

DST - SERC School on Nonlinear Dynamics-Dec. 04 -24, 2011

Sr. No.	Speakers	Topics	Date
1	R.E.Amritkar, PRL, Ahmedabad (5 LH + 3 TH)	Discrete, continuous, linear and nonlinear dynamical systems, Phase space, trajectories, critical points; classification of critical points in 2D, linear stability analysis; stable unstable and center manifolds, conservative and dissipative dynamical systems, attractors: fixed point, limit cycle, higher dimensional attractors, Hopf bifurcation	5 - 8 Dec 11
2	Soumitro Banerji, IISER, Kolkatta (5 LH + 3 TH)	1D maps: shift, tent, logistic maps. Period doubling route to chaos, intermittency, Lyapunov exponent, sensitive dependence on initial conditions, invariant density, Frobenius-Perron equation, 2D maps: Baker, Cat maps, routes to Chaos in dissipative systems, duffing oscillator, elementary bifurcations: tangent, transcritical, pitchfork.	5 - 7 Dec 11
3	M.S.Santhanam, IISER, Pune (2 LH + 4 Lab.)	Computer lab. for basic course	6 -10&13 Dec 11
4	Amit Apte, TIFR - CAM, Bangalore (4 LH + 2 TH + 1 Lab.)	Standard map, twist map, KAM theorem, Poincare-Birkhoff theorem, resonances, Chirikov criterion, Green's residue theorem. Fermi Map.	8 - 10 Dec 11
5	Sudhir Jain, BARC, Mumbai (3LH + 2 TH)	Hamiltonian dynamics: Action-angle variables, Liouville integrability, quasi-periodicity, Poincare sections, invariant tori, etc. symmetries, invariance and constant motion.	8 - 10 Dec 11
6	Govindan Rangarajan, IISc, Banagalore (4 LH + 1 Lab.)	Characterisation and Time series: Characterization methods: Coarse graining,fractals, generalized dimensions, Kolmogorov-Sinai entropy, correlation and information dimensions. Attractor reconstruction.	12 - 13 Dec 11
7	M. Lakshmanan, Bharatisadan Univ., Trichi (5 LH)	Finite dimensional dynamical systems(ODE-s), PDE(s); application to linear and nonlinear dispersive waves; solitary waves and solitons, NLS and Sine-Gordon equations, infinite number of constants of motion, complete integrability.	12 - 14 Dec 11

8	K.Krishnakumar, IIT Kharagpur (3 LH)	Fluid dynamics, Euler and Lagrangian description, Euler equation, Navier-Stokes equation, Vorticity.	13 - 15 Dec 11
9	A.D.Gangal, IISER, Pune (6 LH + 2 TH)	Stochastic Differential Equations - Introduction to random motion and noisy dynamical systems, Review of probability distributions. Stable and infinitely divisible distributions. Stochastic processes. Markov chains and Markov processes. Chapman-Kolmogorov equation. Master equation, Fokker-Planck equation. Langevin equation, Elements of Mathematical Brownian motion and Ito calculus; geometric Brownian motion; Black-Scholes equation; Anomalous diffusion; Levy flights and fractional Brownian motion.	14 - 17&20 Dec 11
10	Chandan Dasgupta, IISc, B'lore (2 LH)	Rheological Chaos in driven complex Fluids	15 - 16 Dec 2011
11	K.P.N. Murthy, Hyderabad (2 LH + 2 Lab.)	Computer lab. - Stochastic Differential Equation	15 - 17 Dec 11
12	R. Aditi Simha, IIT, Chennai (2 LH + 1 TH)	Rheochaos, jerky flows and active fluids.	16 - 17 Dec. 11
13	K. Murali, Anna Univ., Chennai (1 LH + 2 Lab.)	Electronics Lab.	19 - 20 Dec 11
14	Abhishek Dhar, RRI, Bangalore (5 LH + 4 TH)	Approach to equilibrium, linear response theory, Fluctuation-dissipation theorems, Kubo-Green formulas for response functions, (classical and quantum cases).	19 - 22 Dec 11
15	Neelima Gupte, IIT, Chennai (3 LH + 1 TH)	Stochastic Partial Differential Equation,	19&23 - 24 Dec 11
16	Pranay Goel, IISER, Pune (1 Lab.)	Electricity in the brain: the mathematical basis of how we think	21 Dec. 11
17	H. Bhate, UoP, Pune (2 LH)	Lagrangian coherent structures	21 Dec. 11
18	P.B. Sunilkumar, IIT, Chennai (1 LH + 1 Lab.)	Rheochaos, jerky flows and active fluids.	22 Dec. 11

19	Shyamal Dana, Indian Institute of Chemical Biology, Kolkatta (1 LH + 1 Lab.)	Chaos & Synchronization in circuits - Electronics Lab.	23 - 24 Dec 11
20	Prodyot Kumar Roy, Presidency University, Kolkata (1 Lab.)	Laser Chaos Lab.	24 Dec. 11

Special Lectures

Sr. No.	Speakers	Topics	Date and Time	Venue
1	Ramakrishna Ramaswamy, University of Hyderabad, H'bad	Amplitude Death: The emergence of stationarity in coupled nonlinear systems	05.12.11 09:00 - 10:00	C 201, IISER Campus
2	Rajaram Nityananda, NCRA, Pune	Nonlinear dynamics of planetary and stellar systems	05.12.11 05:30 - 06:30	C 201, IISER Campus
3	B.N. Goswami, IITM, Pune	Predictability of the Indian Summer Monsoon	07.12.11 04:30 - 05:30	Raman Hall, Sai Trinity Campus
4	A.K.Sood, IISc, Bangalore	Rheo-Chaos, Elastic Turbulence and Non-equilibrium Fluctuation Relation in Sheared Soft Matter	12.12.11 10:00 - 11:00	C 201, IISER Campus
5	Somdatta Sinha, CCMB, H'bad	Nonlinear Dynamics in Biochemical Pathways	12.12.11 04:30 - 05:30	C 201, IISER Campus
6	Sanjay Puri, JNU, New Delhi	Pattern Formation in Granular Materials	13.12.11 03:00 - 04:00	Raman Hall, Sai Trinity Campus
7	Sushanta Dattagupta, IISER, Kolkata	Fractal Pattern Formation in Bacterial Colony	15.12.11 11:30 - 12:30	C 201, IISER Campus
8	Sudeshna Sinha, IISER Mohali	The concept of Logical Stochastic Resonance	19.12.11 05:30 - 06:30	Raman Hall, Sai Trinity Campus

9	T. Padmanabhan, IUCAA, Pune	Gravity : Fluid Mechanics of Spacetime	21.12.11 5:30 - 06:30	Raman Hall, Sai Trinity Campus
10	Tarun Souradeep, IUCAA, Pune	Measuring Cosmo-dynamics	23.12.11 05:30 - 06:30	Raman Hall, Sai Trinity Campus

Schedule

05 - 11, December 2011

Time Date	09:00 - 10:00	10:00 - 11:00	11:00 - 11:30	11:30 - 12:30	12:30 - 02:00	2:00 - 3:00	3:00 - 4:00	4:00 - 4:30	4:30 - 5:30	5:30 - 6:30
05.12.2011 (Monday)	RR (C201)	SB L1 (C201)	Tea Break	REA L1 (C201)	Lunch Break	SB L2 (C201)	REA L2 (C201)	Tea Break	SB T1 (C201)	RN (C201)
06.12.2011 (Tuesday)	SB L3 (C201)	REA L3 (C201)	Tea Break	SB L4 (C201)	Lunch Break	SB T2 (RH)	MSS L1 (RH)	Tea Break	MSS L2 (RH)	Comp. Lab.(MSS) (212)
07.12.2011 (Wednesday)	SB L5 (C301)	REA T1 (C301)	Tea Break	SB T3 (C201)	Lunch Break	REA L4 (RH)	REA T2 (RH)	Tea Break	BNG (RH)	
08.12.2011 (Thursday)	SJ L1 (C201)	REA L5 (C201)	Tea Break	REA T3 (C201)	Lunch Break	SJ L2 (RH)	Computer Laboratory (MSS) (3 hours)(212)			

09.12.2011 (Friday)	SJ L3 (C201)	AA L1 (C201)	Tea Break	SJ T1 (C201)	Lunch Break	AA T1 (C201)	Computer Laboratory (MSS) (3 hours) (212)			
10.12.2011 (Saturday)	AA L2 (C201)	SJ T2 (C201)	Tea Break	AA L3 (C201)	Lunch Break	AA L4 (RH)	AA T2 (RH)	Computer Laboratory (MSS/AA) (2 hours)(212)		

- **11th December 2011 – Trip to GMRT and Girawali**

12 - 18, December 2011

Time Date	09:00 – 10:00	10:00 – 11:00	11:00 – 11:30	11:30 – 12:30	12:30 – 02:00	2:00 – 3:00	3:00 – 4:00	4:00 – 4:30	4:30 – 5:30	5:30 – 6:30
12.12.2011 (Monday)	ML L1 (C201)	AKS (C201)	Tea Break	GR L1 (C201)	Lunch Break	ML L2 (C201)	GR L2 (C201)	Tea Break	SS (C201)	
13.12.2011 (Tuesday)	ML L3 (C201)	GR L3 (C201)	Tea Break	KK L1 (C201)	Lunch Break	GR L4 (RH)	ML L4 (RH)	Computer Laboratory(GR/MSS) (3 Hours)(212)		
14.12.2011 (Wednesday)	ML L5 (C201)	KK L2 (C201)	Tea Break	ADG L1 (C201)	Lunch Break	MCQ TEST (RH)	SP L1 (RH)	Tea Break	Lab. (212)	Cultural Program (C201)
15.12.2011 (Thursday)	KK L3 (C201)	ADG L2 (C201)	Tea Break	SDG (C201)	Lunch Break	CDG L1 (C201)	ADG L3 (C201)	Tea Break	ADG T1 (C201)	KPN (C201)

16.12.2011 (Friday)	CDG L2 (C201)	AS L1 (C201)	Tea Break	ADG T2 (C201)	Lunch Break	KPN L1 (RH)	Computer Laboratory (KPN) (3 hours) (212)
17.12.2011 (Saturday)	ADG L4 (C201)	AS L2 (C201)	Tea Break	AS T1 (C201)	Lunch Break	ADG L5 (RH)	Computer Laboratory (KPN) (3 hours) (212)

- **18th December 2011 – Trip to Sinhgad**

19 - 24, December 2011

Time Date	09:00 – 10:00	10:00 – 11:00	11:00 – 11:30	11:30 – 12:30	12:30 – 02:00	2:00 – 3:00	3:00 – 4:00	4:00 – 4:30	4:30 – 5:30	5:30 – 6:30
19.12.2011 (Monday)	NG L1 (C201)	AD L1 (C201)	Tea Break	AD L2 (C201)	Lunch Break	KM (RH)	Electronics Laboratory (KM)(2 hours)(214)		SS' (RH)	
20.12.2011 (Tuesday)	AD L3 (C201)	ADG L6 (C201)	Tea Break	AD T1 (C201)	Lunch Break	Electronics Laboratory (KM) (4 hours)(214)				
21.12.2011 (Wednesday)	AD L4 (C201)	HB L1 (C201)	Tea Break	HB L2 (C201)	Lunch Break	AD T2 (RH)	Computer Laboratory(PG) (2 hours)(RH)	TP (RH)		
22.12.2011 (Thursday)	AD L5 (C201)	AD T3 (C201)	Tea Break	SK L1 (C201)	Lunch Break	Computer Laboratory (SK) (4 hours)(212)				

23.12.2011 (Friday)	NG L2 (C201)	AD T4 (C201)	Tea Break	SD (C201)	Lunch Break	Electronics Laboratory (Dana) (2 hours)(214)	TS (RH)
24.12.2011 (Saturday)	NG L3 (C201)	NG T1 (C201)	Elec. Lab (PR) (212)		Lunch Break	Concluding Session (C201)	

1. C201 – Lecture hall, 1st Floor, New hostel, IISER Campus
C301 – e-classroom, 2nd Floor, New hostel, IISER Campus
2. RH – Raman Hall, 1st Floor, Sai Trinity Campus
Lecture 1, 2, 3
3. 212 – Computer Lab., 2nd Floor, Sai Trinity Campus
4. 214 – Physics Lab., 2nd Floor, Sai Trinity Campus

L1, L2, L3 ...– Lecture 1, 2, 3
T1, T2, T3 – Tutorial 1, 2, 3
SL1, SL2, SL3 . – Special

List of Speakers

1. RR – Ram Ramaswamy
2. REA – R.E.Amritkar
3. SB – Soumitro Banerjee
4. MSS – M. S. Santhanam
5. SJ – Sudhir Jain
6. AA – Amit Apte
7. ML – M. Lakshmanan
8. GR – Govindan Rangarajan
9. KK – K.Krishnakumar
10. ADG – A.D.Gangal
11. CDG – Chadan Dasgupta

12. KPN – K. P. N. Murthy
13. AS – R. Aditi Simha
14. KM – K. Murali
15. AD – Abhishek Dhar
16. NG – Neelima Gupte
17. HB – Hemant Bhate
18. SK – P. B. Sunilkumar
19. SD – Syamal Dana
20. PR – Pradyot Kumar Roy
21. RN – Rajaram Nityananda
22. BNG – B. N. Goswami
23. AKS – A. K. Sood
24. SS – Somdatta Sinha
25. SP – Sanjay Puri
26. PG – Pranay Goel
27. SDG – Sushanta Dattagupta
28. SS' – Sudeshna Sinha
29. TP – T. Padmanabhan
30. TS – Tarun Souradeep