai, from 1st to 4th July, 2011.
8. Dr. Subhroshekar Ghosh, UC Berkeley, USA, from 5th to 24th July, 2011.
9. Prof. Sanjay Parui, NISER, Bhubaneswar, from 5th to 29th July, 2011.
10. Dr. Arvind Ayyer, University of Davis, USA, from 30th June to 1st July, 2011.
11. Dr. N. K. Vishnu, University of Hyderabad, from 7th to 8th July 2011.
12. Dr. Debasish Bose, IMSc, Chennai, from 16th to 20th July, 2011.
13. Prof. Shobha Madan, IIT Kanpur, from 16th to 20th July.
14. Prof. Suresh, NCL, Pune, from 26th to 29th July, 2011.
15. Dr. Shibananda Biswas, Ben Gurion University, Israel, from 19th to 26th Sept., 2011.
16. Prof. Michael Dritschel, Newcastle University, UK, from 20th to 27th Sept., 2011.
17. Prof. Arup Bose, ISI, Kolkata, 18th Oct, 2011.
18. Dr. Sivananthan Sampath, Radon Institute for Computational & Applied Math, Linz, Oct. 19, 2011
19. Dr. Anjishnu Banerjee, Duke University, USA, from 18th to 21st Oct., 2011.
20. Prof. Jean-Pierre Demailly, Institut Fourier, Grenoble, France, from 22nd to 27th Nov, 2011.
21. Dr. V. Ravichandran, University Saing Malasia, Malaysia, Dec. 7, 2011.
22. Dr. Kashyap Rajeevsarathy, IISER, Bhopal, from 9th to 14th Dec, 2011.
23. Dr. Anuradha Garge, Mumbai University, Mumbai, from 9th to 17th of Dec, 2011.
24. Prof. Angela Pasquale, Universit Paul Verlaine-Metz, France, from 13th to 30th Dec, 2011.
25. Prof. Jay Gopalakrishnan, Portland State University, USA, from 18th to 21st Dec, 2011.

26. Prof. Robert Kanigel, MIT, USA, from 28th Dec 2011 to 1st of Jan 2012.
27. Prof. K. B. Athreya, AMES, USA, from 5th Jan to 23rd Feb, 2012.
28. Prof. Raju K George, IIST, Trivandrum, from 22nd to 28th Jan, 2012.
29. Dr. Bhaskar Dubey, IIST Trivandrum, from 22nd Jan to 2nd Feb, 2012.
30. Prof. A. Martini, UNSW Sydney, Australia, from 22nd Jan to 3rd Feb, 2012.
31. Prof. G. B. Folland, Univ. of Washington, USA, from 22nd of Jan to 9th of Feb, 2012.
32. Prof. Amim Sofi, University of Kashmir, from 24th Jan to 28th Feb, 2012.
33. Dr. Srinivas Varadhraj, Catholic University of America, USA, from 29th to 30th Jan, 2012.
34. Dr. Kui Ji, Hebei Normal University, China, from 29th Jan to 30th June 2012.
35. Prof. Vidare Thomee, Chalmess University of Technology, Sweden, from 3rd to 10th Feb, 2012.
36. Prof. V. S. Borkar, TIFR Mumbai, from 4th to 7th Feb, 2012.
37. Prof. A. Arapostathis, Univ of Texas, USA, from 4th to 7th Feb, 2012.
38. Prof. J. Sengupta, TIFR Mumbai, from 19th to 29th Feb, 2012.
39. Dr. Suparna Sen, ISI Kolkata, from 19th to 26th Feb, 2012.
40. Dr. Arni Srinivasa Rao, BIR Unit, ISI Kolkata, from 22nd to 29th Feb, 2012.
41. Prof. S. S. Sritharan, D R C S T, USA, Feb. 23, 2012.

Visitors for the period April 2012 - March 2013

42. Prof. R. Parthasarathy, Bharatiar University, Coimbatore, during April 15 - 21, 2012
43. Dr. Shrihari Sridharan, Chennai Mathematical Institute, Chennai, during May 1 - 31, 2012
44. Dr. Rizwanur Khan, Universitat Gottingen, Germany, during May 3 - 5, 2012
45. Dr. Subrata Shyam Roy, ISSRER, Kolkata, during May 5 - 19, 2012
46. Dr. K. S. Mallikarjuna Rao, I E O R, IIT Mumbai, Mumbai, during May 8 - 22, 2012
47. Dr. S. Sundar, Stat Math Unit, ISI Delhi, during May 14 - 18, 2012
48. Prof. P. K. Jain, Delhi University, Delhi, during May 16 - 18, 2012
49. Prof. N. Mohan Kumar, University of Washington, USA, during May 16 - 26, 2012
50. Dr. Sarit Mitra, NIT Durgapur, during May 21 - June 5, 2012.
51. Dr. K. R. Arun, Germany, during May 23 - 25, 2012.
52. Dr. Shyam Sundar Ghosal, TIFR, Bangalore, during May 24, 2012.

53. Ms. Ramya Teja, BITS, Pilani, during May 24 - 29, 2012.

54. Dr. Soumen Sarkar, KAIST, Republic of Korea, during June 1 - 14, 2012

55. Prof. Mikiya Masuda, Osaka City University, Japan, during June 3 - 10, 2012

56. Prof. Parameswaran Sankaran, IMSc, Chennai, during June 7 - 8, 2012

57. Dr. Ratna Ghosh, Jadavpur Univ., Kolkata, during June 9 - 13, 2012

58. Dr. Kuldeep Saha, RKM Vivekananda Univ., Howrah, during June 20 - July 12, 2012

59. Prof. David Gabai, Princeton University, during June 25 - 29, 2012.

60. Dr. Dimple Kumar, Dept of Maths & Comp. Science, Viginia Military Institute, USA, during June 27 - July 07, 2012.

61. Dr. Kunal Mukherjee, I M Sc., Chennai, during June 27 - 28, 2012.

62. Prof. Michael Grabchak, Dept of Mathematics, UNC Charlotte, USA, during June 27 - July 7, 2012

63. Prof. Sundar Sethuraman, Department of Mathematics, USA, on June 29, 2012

64. Dr. G. V. Ravindra, University of Missouri, USA, during July 7 - 11, 2012

65. Prof. Silanjan Bhattacharya, West Bengal State University, during July 9 - 14, 2012

66. Dr. Subhojoy Gupta, California Instt of Technology, USA, during July 11 - 14, 2012

67. Dr. Anish Ghosh, University of East Anglia, Norwich, UK, during July 15 - 18, 2012

68. Prof. Rama Mishra, IISER, Pune, during July 17 - 28, 2012

69. Prof. P. Pal Choudhury, ISI, Kolkata, during July 29 - Aug. 3, 2012

70. Dr. Sk. S. Hassan, Instt. Maths & Appl., Bhubaneswar, during July 29 - 31, 2012

71. Prof. S. S. Sritharan, Naval Postgraduate School, C. A., on July 30, 2012

72. Dr. Soumya Das, TIFR Mumbai, during Aug. 8 - 9, 2012

73. Dr. Pratyoosh Kumar, ISI, Kolkata, during Aug. 12 - Sept. 30, 2012

74. Dr. Sarvesh Kumar, Indian Instt of Space & Technology, Trivendram, during Aug. 21 - 31, 2012

75. Prof. Anindya Bhattacharya, York University, UK, during Aug. 21 - 24, 2012

76. Dr. Chandrakant Aribam, Heiderbugh University, Germany, during Aug. 23 - 25, 2012

77. Ms. Gayatri Varma, K C College, Mannanam, Kotayam, Kerala, during Aug. 25 - Nov. 25, 2012

78. Prof. Ewa Damek, Institute of Mathematics, Poland, during Aug. 25 - Sept. 25, 2012

79. Dr. Suparna Sen, ISI, Kolkata, during Aug. 28 - Sept 12, 2012

80. Prof. M P. Srivastava, Delhi University, Delhi, during Aug. 28 - 31, 2012
81. Prof. V. G. Tikekar, Retd Professor, IISc Bangalore, during Aug. 28 - 31, 2012
82. Prof. P. Vijayaraju, Anna University, Chennai, on Sept. 9, 2012
83. Prof. S. Ramasubramanian, ISI, Bangalore, on Sept. 10, 2012
84. Dr. Diganta Borah, IISER Pune, during Sept. 11 - 14, 2012
85. Dr. Anindya Goswami, IISER Pune, during Sept. 18 - 23, 2012
86. Dr. B. S. R. V. Prasad, VIT University, Vellore, during Sept. 20 - 21, 2012
87. Dr. Thomas Richard, Fourier Institute, France, during Sept. 28 - Oct. 28, 2012
88. Dr. Ratna Ghosh, Jadavpur Univ., Kolkata, during Oct. 16 - 24, 2012
89. Prof. Arup Bose, ISI, Kolkata, on Oct. 18, 2011
90. Prof. Herve Gaussier, Instt of Fourier, France, during Nov. 18 - Dec. 1, 2012
91. Dr. Soumik Pal, Univ of Washinton, USA, during Nov. 27 - Dec. 1, 2012
92. Prof. Eric Todd Quinto, Tufts University, USA, Dec. 2 - 18, 2013.
93. Dr. S. Baskar, IIT Bombay, Mumbai, during Dec. 13 - 22, 2012
94. Prof. Adam Koranyi, Dept of Mathematics, Cony, NY, USA, during Dec. 23, 2012 - Jan. 20, 2013
95. Prof. Adam Koramji, City University of New York, USA, Dec. 28, 2012 - Jan. 27, 2013.
96. Dr. Amos Nevo, Technion, Haifa, Israel, during Dec. 30, 2012 - Jan. 6, 2013.
97. Dr. Thomas Richard, Universite de Grenoble, France, Jan. 10 - 31, 2013.
98. Dr. Ram Singh, BGSB University, Rajouri, Jammu & Kashmir, Jan. 12 - 16, 2013.
99. Dr. Suhas Pandit, ICTP, Trieste, Italy, Jan. 12 - 19, 2013.
100. Prof. M. A Sofi, Kashmir University, Kashmir, Jan. 25 - Mar. 23, 2013.
101. Prof. Ferit Ozturk, Beyazili University, Turkey, Jan. 26 - 28, 2013.
102. Dr. Rajesh Srivastava, IIT Guwahati, Jan. 29 - Feb. 4, 2013.
103. Prof. Ritabraja Munshi, TIFR Mumbai, Feb. 4 - 28, 2013.
104. Prof. R. D. Giri, R T M Nagpur University, Nagpur, Feb. 13 - 22, 2013.
105. Dr. Sreekar Vadlamani, TIFR CAM, Bangalore, Feb. 11, 2013.
106. Dr. Dinesh P. A., M. S. Ramaiah Instt of Tech., Bangalore, Feb. 15, 2013.
107. Mr. Tapas Chatterjee, IMSc., Chennai, Feb. 17 - 23, 2013.

108. Prof. B. V. Limaye, IIT Bombay, Mumbai, Feb. 18 - 19, 2013.

109. Dr. Yogeshwaran Dhandapani, Technion, Haifa, Isreal, Feb. 18 - Mar. 31, 2013.

110. Prof. S. Kesavan, IMSc., Chennai, Feb. 26, 2013.

111. Prof. Maria Lukacova, University of Mainz, Germany, Mar. 4 - 13, 2013.

112. Dr. Prachi Mahajan, IIT Bombay, Mumbai, Mar. 11 - 14, 2013.

113. Dr. P. Bera, IIT Roorkee, Mar. 21 - 24, 2013.

114. Mr. Liyao Wang, Yale University, United States, Dec. 30, 2012 - March 31, 2013.

Visitors for the period April 2013-March 2014

115. Mr. Liyao Wang, Yale University, United States, Apr 1 - May 15, 2013.

116. Dr. Debargha Banerjee, Max Planek Instt, Bonn, Germany, May 1 - 5, 2013.

117. Dr. Mizanoor Rahman, Shanthiniketan, Kolkata, May 1 - 18, 2013.

118. Dr. K. R. Arun, IISER Thiruvananthapuram, May 1 - 3, 2013.

119. Prof. P. L. Roe, University of Michigam, USA, May 7 - 16, 2013.

120. Prof. M. S. Raghunathan, IIT Bombay, Mumbai, May 11 - 18, 2013.

121. Dr. Kindshuk Biswas, Vivekananda University, Kolkata, May 14 - 28, 2013.

122. Prof. Philip L Roe, University of Michigan, USA, May 15 - June 5, 2013.

123. Prof. Ravi Aithal, University of Mumbai, May 19 - 26, 2013.

124. Dr. Johnny Guzman, Brown University, USA, May 21 - June 2, 2013.

125. Prof. Gaik Ambartsounian, University of Texas, USA, June 8 - 23, 2013.

126. Prof. Victor Anandam, I M Sc., Chennai, June 16 - 17, 2013.

127. Dr. Sneh Lata, Shivnadr University, Delhi, June 26 - July 11, 2013.

128. Prof. C. G. Suresh, N C L., Pune, June 26 - 27, 2013.

129. Dr. Sarang Sane, University of Kansas, USA, July 1 - 2, 2013.

130. Prof. Ratna Singh Shivaji, Mississippi State Univ., USA, July 8 - 20, 2013.

131. Prof. Jyothi Sengupta, TIFR, Mumbai, July 18 - 26, 2013.

132. Dr. Dranck Djideme, University of Benin, France, July 24 - Nov. 11, 2013.

133. Prof. Siegfried Bocherer, Institat Mannheim, Germany, July 28 - Aug. 9, 2013.

134. Prof. Malabika Pramanik, University of British Columbia, Canada, Aug. 5 - 31, 2013.

135. Dr. Ankik Giri, Austrian Academy of Scs., Austria, Aug. 6 - 8, 2013.

136. Dr. Subhroshekhar Ghosh, Princeton University, Aug. 11 - 29, 2013.

137. Dr. Mousomi Bhakta, Technion, Haifa, Isreal, Aug. 12 - 13, 2013.

138. Ms. Kalai Vani, Ramanujan Instt for Adv. Studies, Chennai, Aug. 19 - 30, 2013.

139. Mr. Rajesh, K. S., IIT Kanpur, Aug. 18 - 30, 2013.

140. Dr. Swagato Ray, ISI, Kolkata, Aug. 18 - 24, 2013.

141. Dr. Debashish Bose, Shiv Nadar University, UP, Aug. 18 - 30, 2013.

142. Dr. Suparna Sen, ISI, Kolkata, Aug. 18 - Sept. 7, 2013.

143. Prof. Rudra Sarkar, ISI, Kolkata, Aug. 18 - 24, 2013.

144. Dr. Shrihari Shridharan, Chennai Mathematical Instt., Chennai, Aug. 19 - 30, 2013.

145. Dr. S. Pattanayak, Weizmann Instt of Scs., Isreal, Aug. 20 - 21, 2013.

146. Prof. Nitin Nitsure, TIFR Mumbai, Aug. 22 - 29, 2013.

147. Dr. Nikhil Srivastava, Microsoft Research, Bangalore, Aug. 23, 2013.

148. Dr. Rajesh Srivastava, IIT Guwahati, Aug. 25 - 30, 2013.

149. Prof. Anand Swarup, Univ. of Melbourne, Australia, Aug. 27 - 31, 2013.

150. Prof. Indranil Biswas, TIFR Mumbai, Aug. 29 - 31, 2013.

151. Prof. Paul Zinn-Justin, Universite Pierre et Marie-Curie, Paris, France, Sept. 1 - 30, 2013.

152. Prof. Zinn- Justin, Paris, France, Sept. 7 - 13, 2013.

153. Prof. K. Srinivasa Rao, IMSc., Chennai, Sept. 12, 2013.

154. Prof. Siva Athreya, ISI, Bangalore, Sept. 23, 2013.

155. Prof. Herve Gaussier, Institut Fourier, France, Oct. 1 - 8, 2013.

156. Dr. Tirupathi Seshu, Brown University, USA, Oct. 4 - 7, 2013.

157. Dr. Mizanur Rahman, Viswa Bharathi Uni., West Bengal, Oct. 10 - 24, 2013.

158. Prof. C. S. Aravinda, TIFR, Bangalore, Oct. 23, 2013.

159. Prof. Jaydeb Sarkar, ISI, Bangalore, Oct. 25, 2013.

160. Dr. Ratna Ghosh, Instt of Electronics, JU, Kolkata, Dec. 19 - 26, 2013.

161. Prof. Raju K. George, IIST, ISRO, Trivandrum, Nov. 17 - 22, 2013.

162. Dr. Manish Kumar, ISI, Bangalore, Nov. 8, 2013.

163. Prof. Manjunath, IIT Bombay, Mumbai, Nov. 11, 2013.

164. Prof. N S N Sastry, ISI, Bangalore, Nov. 15, 2013.

165. Dr. Saranya Subbaiyan, Avinashiligam Instt of Home Science, Coimbatore, Nov. 25 - 30, 2013.

166. Dr. Apoorva Khare, Stanford University, USA, Nov. 26 - 28, 2013.

167. Dr. Sudhakar Chaudhury, IIT Delhi, Dec. 1 - 25, 2013.

168. Prof. Harald Upmeier, Universitat Marburg, Germany, Dec. 1 - 21, 2013.

169. Prof. Mahan Mj., Vivekananda University, Kolkata, Dec. 1 - Jan 5, 2014.

170. Prof. Todo Quinto, Tufts University, Dec. 12, 2013.

171. Prof. Sandeep Juneja, TIFR, Mumbai, Dec. 18, 2013.

172. Prof. S. Ramanan, Chennai Mathematical Instt, Chennai, Dec. 13 - 15, 2013.

173. Mr. Ajay Kumar, University of Delhi, Dec. 16 - 20, 2013.

174. Mr. Nithesh Sahni, University of Delhi, Dec. 16 - 20, 2013.

175. Dr. Mizanur Rahman, Viswa Bharathi Uni., West Bengal, Dec. 16 - 20, 2013.

176. Prof. M. N. Nambodhari, Cochin Univ. of Sci & Technology, Dec. 16 - 20, 2013.

177. Prof. V. M. Sholapurkar, S P College, Pune, Dec. 16 - 20, 2013.

178. Prof. Sudesh K Kanduja, IISER, Mohali , Dec. 19, 2013.

179. Prof. R. Kerman, Brock University, Canada, Dec. 24 - 30, 2013.

180. Prof. Uwe Storch, Ruhr-Universität Bochum, Germany, Jan. 1 - 31, 2014.

181. Prof. Victor Vinnikov, Bengurion Univ, Israel, Jan. 5, 2014.

182. Prof. Rizwanur Khan, Texas A & M Univ. Qatar, Dec. 31, 2013 - Jan. 9, 2014.

183. Prof. K. B. Athreya, IOWA State Univ., USA, Jan. 17, 2014.

184. Dr. Sumanto Sarkar, Centre for Excellence in Cryptology, Kolkata, Jan. 19 - 21, 2014.

185. Prof. M. A. Sofi, Kashmir Univ., Kashmir, Jan 29 - Feb. 27, 2014.

186. Prof. T E S Raghavan, Univ. of Illinois, Chicago, USA, Jan. 27 - 29, 2014.

187. Prof. Martin Kreuzer, Ruhr-Universität Bochum, Germany, Jan. 31 - Feb. 21, 2014.

188. Prof. Shanta Laishram, ISI, Delhi, Feb. 10 - 14, 2014.

189. Prof. Konstantin Khanin, Univ of Toronto, Canada, Feb. 10, 2014.

190. Prof. Bhaskar Bagchi, ISI, Bangalore, Feb. 14, 2014.

191. Prof. M. P. Murthy, Univ of Chicago, USA, Feb. 10 - May 05, 2014.

192. Dr. Ravi Prakash, Univ. de Conuphon, Chile, Feb. 13 - Mar. 18, 2014.

193. Prof. Arijit Chakrabarty, ISI, Delhi, Feb. 8 - 10, 2014.

194. Prof. S. Keshavan, IMSc., Chennai, Feb. 19 - 20, 2014.

195. Prof. Herve Gaussier, Intt. Fourier, Grenoble, France, Mar. 2 - 13, 2014.

196. Prof. Gerard Besson, Intt. Fourier, Grenoble, France, Mar. 2 - 13, 2014.

197. Prof. S. Ramasubramanian, ISI, Bangalore, Mar. 10, 2014.

198. Prof. Guido Kanschat, Univ. of Heidenberg, Germany, Mar. 8 - 11, 2014.

199. Prof. Satadal Ganguly, ISI, Kolkata, Mar. 24 - 31, 2014.

200. Prof. Neeraja Sahasrabudhe, ISI, Bangalore, Mar. 10, 2014.

Visitors for the period April 2014-March 2015

201. Dr. Chandan Pal, II Bombay, Mumbai, Mar. 31 - Apr. 4, 2014.

202. Prof. M. Vanninathan, TIFR, Bangalore, Apr. 25, 2014.

203. Prof. Chandan Singh Dalawat, HRI, Allahabad, Apr. 28 - May 5, 2014.

204. Prof. B. Rajeev, ISI, Bangalore, Apr. 30, 2014.

205. Dr. Santanu Sarkar, IMSc., Chennai, Apr. 29 - May 5, 2014.

206. Mr. Balarka Sen, Sodepur, West Bengal, May 5 - July 4, 2014.

207. Prof. G. K. Basak, ISI, Kolkata, May 27 - June 5, 2014.

208. Prof. Rukmini Dey, HRI, Allahabad, May 30 - June 5, 2014.

209. Prof. Shrihari Sridharan, CMI, Chennai, June 1 - 13, 2014.

210. Prof. Kingshook Biswas, Vivekananda Univ., Kolkata, June 23 - 30, 2014.

211. Prof. Sivaram Ambikasaran, Courant Instt of Mathematical Sciences, New York, USA, June 11 - 12, 2014.

212. Dr. Ashish K Upadhyay, IIT Patna, June 25 - July 3, 2014.

213. Dr. Chaitanya Senapathi, TIFR, Mumbai, July 7 - 14, 2014.

214. Prof. Neela Nataraj, IIT Bomay, Mumbai, July 7 - 14, 2014.

215. Prof. P. P. Divakaran, CMSc, Chennai, July 17, 2014.

216. Prof. Sunder Sethuraman, Univ. of Arizona, USA, July 15, 2014.

217. Prof. Rahul Roy, ISI, Delhi, July 17, 2014.

218. Prof. Charles Bordenave, Univ. de Tolouse, France, July 24, 2014.

219. Dr. Snigdnayan Mahanta, Uni of Muenster, July 25 - 28, 2014.

220. Prof. Emmanuel Kwame Essel, Univ. of Cape Coast, Ghana, July 31, 2014.

221. Prof. LUZ Roncal Gomez, Univ dela Rioja, Spain, Aug. 1 - Sept. 10, 2014.

222. Dr. Saurabh Srivastava, IISER, Bhopal, Aug. 3 - 9, 2014.

223. Prof. Subhroshekar Ghosh, IEOR Dept, Princeton, USA, Aug. 4 - 17, 2014.

224. Prof. Ali Baklouti, Univ of Sfax, Tunisia, Aug. 8 - Sept. 7, 2014.

225. Prof. Radouan Daher, Univ of Casablanca, Morocco, Aug. 19 - 28, 2014.

226. Dr. R. S. Kulkarni, Bhaskaracharya, Pune, Aug. 28 - 30, 2014.

227. Prof. Raju K George, IIST, Trivandrum, Sept. 15 - 24, 2014.

228. Dr. Rahul Garg, Technion Haifa, Israel, Sept. 22 - Oct. 1, 2014.

229. Prof. G. K. Basak, ISI, Kolkata, Sept. 30 - Oct. 7, 2014.

230. Prof. Koushik Ramachandran, ISI, Bangalore, Aug. 18, 2014.

231. Prof. Srikanth Tupurani, IMSc., Chennai, Sept. 22, 2014.

232. Prof. I. D. Dhariyal, Chennai Mathematical Instt., Chennai, Oct. 1 - 5, 2014.

233. Prof. Siefried Bocherer, Univ. of Mannheium, Germany, Oct. 12 - 28, 2014.

234. Prof. Parameshwaran Sankaran, IMSc., Chennai, Oct. 14, 2014.

235. Dr. Jonathan Spreer, Univ. of Queensland, Australia, Oct. 27 - Nov. 21, 2014.

236. Prof. Benjamin A. Burton, Univ. of Queensland, Australia, Nov. 2 - 21, 2014.

237. Dr. Prihwit De, TIFR Mumbai, Nov. 8 - 11, 2014.

238. Prof. A. Raghuram, IISER, Pune, Oct. 16 - 18, 2014.

239. Dr. Satyabrata Das, Research Associate, West Bengal, Oct. 16 - 23, 2014.

240. Mr. Thibant Gascuel, INSA of RENNES, France, Oct. 20 - Dec. 31, 2014.

241. Prof. Krishna Maddaly, IMSc, Chennai, Nov. 18 - 19, 2014.

242. Prof. Jean-Baptiste Gatsinzi, Univ. of Namibia, Namibia, Nov. 18 - Dec. 16, 2014.

243. Prof. Divakar Viswanath, Univ of Machigan, USA, Nov. 24, 2014.

244. Prof. M. S. Raghunathan, TIFR, Mumbai, Nov. 24, 2014.

245. Dr. Hari Shankar Mahato, Univ. of Erlancen, Germany, Dec. 7 - 9, 2014.

246. Dr. Priyanka Grover, ISI, Delhi, Dec. 8 - 19, 2014.

247. Prof. Susanne Brenner, Lousiana State Univ., USA, Dec. 16 - 21, 2014.

248. Prof. Neela Nataraj, IIT Bombay, Mumbai, Dec. 16 - 21, 2014.

249. Prof. M. Cowling, Univ of N S W, Sydney, Dec. 16 - 18, 2014.

250. Dr. Rupanwita Gayen, IIT Kharagpur, Dec. 19 - 25, 2014.

251. Dr. Atul Dixit, Tulane Univ. USA, Dec. 22 - 25, 2014.

252. Prof. Nayantara Bhatnagar, Univ. of Delaware, USA, Dec. 28, 2014 - Jan. 4, 2015.

253. Prof. Mahan Mj., Vivekananda University, Howrah, Dec. 31, 2014 - Jan 5, 2015.

254. Prof. Nayantara Bhastnagar, University of Delaware, USA, Dec. 29, 2014 - Jan. 08, 2015.

255. Dr. Eichanan Mossel, Univ. of Pennsylvania on Jan. 05, 2015

256. Dr. Mahesh Kakde, Kings College, London, Jan. 05 - 06, 2015

257. Prof. B. P. Purna Prajna, Univ. of Kansas, USA, on Jan. 09, 2015

258. Prof. Alladi Sitaram, ISI, Bangalore, on Jan. 16, 2015.

259. Dr. Sandeep Varma, TIFR Mumbai, Jan. 29 - 30, 2015

260. Prof. Christian Berg, Univ. of Copenhagen, Denmark, Feb. 04 - 07, 2015.

261. Prof. K. R. Parthasarathy, ISI, New Delhi, on Feb. 13, 2015.

262. Prof. Carsten Carstensen, Humbpldt University, Germany, Feb. 20 - 22, 2015.

263. Prof. Martin Krenzer, Universitit Passan, Germany, Feb 15 - Mar. 5, 2015.

264. Dr. Jerome Berfrand, Universite Paul Sabatier, France, on Feb. 05, 2015.

265. Prof. Ronald G Douglas, Texas & M University, USA, Mar. 07 - 22, 2015.

266. Prof. P. K. Ratnakumar, HRI, Allahabad, on Mar. 12, 2015.

267. Dr. Amita Malik, Univ. of Illinos at Urbana Champaign, USA, on Mar. 18, 2015.

268. Dr. Soumya Bhattacharya, CIRM, Trento, Italy, on Mar. 20, 2015.

Visitors for the period April 2015-December 2015

269. Dr. Swagata Sarkar, ISI, Kolkata, Mar. 15 - April 30, 2015.

270. Dr. Siddhartha Chakrabarty, IIT Guwahati, Mar. 28 - April 05, 2015.

271. Dr. Yogeshwaran, D., ISI, Bangalore, Apr. 06, 2015.

272. Prof. Maris Trybula, Fac. of Math & Comp. Sci, Jagiellonian, Polland, Apr. 13 - 26, 2015.

273. Dr. Doyel Kayal, ISI, Kolkata, Apr. 19 - 20, 2015.

274. Prof. Ratna Ghosh, Jadavpur University, Kolkata, May. 10 - 21, 2015.

275. Prof. K. N. Raghavan, IMSc, Chennai, May. 12 - 13, 2015.

276. Dr. Sudeshna Basu, George Washington Univ. Washington DC, USA, June 1 - 15, 2015.

277. Prof. Alladi Sitaram, ISI, Bangalore, June 15 - Aug. 15, 2015.

278. Dr. Muzibur Rahman, Asst. Professor, Aligarh Muslim Univ. India, June 3 - 5, 2015.

279. Dr. Wajih Ashraf, Aligarh Muslim Univ., India, June 3 - 5, 2015.

280. Dr. Subhroshekar Ghosh, Princeton, USA, June 5 - 10, 2015.

281. Dr. P. K. Sanjay, NIT Calicut, Kerala, June 11 - July 24, 2015.

282. Dr. Rizwanur Khan, Texas A & M Univ. at Qatar, June 19, 2015.

283. Prof. Koushik Ramachandran, ISI, Bangalore, June 24, 2015.

284. Dr. Sivaram Ambikarasan, N Y U, June 24, 2015.

285. Prof. Riddhi Shah, JNU, New Delhi, June 25, 2015.

286. Dr. Dinesh Kumar Keshari, ISI Bangalore, June 26 to July 5, 2015.

287. Dr. Dilbag Singh, Panjab Univ., Chandigarh, July 12 - 18, 2015.

288. Dr. Shibananda Biswas, IISER, Kolkata, June 22 - July 5 , 2015.

289. Dr. Subraya Shyam Roy, IISER, Kolkata, June 22 - July 5 , 2015.

290. Dr. Vamsi Pingali, John Hopking Univ. of Baltimore, USA, July 1 - 3, 2015.

291. Mr. Sourav Sarkar, ISI Kolkata, July 20 - 28, 2015.

292. Prof. Angela Pasquale, Univ. of Lorraine, Metz, France, Aug. 4 - 19, 2015.

293. Prof. Anita Naolekar, ISI Bangalore, Aug. 5 - 26, 2015.

294. Prof. Youssef Ouknine, Univ. of Cadi Ayyed, Morocco, Aug. 07, 2015.

295. Dr. Jonathan Fernandes, Univ. of Maryland College of Para, Aug. 14, 2015.

296. Prof. Nayantara Bhatnagar, Univ. of Delaware, USA during Aug. 16 - 21, 2015.

297. Prof. Amritasau Prasad, IMSc, Chennai, Aug. 17 - 18, 2015.

298. Prof. Siegfried Bocherer, Univ. Mannheim, Germany, Aug. 24 - Sept. 7, 2015.

299. Prof. Malabika Pramanik, UBC, Canada, July 15 - Aug. 15, 2015.

300. Prof. Angela Pasqule, Univ of Levraine, France, Aug. 4 - 19, 2015.

301. Dr. A. Dasgupta, EPFL, Lausanne, Switzerland Aug. 18 - 21, 2015.

302. Dr. Jotsaroop Kaur, Univ. of Milano, Italy, Aug. 19 - 24, 2015.

303. Dr. Kui Ji, Hebei Normal Univ. Shijiazhuang, China, Sept. 15 - Nov. 11, 2015.

304. Dr. Aprameyan Parthasarathy, Univ of Paderbonn, Germany, Sept. 30 - Oct. 01, 2015.

305. Prof. Siva Athreya, ISI, Bangalore Sept. 21, 2015.

306. Dr. Safdar Quddus, NISER, Odisha, Oct. 4 - 10, 2015.

307. Prof. K. Sandeep, TIFR-CAM, Bangalore, Oct. 16, 2015.

308. Prof. Tanmoy Som, IIT Varanasi, Oct. 19 - 20, 2015.

309. Prof. Marie Kratz, France (visiting Professor IIM Bangalore), Oct. 26, 2015.

310. Prof. Benjamin A. Burton, The Univ. of Queensland, Australia, Nov. 01 - 13, 2015.

311. Prof. Sutanu Roy, Univ. of Ottawa, Canada during Nov. 04 - 09, 2015.

312. Prof. Raphael Chetrite, Univ. Sophia, Antipolls, France, Nov. 05, 2015.

313. Dr. Jonathan Spreer, The Univ. of Queensland, Australia, Nov. 2 - 13, 2015.

314. Dr. Manish Mishra, Univ of Heidelberg, Germany, Nov. 16 - 18, 2015.

315. Prof. Kyoung Seog Lee, KIAS, Korea, during Nov. 14 - 21, 2015.

316. Prof. Patrice Philippen, Inst. of Mathematique, Paris, France, Nov. 21 - Dec. 13, 2015.

317. Dr. Vikash Singh, Univ. of Paris Sud, France, Nov. 26, 2015.

318. Dr. Somnath Jha, IIT Kanpur, during Nov. 28 - Dec. 05, 2015.

319. Dr. Ritwik Mukharjee, TIFR Mumbai, on 01.12.2015.

320. Prof. Ali Baklouti, Univ. of Sfax, Sfax, Tunisia Dec. 01 - 09, 2015.

321. Dr. K. R. Arun, IISER Trivandrum, Dec. 16 - 20, 2015.

322. Prof. Amritanshu Prasad, IMSc, Chennai, Dec. 18 - 19, 2015.

323. Prof. G. B. Folland, Washington Univ., Seattle, USA, Dec. 13 - 31, 2015.

324. Prof. Bruno Kahn, University of Paris VI, France, Dec. 20, 2015 - Jan. 05, 2016.