

## Amit Apte

International Centre for Theoretical Sciences, Tata Institute of Fundamental Research

Survey No. 151, Shivakote, Hesaraghatta Hobli, Bengaluru North 560089 India

Office: +91 80 4653 6230; Email: [apte@icts.res.in](mailto:apte@icts.res.in); Web: <https://www.icts.res.in/people/amit-apte>

ORCID: [0000-0002-3632-7553](https://orcid.org/0000-0002-3632-7553); Google scholar: [2x7ZjrIAAAAJ](https://scholar.google.com/citations?user=2x7ZjrIAAAAJ); Mathscinet: [716018](https://mathscinet.org/716018)

### EDUCATION

- The University of Texas at Austin, Texas, USA; Ph.D., Physics, May 2004  
Dissertation: “Numerical studies of the standard nontwist map and a renormalization group framework for breakup of invariant tori”; Supervisor: [Philip J. Morrison](#)
- Indian Institute of Technology, Kanpur, India; M.Sc., Physics, May 1996

### EMPLOYMENT

- International Centre for Theoretical Sciences, Tata Institute of Fundamental Research, Bangalore, India: *Associate professor*, Jan 2016 - present; *Reader*, Aug 2013 - Dec 2015
- Center for Applicable Mathematics, Tata Institute of Fundamental Research, Bangalore, India: *Reader*, Aug 2011 - Jul 2013, *Fellow*, Jul 2007 - Jul 2011
- Mathematical Sciences Research Institute (MSRI), Berkeley CA, USA: *Postdoctoral fellow*, Jan - May 2007
- Department of Mathematics, University of North Carolina, Chapel Hill NC, USA: *Postdoctoral researcher*, Aug - Dec 2006
- Statistical and Applied Mathematical Sciences Institute (SAMSI), Durham NC, USA: *Postdoctoral fellow*, Jan 2005 - Aug 2006
- University of Texas, Austin TX, USA: *Teaching, Research assistant*, Aug 1996 - May 2004

### RESEARCH INTERESTS

APPLIED MATHEMATICS: Data assimilation; Monsoon modelling; Particle and Kalman filtering; Dynamical systems; Hamiltonian systems; Renormalization group and transition to chaos;

PUBLICATIONS: *Refereed - journal and conference (5 significant ones in bold)*

Recent (since Jan 2016)

30. S. Ganapa, A. Apte, A. Dhar, “Thermalization of local observables in the  $\alpha$ -FPUT chain,” *Journal of Statistical Physics* v.180, pp.1010–1030 (2020) [doi:10.1007/s10955-020-02576-2](https://doi.org/10.1007/s10955-020-02576-2)
29. A.S. Reddy, A. Apte, S. Vadlamani, “Asymptotic Properties of linear filter for deterministic processes,” *Systems & Control Letters* v.139, pp.104676 (2020) [doi:10.1016/j.sysconle.2020.104676](https://doi.org/10.1016/j.sysconle.2020.104676)
28. **A. Mitra, A. Apte, R. Govindarajan, V. Vasan, S. Vadlamani, “Spatio-temporal patterns of daily Indian summer monsoon rainfall,” *Dynamics and Statistics of the Climate System* v.3, dzy010 (2018) [doi:10.1093/climsys/dzy010](https://doi.org/10.1093/climsys/dzy010)**
27. A. Mitra, A. Apte, R. Govindarajan, V. Vasan, S. Vadlamani, “A discrete view of the Indian monsoon to identify spatial patterns of rainfall,” *Dynamics and Statistics of the Climate System* v.3, dzy009 (2018) [doi:10.1093/climsys/dzy009](https://doi.org/10.1093/climsys/dzy009)

26. A. Apte, D. Auroux, M. Ramaswamy, “Observers for compressible Navier-Stokes equation,” *SIAM Journal on Control and Optimization* v.56, pp.1081-1104 (2018) [doi:10.1137/16M1060601](https://doi.org/10.1137/16M1060601)
25. A. Mitra, A. Apte, R. Govindarajan, V. Vasani, S. Vadlamani, “Tracking the propagation of planetary scale cloud zones over Indian ocean and south Asia with Markov random fields,” in V. Lyubchich, N.C. Oza, A. Rhines, and E. Szekely (editors), *Proceedings of the 7th International Workshop on Climate Informatics: CI 2017*, pp.9-12 (2017) [doi:10.5065/D6222SH7](https://doi.org/10.5065/D6222SH7)
24. A. Mitra, A. Apte, R. Govindarajan, V. Vasani, S. Vadlamani, “Finding active and break spells of Indian monsoon by Markov random fields,” in V. Lyubchich, N.C. Oza, A. Rhines, and E. Szekely (editors), *Proceedings of the 7th International Workshop on Climate Informatics: CI 2017*, pp.5-8 (2017) [doi:10.5065/D6222SH7](https://doi.org/10.5065/D6222SH7)
23. M. Ray, A. Amodkar, A. Apte, “Data assimilation with Chua’s circuit,” *Indian Academy of Sciences Conference Series* v.1, pp.25-34 (2017) [webpage](#)
22. K.S. Gurumoorthy, C. Grudzien, A. Apte, A. Carrassi, C.K.R.T. Jones, “Rank deficiency of Kalman error covariance matrices in linear time-varying system with deterministic evolution,” *SIAM Journal on Control and Optimization* v.55, pp.741-759 (2017) [doi:10.1137/15M1025839](https://doi.org/10.1137/15M1025839)
21. **M. Bocquet, K.S. Gurumoorthy, A. Apte, A. Carrassi, C. Grudzien, C.K.R.T. Jones, “Degenerate Kalman filter error covariances and their convergence onto the unstable subspace,” *SIAM/ASA Journal on Uncertainty Quantification* v.5, pp.304-333 (2017) [doi:10.1137/16M1068712](https://doi.org/10.1137/16M1068712)**

Bygone (before Jan 2016)

20. L.C. Slivinski, E.T. Spiller, A. Apte, “A hybrid particle-ensemble Kalman filter for high-dimensional Lagrangian data assimilation,” in S. Ravela, A. Sandu (editors), *Dynamic Data-Driven Environmental Systems Science DyDESS 2014*, Lecture Notes in Computer Science v.8964, pp 263–273 (2015) [doi:10.1007/978-3-319-25138-7\\_24](https://doi.org/10.1007/978-3-319-25138-7_24)
19. A. Apte, “An introduction to data assimilation,” in S. Sarkar, U. Basu, S. De (editors), *Applied Mathematics*, Springer Proceedings in Mathematics & Statistics v.146, pp.31–42 (2015) [doi:10.1007/978-81-322-2547-8\\_4](https://doi.org/10.1007/978-81-322-2547-8_4)
18. L. Slivinski, E.T. Spiller, A. Apte, and B. Sandstede, “A hybrid particle-ensemble Kalman filter for Lagrangian data assimilation,” *Monthly Weather Review* v.143, pp.195–211 (2015) [doi:10.1175/MWR-D-14-00051.1](https://doi.org/10.1175/MWR-D-14-00051.1)
17. E.T. Spiller, A. Apte, C.K.R.T. Jones, “Assimilating en-route Lagrangian observations,” *Tellus A: Dynamic Meteorology and Oceanography* v.65, pp.20319 (2013) [doi:10.3402/tellusa.v65i0.20319](https://doi.org/10.3402/tellusa.v65i0.20319)
16. **A. Apte, C.K.R.T. Jones, “The impact of nonlinearity in Lagrangian data assimilation,” *Nonlinear Processes in Geophysics* v.20, pp.329–341 (2013) [doi:10.5194/npg-20-329-2013](https://doi.org/10.5194/npg-20-329-2013)**
15. Md. Nurujjaman, A. Apte, P. Vinayachandran, “Data assimilation using ensemble transform Kalman filter (ETKF) in ROMS model for Indian Ocean,” *European Physical Journal Special Topics* v.222, pp.875-883 (2013) [doi:10.1140/epjst/e2013-01890-3](https://doi.org/10.1140/epjst/e2013-01890-3)

14. Md. Nurujjaman, S. Shivamurthy, A. Apte, T. Singla, P. Parmananda, "Effect of discrete time observations on synchronization in Chua model and applications to data assimilation," *Chaos* v.22, pp.023125 (2012) [doi:10.1063/1.4712591](https://doi.org/10.1063/1.4712591)
13. A. Apte, "Renormalization group operators for maps and universal scaling of universal scaling exponents," *Physica D: Nonlinear Phenomena* v.240, pp.317-322 (2010) [doi:10.1016/j.physd.2010.09.005](https://doi.org/10.1016/j.physd.2010.09.005)
12. A. Apte, D. Auroux, M. Ramaswamy, "Variational data assimilation for discrete Burgers equation," *Electronic Journal of Differential Equations, Conference* v.19, pp.15-30 (2010) [webpage](#)
11. **A. Apte, C.K.R.T. Jones, A. M. Stuart, J. Voss, "Data assimilation: mathematical and statistical perspectives,"** *Int. J. Numer. Methods in Fluids* v.56, pp.1033-1046 (2008) [doi:10.1002/fld.1698](https://doi.org/10.1002/fld.1698)
10. A. Apte, C.K.R.T. Jones, A. M. Stuart, "A Bayesian approach to Lagrangian data assimilation," *Tellus A: Dynamic Meteorology and Oceanography* v.60, pp.336-347 (2008) [doi:10.1111/j.1600-0870.2007.00295.x](https://doi.org/10.1111/j.1600-0870.2007.00295.x)
9. T.B. Krause, A. Apte, P.J. Morrison, "A unified approach to the Darwin approximation," *Physics of Plasmas* v.14, pp.102112 (2007) [doi:10.1063/1.2799346](https://doi.org/10.1063/1.2799346)
8. **A. Apte, M. Hairer, A. M. Stuart, J. Voss, "Sampling the posterior an approach to non-Gaussian data assimilation,"** *Physica D: Nonlinear Phenomena* v.230, pp.50-64 (2007) [doi:10.1016/j.physd.2006.06.009](https://doi.org/10.1016/j.physd.2006.06.009)
7. K. Fuchss, A. Wurm, A. Apte, P.J. Morrison, "Breakup of shearless meanders and 'outer' tori in the standard nontwist map," *Chaos* v.16, pp.033120 (2006) [doi:10.1063/1.2338026](https://doi.org/10.1063/1.2338026)
6. A. Apte, R. de la Llave, E. Petrisor, "Comment on 'Reconnection scenarios ...,' *Chaos Solitons and Fractals* 2002;10(1):117-127," *Chaos, Solitons & Fractals* v.27, pp.1115-1116 (2006) [doi:10.1016/j.chaos.2004.12.018](https://doi.org/10.1016/j.chaos.2004.12.018)
5. A. Wurm, A. Apte, K. Fuchss, P.J. Morrison, "Meanders and reconnection-collision sequences in the standard nontwist map," *Chaos* v.15, pp.023108 (2005) [doi:10.1063/1.1915960](https://doi.org/10.1063/1.1915960)
4. A. Apte, R. de la Llave, N.P. Petrov, "Regularity of critical invariant circles of the standard nontwist map," *Nonlinearity* v.18, pp.1173-1187 (2005) [doi:10.1088/0951-7715/18/3/013](https://doi.org/10.1088/0951-7715/18/3/013)
3. A. Apte, A. Wurm, P.J. Morrison, "Renormalization for breakup of invariant tori," *Physica D: Nonlinear Phenomena* v.200, pp.47-59 (2005) [doi:10.1016/j.physd.2004.09.010](https://doi.org/10.1016/j.physd.2004.09.010)
2. A. Wurm, A. Apte, P.J. Morrison, "On reconnection phenomena in the standard nontwist map," *Brazilian Journal of Physics* v.34, pp.1700-1706 (2004) [doi:10.1590/S0103-97332004000800035](https://doi.org/10.1590/S0103-97332004000800035)
1. A. Apte, A. Wurm, P.J. Morrison, "Renormalization and destruction of  $1/\gamma^2$  tori in the standard nontwist map," *Chaos* v.13, pp.421-433 (2003) [doi:10.1063/1.1555472](https://doi.org/10.1063/1.1555472)

PUBLICATIONS: *Submitted, in preparation*

2. A.S. Reddy, A. Apte, "Stability of non-linear filter for deterministic dynamics," [arxiv:1910.14348](https://arxiv.org/abs/1910.14348)
1. A. Ghosh, S. Bhattacharyya, S. Sinha, A. Apte, "Parameter estimation in models with complex dynamics," [arxiv:1705.03868](https://arxiv.org/abs/1705.03868)

PUBLICATIONS: *Non-refereed, proceedings, reports*

5. **Hans Engler, Amit Apte, Pedro Leite Da Silva Dias, Maria J. Esteban, Edward Lungu, Claudia Sagastizábal, "Mathematicians and planetary challenges,"**

- in *Proceedings of the International Congress of Mathematicians (ICM 2018)*, pp.1111-1123 (2019) [doi:10.1142/9789813272880\\_0039](https://doi.org/10.1142/9789813272880_0039)
4. **Mathematics of planet earth 2013: “An interactive exhibition: mathematics for the billion” - ICTS website and Exhibition booklet**
  3. A. Apte, Ravi Nanjundiah, Vijay Chandru, Roddam Narasimha, Spenta Wadia, “Report of the ICTS program ‘Scientific discovery through intensive exploration of data’,” Submitted to the Scientific Advisory Committee to the Prime Minister of India, Apr 2011, and a shortened version to *Current Science*; <http://sactopm.gov.in/SAC.PM.AR2011.pdf> or [link to archived version](#) pp.91-98
  2. A. Apte, C.K.R.T. Jones, A. M. Stuart, “A Bayesian approach to Lagrangian data assimilation: Langevin sampling and model error,” *Proceedings of the International Conference on Recent Developments in Nonlinear Systems and Dynamics*, Bharathidasan University, Tiruchirapalli, India, Feb 2008
  1. A. Apte, “Wave–mean–flow interaction in Oldroyd-B fluid,” *Proceedings of the 2003 Program in Geophysical Fluid Dynamics* Woods Hole Oceanographic Institution, Woods Hole, MA 02543 USA [Proceedings Volume 2003](#)

SUPERVISION AND COLLABORATION [*last known affiliation, if known, in brackets*]

- **PH.D. STUDENTS:**
  - Recent (since Jan 2016)
  - Shashank Roy, 2023, expected;
  - Pinak Mandal, 2022, expected;
  - Santhosh Ganapa, jointly with A.Dhar, 2021, expected;
  - Mukesh Singh Raghav, jointly with R.Govindarajan, 2021, expected;
  - Anugu Sumith Reddy, 2020, expected;
  - Madhuresh, jointly with S. Vadlamani, 2017 [JP Morgan India]
- **POSTDOCTORAL SCHOLARS:**
  - Recent (since Jan 2016)
  - Adway Mitra [faculty, IIT Kharagpur India];
  - Suman Acharyya [postdoc, Bar-Ilan University Israel];
  - Souvik Roy [faculty, UTexas Arlington, USA]
  - Bygone (before Jan 2016)
  - Sajini Anand [A.P.Moller Maersk Bangalore India];
  - Sk. Sarif Hassan [faculty, Pingla Thana Mahavidyalaya India];
  - Karthik Gurumoorthy [Amazon India Bangalore];
  - Md. Nurujjaman [faculty, NIT Sikkim India];
- **COLLABORATORS:** Amol Amodkar, Didier Auroux, Marc Bocquet, Alberto Carrassi, Abhishek Dhar, Rafael de la Llave, Katherin Fuchss, Santhosh Ganapa, Abhirup Ghosh, Rama Govindarajan, Colin Grudzien, Karthik Gurumoorthy, Martin Hairer, Chris K.R.T. Jones, Todd B. Krause, Madhuresh, Adway Mitra, Philip J. Morrison, Md. Nurujjaman, Punit Paramananda, Emilia Petrisor, Nikola Petrov, Mythily Ramaswamy, Mishty Ray, Anugu Sumith Reddy, Bjorn Sandstede, Sumanth Shivamurthy, Somdatta Sinha, Laura Slivinski, Elaine Spiller, Andrew Stuart, Sreekar Vadlamani, P.N. Vinayachandran, Vishal Vasan, Jochen Voss, Alex Wurm,
- **LONG TERM PROJECT STUDENTS:** Fathima C P; Ashwini Kannan; Joel Prakash Stephen;

Abhinav Das; Amol Amodkar [IIM Indore]; Mayuri Chatterjee; Purvi Tiwari [IIM Bangalore]; Sumanth Bharadwaj [faculty, M. S. Ramaiah University of Applied Sciences Bangalore];

- SUMMER RESEARCH PROJECT STUDENTS: about 25 till present

#### SYNERGISTIC ACTIVITIES

##### Continuing

19. Editorial board for *Nonlinear Processes in Geophysics*
18. Referee for *Chaos; Chaos, Solitons & Fractals; Communications in Nonlinear Science and Numerical Simulation; Current Science; Discrete and Continuous Dynamical Systems; Indian Journal of Pure and Applied Mathematics; Journal of Earth System Science; Journal of Scientific Computing; Nonlinearity; Physica D; Physical Review; Pramana; Quarterly Journal of the Royal Meteorological Society; SIAM Journal for Applied Dynamical Systems*
17. Administrative duties:
  - Convener of the graduate cell (overseeing the academic activities of the doctorate program at ICTS), 2018-19
  - Member (current / past) of several committees at ICTS: (a) NAAC advance team (inputs for preparation of AQAR) 2019-20, (b) Outreach, (c) General administration & human resource planning and management, (d) Faculty search and screening, (e) ICTS standing tender, (f) Visiting students

##### Recent (since Jan 2016)

16. Co-organizer of the ongoing outreach lecture series: “Kaapi with Kuriosity” in Bangalore, India: Oct 2016 - Mar 2020
15. Co-organizer (with Soumitro Banerjee, Pranay Goel, Partha Guha, Neelima Gupte, Govindan Rangarajan and Somdatta Sinha), of the series of “Summer Research Programs on Dynamics of Complex Systems,” ICTS-TIFR, Bangalore, India (each one with approx. 25-40 speakers, 40+ participants):
  - (a) “Social Sciences & Economics,” 15 May - 12 Jul 2019
  - (b) “Non-smooth dynamical systems and complex networks,” 16 - 30 Jun 2018
  - (c) “Mathematical biology,” 10 May - 10 Jul, 2017
  - (d) “Geophysical phenomena,” 23 May - 23 Jul, 2016

##### Bygone (before Jan 2016)

14. Part of the organizing committee of “Latin American Workshop on Nonlinear Phenomena,” Cartagena, Colombia (100+ participants): 21-25 Sep 2015
13. Co-organizer (with Christopher K.R.T. Jones, Dave Stainforth, Henk Dijkstra), “Climate Variability: from Data and Models to Decisions,” Lorentz Center, Leiden, Netherlands (25 invited participants): 01-05 Dec 2014
12. Part of the organizing committee of “Dynamic Days Asia-Pacific 08,” A conference at Indian Institute of Technology-Madras, Chennai, India: 21-24 Jul 2014
11. Part of organizing committee (with Ravi Banavar, Partha Guha, A. K. Nandakumaran), “Geometry of Mechanics and Control Theory,” A workshop as part of the National Mathematics Initiative thematic program “Integrable systems” at Indian Institute of Science, Bangalore, India (14 speakers, 35 participants): 02-10 Jan 2014

10. Co-organizer (with Christopher K.R.T. Jones, Sreekar Vadlamani), “Nonlinear filtering and data assimilation,” A discussion meeting at ICTS-TIFR, Bangalore, India (8 speakers, 35 participants); 08-11 Jan 2014
9. Co-organizer (with Sreekar Vadlamani, C.S. Aravinda, Mythily Ramaswamy, Seema Nanda), “Mathematics of Planet Earth 2013: Mathematics for the billion” an interactive exhibition at the Visvesvaraya Industrial and Technological Museum, Bangalore, India (30+ interactive exhibits; 100 facilitators; approx. 30000+ visitors): 22 Nov - 01 Dec 2013 (and extended up to first week of Jan 2014)
8. Co-organizer (with A Jayaraman, Hann-Ming Juang, Amit Kesarkar, Ramchandra D Nair, Purnendranath Sen, Mahendra Verma), “Advanced dynamical core modeling for atmospheric and oceanic circulations,” ICTS programme as part of MPE-2013 activities, National Atmospheric Research Laboratory (NARL), Gadanki, India (30 speakers, 100 participants): 18-23 Feb 2013
7. Co-organizer (with G.S. Bhat, Andrew Majda, Ravi Nanjundiah, Roddam Narasimha, K.R. Sreenivasan, J. Srinivasan, Jai Sukhatme), “Mathematical Perspectives on Clouds, Climate, and Tropical Meteorology,” Ramanujan lectures by Andrew Majda and a discussion meeting at ICTS-TIFR, Bangalore, India (25 speakers, 50 participants): 21-25 Jan 2013
6. Co-organizer (with S.M. Deshpande, Christopher K.R.T. Jones, A.S.V. Murthy, Ravi S. Nanjundiah, and Mythily Ramaswamy), “Monsoon school on mathematical and statistical foundations of data assimilation” and “International conference on data assimilation,” TIFR Centre for Applicable Mathematics and the Indian Institute of Science, Bangalore, India (25 speakers, 60 participants); 04-23 Jul 2011
5. Co-convener (with Ravi S. Nanjundiah, and Co-organizer with Vivek Borkar, Vijay Chandru, Ravi Kannan, Roddam Narasimha, and J. Srinivasan), “Scientific discovery through intensive data exploration,” Jawaharlal Nehru Center for Advanced Scientific Research, Bangalore, India (34 speakers, 80 participants); 02-11 February 2011
4. Co-organizer (with P.S. Datti, B.R. Nagaraj, S. Prashanth, and A.S.V. Murthy), “Homi Bhabha Birth Centenary Symposium on Hyperbolic PDE and Related Topics,” TIFR-CAM, Bangalore, India, (7 speakers, 40 participants) 20-24 Jul 2009
3. Elected as Membership Coordinator (1999-2000), Food Buyer (Summer 2000), and Director (Fall 2000) of Laurel House Cooperative, Austin TX
2. Judge for Texas State Science Fair, Austin TX, 1999
1. Workshop leader in “Holding office hours and dealing with student problems” and “Sharing concerns” sessions and participant in “Experienced TAs and AIs and UT undergraduate students” session of Fall 1999 and Summer 2000 International Teaching Assistants’ Workshop, University of Texas, Austin

VISITS (*invitations / research collaborations; longer than 2 weeks in bold*)

Recent (since Jan 2016)

17. **Research Fellow for the “Program on Mathematical and Statistical Methods for Climate and the Earth System” at The Statistical and Applied Mathematical Sciences Institute (SAMSI), Aug 2017 - Jun 2018**
16. Nansen Environmental and Remote Sensing Center, Bergen, Norway, Dec 2016
15. École des Ponts ParisTech, Paris, France, 11-15 Apr 2016



14. **University of Nice, Nice, France, 12 Apr - 06 May 2017**, 18 Apr - 05 May 2016

Bygone (before Jan 2016)

13. **University of Nice, France**, 13-18 Sep 2015; 15-30 Nov 2014; **25 May - 24 Jun 2013**
12. **Universidad Nacional de Colombia, Bogota, Colombia, 25 Jun - 31 Jul 2013**
11. University of North Carolina, Chapel Hill NC, USA, 17 Oct - 03 Nov 2011
10. Indian Institute of Technology Bombay, Mumbai India, 03-07 Oct 2011
  9. Marquette University, Milwaukee USA, 26 May - 04 Jun 2011
  8. American Institute of Mathematics (planning meeting for activities for “Mathematics of Planet Earth 2013”), Palo Alto CA, USA, 08-11 Mar 2012; 08-14 Mar 2011
  7. University of North Carolina, Chapel Hill NC, USA, 06-15 May 2010
  6. Institut de Mathematiques de Toulouse, Uni. Paul Sabatier, France, 26 May - 19 Jun 2009
  5. **Centro de Estudios Interdisciplinarios Básicos y Aplicados en Complejidad, Universidad Nacional de Colombia, 15 Apr - 25 May 2009**
  4. S.N. Bose National Centre for Basic Sciences and Indian Institute of Technology Kanpur, Theoretical Physics Seminar Circuit, 02 Feb - 14 Feb 2009
  3. Mathematics Institute, University of Warwick UK, 08-20 Dec 2008, 18 Nov - 01 Dec 2007, 14-26 May 2006
  2. Instituto de Investigaciones en Mathematicas Aplicadas y en Sistemas, Universidad Nacional Autonoma de Mexico, Mexico D.F., 21-28 Nov 2004
  1. *Fellow of the Summer Program in Geophysical Fluid Dynamics*, Woods Hole Oceanographic Institute, Woods Hole MA, Jun-Aug 2003

PRESENTATIONS: Invited talks, colloquia, seminars (*significant ones in bold*)

Recent (since Jan 2016)

70. Invited webinar in the online lecture series on “Climate Change” at the Institute of Climate Change Research, The Maharaja Sayajirao University of Baroda, India, Aug 2020
69. Invited talk at the International Conference on Ensemble Methods in Modelling and Data Assimilation, NCMRWF, Noida, India, February 2020
68. **Invited talk at the “Maths Day for Development,” UNESCO, Paris, France, Mar 2019**
67. “Monsoon day,” a discussion meeting at ICTS-TIFR, Bangalore, India, February 2019
66. Seminar, School of Technology and Computer Science, TIFR, Mumbai India, Nov 2018
65. International Centre for Transformative Artificial Intelligence (ICTAI) day at Intel India Research Colloquium 2018, Bangalore India, Nov 2018
64. Seminar at the Laboratory for Information and Decision Systems (LIDS), Massachusetts Institute of Technology (MIT), Cambridge USA, Sep 2018
63. IUTAM workshop on “Stochastic Approaches to Transitions in Fluid Flows,” Cornell University, Ithaca NY, USA, Sep 2018
62. International Workshop on Cloud Dynamics, Micro physics, and Small-Scale Simulation, Indian Institute of Tropical Meteorology (IITM), Pune India, Aug 2018
61. **Invited panelist, International Congress of Mathematicians (ICM); “How can mathematicians contribute to planetary challenges?,” Rio de Janeiro, Brazil, Aug 2018**

60. Program on Integrable systems in Mathematics, Condensed Matter and Statistical Physics, ICTS-TIFR, Bangalore India, Jul 2018
59. Workshop on Complex Networks in the Summer Program on Dynamics of Complex Systems, ICTS-TIFR, Bangalore India, Jun 2018
58. Transition workshop for the Program on Mathematical and Statistical Methods for Climate and the Earth System (CLIM), Statistical and Applied Mathematical Sciences Institute (SAMSI), Durham USA, May 2018
57. Colloquium at Dept. of Mathematics, Statistics and Computer Science, Marquette University, Milwaukee USA, Apr 2018
56. Math Biology Seminar, University of British Columbia, Vancouver, Canada, Feb 2018
55. **Solicited talk in NP5.1 “Inverse Problems, Data Assimilation and Error Dynamics” in European Geosciences Union General Assembly 2017, Vienna, Austria, Apr 2017**
54. Conference on Nonlinear Systems and Dynamics, Indian Institute of Science Education and Research (IISER), Kolkata, India, Dec 2016
53. International Winter School on “Operational Oceanography: Indian Ocean Circulation and Sea Level Variation,” Hyderabad India, Oct 2016
52. **Oberwolfach meeting “Mathematical and Algorithmic Aspects of Atmosphere-Ocean Data Assimilation,” Oberwolfach, Germany, Oct 2016**
51. Colloquium at Dept. Computational and Data Sciences, Indian Institute of Science, Bangalore, India, Sep 2016
50. **Invited talk at Perspectives in Nonlinear Dynamics PNL D 2016, Berlin, Germany, Jul 2016**
49. Webinar colloquium, Mathematics and Climate Research Network, May 2016
48. Seminar, Laboratoire Jacques-Louis Lions, U.Paris Diderot, Paris, France, Apr 2016
47. Workshop on “Mathematics of sea-ice and data assimilation,” Nansen Environmental and Remote Sensing Center, Bergen, Norway, Mar 2016
46. Workshop on “Complex systems approach to self-organization,” IIT Madras, Chennai, India, February 2016

Bygone (before Jan 2016)

45. Latin American Workshop on Nonlinear Physics, Cartagena, Colombia, Sep 2015
44. Colloquium at IIT-BHU, Varanasi, India, Apr 2015
43. Conference on Nonlinear Systems and Dynamics, Indian Institute of Science Education and Research (IISER), Mohali, India, Mar 2015
42. Colloquium at the Nansen Environmental and Remote Sensing Center, Bergen, Norway, Dec 2014
41. International Conference on “Stochastic Systems and Applications,” Indian Institute of Science, Bangalore, India, Sep 2014
40. Dynamic Days Asia-Pacific, IIT Madras and IMSc, Chennai, India, Jul 2014
39. Conference on Emerging Trends in Applied Mathematics, University of Calcutta, Kolkata, India, February 2014
38. Indian National Centre for Ocean Information Systems, Hyderabad, India, Oct 2013
37. Intel India academic forum, Goa, India, Sep 2013
36. Colloquium at Indian Institute of Science Education and Research, Mohali, India, Mar 2013



35. Workshop on “Advanced dynamical core modeling for atmospheric and oceanic circulations,” NARL, Gadanki, India, February 2013
34. Discussion meeting on “Mathematical Perspectives on Clouds, Climate, and Tropical Meteorology,” ICTS-TIFR, Bangalore, India, January 2013
33. Colloquium, ICTS-TIFR, Bangalore, India, February 2013
32. **Oberwolfach meeting “Mathematical and Algorithmic Aspects of Atmosphere-Ocean Data Assimilation,” Oberwolfach, Germany, Dec 2012**
31. Colloquium, TIFR Centre for Applicable Mathematics, Bangalore, India, Nov 2013
30. Workshop on “Data assimilation: third workshop on numerical methods for solving the filtering problem and high order methods for solving parabolic PDEs,” Oxford-Man Institute of Quantitative Finance, Oxford, UK, Sep 2012
29. Workshop on “Generalized Hamiltonian structure of differential equations and dissipative dynamical systems,” University of Kent, UK, Jun 2011
28. Colloquium, Raman Research Institute, Bangalore India, Apr 2011
27. Round Table Meeting on Weather and Climate Modelling, Centre for Development of Advanced Computing (C-DAC), Bangalore India, February 2011
26. National Conference on Nonlinear Sciences and Dynamics, Tiruchirapalli, India, Jan 2010
25. Indo-French Workshop on Applied Mathematics, Indian Institute of Science, Bangalore India, Dec 2010
24. **Invited talk at the “Perspectives in Nonlinear Dynamics” PNLD 2010, Bangalore India, Jul 2010**
23. International Conference on Turbulence, IIT Kanpur, India, Dec 2009
22. II Indo-Brazil Symposium in Mathematics, TIFR Centre for Applicable Mathematics, Bangalore India, Dec 2009
21. Colloquium, Institut de Mathematiques de Toulouse, Uni. Paul Sabatier, France, Jun 2009
20. Colloquium, Department of Mathematics, Universidad Nacional de Colombia, Bogota Colombia, May 2009
19. National Conference on Nonlinear Sciences and Dynamics, Kolkata, India, Mar 2009
18. Colloquium, Indian Institute of Technology Kanpur, India, February 2009
17. Junior DA Researchers Day, University of Reading UK, Dec 2008
16. Bangalore Probability Seminar, Indian Institute of Science, Bangalore India, Nov 2008
15. International Conference on Nonlinear Dynamical Systems and Turbulence, Indian Institute of Science, Bangalore, India, Jul 2008
14. Colloquium, Indian Institute of Technology, Mumbai, May 2008
13. National Seminar on “Generalizations and Approximations in Mathematics,” Visva-Bharati University, India, Mar 2008
12. Colloquium, Indira Gandhi Centre for Atomic Research, India, Mar 2008
11. Colloquium, Indian Institute of Technology, Chennai, India, Mar 2008
10. Symposium in honour of 60th birthday of Professor S.G. Dani, Bangalore, India, Dec 2007
9. Seminar at National Aeronautics Laboratory, Bangalore India, Oct 2007
8. Workshop on “Environmental Modeling and Data Assimilation,” U.Warwick, UK, Nov 2007
7. Seminar at Institute for Plasma Research, Ahmedabad, India, February 2007
6. Seminar at Institute of Mathematical Sciences, Chennai, India, February 2007
5. Seminar at TIFR Center, Bangalore, India, February 2007

4. Workshop on “Mathematics of Data Assimilation,” University of Warwick, UK, May 2006
3. Department of Mathematics and Mechanics seminar, Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas (IIMAS), UNAM, Mexico City, Mexico, Nov 2004
2. Plasma Theory Group seminar, Los Alamos National Laboratory, Nov 2004
1. Working Dynamical Systems seminar, University of Texas, Austin TX, Oct 2004

PRESENTATIONS: *Contributed talks*

15. SIAM Southeastern Atlantic Sectional (SEAS) Conference, University of North Carolina, Chapel Hill, USA, Mar 2018
14. SIAM Conference on Uncertainty Quantification, EPFL, Lausanne, Switzerland, Apr 2016
13. Indian Statistical Physics Community Meeting, ICTS, Bangalore, February 2016
12. European Dynamic Days, Exeter, UK, Sep 2015
11. Congreso Nacional de Matematicas, Barranquilla, Colombia, Jul 2013
10. SIAM conference “Mathematical and computational geosciences,” Padova, Italy, Jun 2013
9. National Conference on Nonlinear Sciences and Dynamics, Pune, India, Jul 2012
8. Conference “Geometric Methods for Infinite-Dimensional Dynamical Systems,” Brown University, Providence, RI, USA, Nov 2011
7. SIAM Conference on Applications of Dynamical Systems, Snowbird Utah, USA, May 2011
6. European Geosciences Union General Assembly 2010, session on “Data assimilation and inverse problems in the presence of nonlinearities,” Vienna Austria, May 2010
5. Workshop on “Stochastic Differential Equation Models with Applications to the Insulin-Glucose System and Neuronal Modelling,” Middlefart, Denmark, Aug 2008
4. National Conference on Nonlinear Sciences and Dynamics, Ahmedabad, India, Jan 2008
3. International Conference “Chaos, Complexity and Transport: Theory and Applications,” Marseille, France, Jun 2007
2. SIAM Conference on Applications of Dynamical Systems, Snowbird Utah, USA, May 2007
1. SIAM Conference on Applications of Dynamical Systems, Snowbird Utah, USA, May 2005

PRESENTATIONS: *Lecture series*

9. Introductory course on “Mechanics” as part of the Research Education Advancement Programme (REAP) conducted by the Jawaharlal Nehru Planetarium, Bangalore, Sep 2020 - Apr 2021
8. Introductory lectures and tutorial on “Hidden Markov models” in Summer research program on Dynamics of Complex Systems, ICTS-TIFR, Bangalore, May 2019
7. Workshop on “Simultaneous Localization And Mapping,” Centre for Artificial Intelligence and Robotics (CAIR), Bangalore, India, Jul 2015
6. DST SERC school in nonlinear dynamics, IISER, Pune India, Dec 2011
5. Workshop on PDE and related analysis, Institute Mathematics Initiative of Indian Institute of Science, Bangalore India, Sep 2009
4. “Applications of Hamiltonian dynamical systems,” Universidad Nacional de Colombia, Bogota Colombia, May 2009
3. “Data assimilation: statistical and deterministic approaches,” Universidad Nacional de Colombia, Bogota Colombia, Apr-May 2009
2. Indo-German Workshop-cum-Lecture Series on “Computational Models and Methods Driven by Industrial Problems,” Indian Institute of Technology Madras, Chennai, India, Nov 2008

1. DST-SERC School on Nonlinear Dynamics, Indian Institute of Science, Bangalore India, Jul 2008

PRESENTATIONS: Popular science / expository lectures

19. Webinar in the “Online knowledge series” of Vidnyan Vibhag, Maharashtra Seva Sangh - Mulund, Mumbai India, Sep 2020
18. Invited panelist in Parisanvaad, Maharashtra Mandal Bengaluru, India, Aug 2020
17. Summer School for Women in Mathematics and Statistics, ICTS-TIFR, Bangalore, India, May 2019
16. Undergraduate workshop on “Scientific temper,” Gogate Jogalekar College, Ratnagiri, India, February 2019
15. Undergraduate Workshop, Statistical and Applied Mathematical Sciences Institute (SAMSI), Durham NC, USA, February 2018
14. Snehadhara Marathi Mandal, Malleswaram, Bangalore, Aug 2015
13. SIAM-IISc inaugural event, Indian Institute of Science, Bengaluru, India, February 2015
12. People Science Fest organized by Breakthrough Science Society, Bangalore, India, Jul 2014
11. A series of lectures at various colleges in Bangalore about “Mathematics of Planet Earth 2013” activities, Sep 2012 - Oct 2013
10. Universidad Sergio Arboleda, Bogota, Colombia, Jul 2013
  9. Colegio Colon, Barranquilla, Colombia, Jul 2013
  8. Inspire workshop at Indian Institute of Information Technology, Pune, India, May 2013
  7. National programme on partial differential equations workshop at Institute of Mathematics and its Applications, Bhuvaneshwar, India, May 2013
  6. Workshop on “Design and Analysis of Algorithms,” Nitte Meenakshi Institute of Technology, Bangalore India, Oct 2009
  5. Bishop Cotton College, Bangalore India, Oct 2009
  4. St. Joseph College, Bangalore, India, Jan 2009
  3. Christ College, Bangalore, India, Sep 2008
  2. Government Science College, Bangalore, India, Mar 2008
  1. Maharani Ammani College, Bangalore, India, February 2008

TEACHING

(a) TIFR Centre for Applicable Mathematics, Bangalore; (b) Indian Statistical Institute, Bangalore; (c) ICTS-TIFR; (d) Indian Institute of Science, Bangalore; (e) Statistical and Applied Mathematical Sciences Institute / University of North Carolina Chapel Hill

8. Dynamical systems: 2021 Jan-Apr (d), 2019 Jan-Apr (c)
7. Dynamical systems and data assimilation: 2019 Jan-Apr (d), 2018 Jan-Apr (e), 2017 Jan-Apr (d), 2016 Jan-Apr (c)
6. Numerical analysis: 2016 Jan-Apr (c), 2014 Jan-Apr, 2013 Jan-Apr (b), 2012 Aug-Dec (a)
5. Mathematical modelling: 2012 Jan-Apr, 2012 Aug-Dec (a)
4. Ordinary differential equations: 2010 Aug-Dec, 2009 Aug-Dec (a)
3. Classical mechanics: 2008 Aug-Dec, 2008 Jan-Apr (a)
2. Multivariable calculus: 2006 Aug-Dec (e)
1. Tutorials for several physics courses: 1998-2004 (UT-Austin)

PROJECTS AND FELLOWSHIPS

4. “Wave–mean–flow interactions in Oldroyd-B fluid.” Project completed as a *Fellow of the Summer Program in Geophysical Fluid Dynamics*, Woods Hole Oceanographic Institute, Woods Hole MA, Jun-Aug 2003, Supervisor: Oliver Bühler, Courant Institute, NY
3. “A search for CH stars in globular clusters.” E. Ambrose, A. Apte, T. Krause, M. Wolf; Project for the “Observational Astronomy” class at UT Austin, Summer 2001.
2. “Entropy of  $\mathcal{N} = 4$  supersymmetric theory and its relation to black holes.” Qualifier seminar, UT Austin, Dec 1998; Collaborator: Li Jiang; Supervisor: Willy Fischler
1. “Entropy changes during nucleosynthesis in the early universe.” Project at the Vacation Students’ Programme at Inter University Center for Astronomy and Astrophysics (IUCAA), Pune, India, Aug 1994; Supervisor: N.C. Rana, IUCAA

LANGUAGES

- Marathi, English, Hindi, Spanish
- C, fortran, python, matlab, bash, awk, L<sup>A</sup>T<sub>E</sub>X