



ANIRBAN CHAKRABORTI

BML Munjal University, National Highway 48, 67KM Milestone, Gurugram, Haryana – 122413, INDIA

✉ anirban.chakraborti@bmu.edu.in; anirban@jnu.ac.in

☎ +91 9560812499 (M)

<http://www.jnu.ac.in/Faculty/anirban/index.html>

<https://www.bmu.edu.in/faculty/prof-dr-anirban-chakraborti/>

PROFESSIONAL PROFILE

Dean of Research and Development, BML Munjal University, India

Professor (and Former Dean), School of Engineering and Technology, BML Munjal University, India

Professor, School of Computational & Integrative Sciences, Jawaharlal Nehru University, India (*On leave*)

Concurrent Professor, School of Sanskrit and Indic Studies, Jawaharlal Nehru University, India (*On leave*)

Founding Member, Centre of Complexity Economics, Applied Spirituality and Public Policy, O.P. Jindal Global University, India

International Member, Centro Internacional de Ciencias A.C., México

Consultant, Dono Consulting Pvt. Ltd., India, and Tatras Data Services Pvt. Ltd., India

Co-founder, EhNu Solutions Pvt. Ltd., India

PERSONAL DATA

Date of Birth: 10 February, 1975

Gender: Male

Age: 48 years

Marital Status: Married

Nationality: Indian

WORK HISTORY

BML Munjal University, India	<i>Professor</i>	June, 2021–till date
Jawaharlal Nehru University, India	<i>Professor</i>	March, 2014–till date
École Centrale Paris, France	<i>Chercheur Senior (Associate Professor)</i>	2011–2014
École Centrale Paris, France	<i>Chargé de Recherche (Assistant Professor)</i>	2009–2011
Banaras Hindu University, India	<i>Lecturer</i>	2005–2008
Brookhaven National Laboratory, USA	<i>Research Associate</i>	2003–2005
Helsinki University of Technology, Finland	<i>Senior Researcher</i>	2002–2003
Saha Institute of Nuclear Physics, India	<i>Research Fellow</i>	1998–2002

EDUCATION

2013 Diplôme d'habilitation à diriger des recherches (Physics)
Université Pierre et Marie Curie (Paris VI), France

Thesis: “Statistical mechanics applied to socio-economic systems”

Jury: Jean-Philippe Bouchaud, Delphine Lautier, Attilio Stella,
Frédéric Abergel, Jean-Pierre Nadal, Mathieu Rosenbaum

2003 Doctor of Philosophy in Science
Saha Institute of Nuclear Physics (Jadavpur University), India

Thesis: "Application of Statistical Physics to some Econophysics and Optimization Problems"

Supervisor: Bikas K. Chakrabarti (India)

Examiners: Dietrich Stauffer (Germany); Chandan Dasgupta (India); Parongama Sen (India)

1999 Post M.Sc. Associateship (Physics)—*Ranked First*
Saha Institute of Nuclear Physics, India

1998 Master in Science (Physics)—*Ranked First*
University of Calcutta, India

1996 Bachelor in Science (Physics Honours)
Scottish Church College, University of Calcutta, India

RESEARCH INTERESTS

Econophysics; Sociophysics; Statistical physics; Quantum physics; Nanomaterial science; Complex systems; Data science

AWARDS, GRANTS, FELLOWSHIPS

- 2023 **Fellow, The World Academy of Sciences (TWAS-UNESCO)** with effect from January 1st 2023 (<https://twas.org/article/twas-elects-50-new-fellows>)
- 2019 Grant of INR 1,416,000 (approx.) for project "Development of machine learning algorithms for automated classification based on advanced signal decomposition of EEG signals" as Principal Investigator (along with P.I. Dr. M. Tanveer, IIT Indore and Co-P.I. Dr. Akshansh Gupta, CEERI India), for duration of two years.
- 2016 Grant of INR 600,000 (approx.) for project "To study the genotoxic effect and differential protein expression level in the directly irradiated cells and through radiation induced bystander effect in presence and absence of Gold nanoparticles of different size and shape" (UFR-60319 of IUAC-UGC, duration August, 2016 – August 2019) as Co-Investigator (along with P.I. Dr. Jaydeep Bhattacharya, School of Biotechnology, JNU).
- 2015 Grant of EUR 400 000 for project "*The role of diversity in complex systems*" (IUT39-1 of Estonian Research Council, duration 01.01.2015 – 31.07.2016) as Co-Investigator (along with P.I. Els Heinsalu, National Institute of Chemical Physics and Biophysics, Tallinn, Estonia).
- 2014 Grant of INR 1,820,000 (USD 30,000 approx. in 2014) for Project ID-47 under UPE II scheme, JNU, titled "*The Sociophysics of International and National Collaboration in Contemporary India: Modelling Inequalities in Scientific Research*", as Principal Investigator (along with Co-Investigator Dhruv Raina, School of Social Sciences, JNU).
- 2009 **Indian National Science Academy Young Scientist** medal, India
- 2007 Grant of INR 4,000,000 (USD 100,000 approx. in 2007) for Project entitled "*Development of Data Fusion Models and Algorithms for Molecular Recognition in Polymeric Multisensor Platforms*" as Co-investigator, sanctioned by Defence Research & Development Organisation, Ministry of Defence, Government of India.
- 2006 Travel grant and financial support awarded by the ICTP, Trieste, Italy to attend School and workshop in ICTS, Beijing, China
- 2005 Post-doctoral Research Fellowship awarded by Kellogg School of Management, Northwestern University, Evanston, USA – declined
- 2004 Travel grant and financial support awarded by the EXYSTENCE Thematic Institute "From Many-Particle Physics to Multi-Agent Systems" and the Max Planck Institute for the Physics of Complex Systems (MIPPKS), Dresden, Germany
- 2003-2005 Post-doctoral Research Fellowship awarded by Brookhaven National Laboratory, USA
- 2002-2003 Post-doctoral Research Fellowship awarded by Laboratory of Computational Engineering, Helsinki University of Technology, Finland
- 2001 Financial grant awarded by the Graduate College of Scientific Computing, Cologne University, Germany for visiting Cologne University

- 2001 Travel grant and financial support awarded by Organizing Committee, CCP 2001, Aachen, Germany
- 2000 Travel grant and financial support awarded by ICTP, Trieste, Italy for attending summer school and workshop
- 1999 Travel grant and financial support awarded by ICTP, Trieste, Italy for attending summer school and conference
- 1999 Certificate of Merit and Book Grant awarded for ranking “First” in Post-M.Sc.(Physics) in Saha Institute of Nuclear Physics, India
- 1998-2002 Research Fellowship awarded by Saha Institute of Nuclear Physics, India
- 1998 Certificate of Merit awarded for ranking “First” in M.Sc. in University of Calcutta, India
- 1997 Joint UGC-CSIR NET Junior Research Fellowship (CSIR category) and eligibility for Lectureship awarded, India – declined
- 1996 National Scholarship awarded for studying M.Sc., India

CITATION METRICS

As per Web of Science (Last Updated: 21/03/2023)

- Sum of the Times Cited: 2435
- Articles With Citation Data: 78
- Average Citations per Article: 31.2
- *h*-index: 21
- <https://www.webofscience.com/wos/author/record/559114/>

As per Scopus (Last Updated: 21/03/2023)

- Sum of the Times Cited: 2887
- Documents by Author: 94
- *h*-index: 23
- <https://www.scopus.com/authid/detail.uri?authorId=7005107556>

As per Google Scholar (Last Updated: 21/03/2023)

- Sum of the Times Cited: 5903
- *h*-index: 31
- *i10*-index: 61
- <https://scholar.google.co.in/citations?user=ZfHqOHcAAAAJ&hl=en>

PUBLICATIONS

Books and monographs

- 1) “Data Science for Complex Systems”, A.S. Chakrabarti, K. Shuvo Bakar, and A. Chakraborti (Cambridge University Press, Cambridge, April 2023) (<https://www.cambridge.org/core/books/data-science-for-complex-systems/304F66053C62CD439FDFA46D2D4323A8#>).
- 2) “Limit Order Books”, F. Abergel, A. Chakraborti, A. Jedidi, I. Muni Toke, and M. Anane (Cambridge University Press, Cambridge, 2016).
- 3) “Econophysics of Income and Wealth Distributions”, B.K. Chakrabarti, A. Chakraborti, S.R. Chakravarty, and A. Chatterjee (Cambridge University Press, Cambridge, 2013).
- 4) “Econophysics: An Introduction”, S. Sinha, A. Chatterjee, A. Chakraborti, and B.K. Chakrabarti (Wiley-VCH, Berlin, 2010).

Peer-reviewed journal articles

- 5) “Investigation of Vacuum Arc-Deposited ta-C and ta-C: N Thin Films on Silicon and Stainless-Steel Foil Substrates Using Raman Spectroscopy”, S. Barman, S. Neema, A. Rana, A.S. Patel, A. Chakraborti, A.S. Rana, Materials Transactions 63 (10), 1510-1513 (2022).
- 6) “From Physics to Econophysics and Back: Methods and Insights”, A. Chakraborti, D. Challet, S.A. Cheong, T. Mizuno, G. Oh, W.X. Zhou, Frontiers in Physics, 645 (2022)

- 7) "Visible light-driven photocatalytic degradation of methyl orange by Fe₂O₃-BiOCl_{0.5}Br_{0.5} composite photocatalyst", S. Barman, B. Singh, A. Bag, A.S. Patel, A. Chakraborti, A. Rana, *Asia-Pacific Journal of Chemical Engineering* 16 (6), e2715 (2021)
- 8) "Network geometry and market instability," A. Samal, H.K. Phorasi, S.J. Ramaia, H. Kannan, E. Saucan, J. Jost, and A. Chakraborti, *Royal Society Open Science* 8, 201734 (2021).
- 9) "Enhanced photocatalytic activity of plasmonic Au nanoparticles incorporated MoS₂ nanosheets for degradation of organic dyes," A. Rani, A.S. Patel, A. Chakraborti, K. Singh, and P. Sharma, *Journal of Materials Science: Materials in Electronics* 32, 6168 (2021).
- 10) "Network-centric indicators for fragility in global financial indices," A. Samal, S. Kumar, Y. Yadav, and A. Chakraborti, *Frontiers in Physics* (2021) <https://doi.org/10.3389/fphy.2020.624373>
- 11) "Distress propagation on production networks: Coarse-graining and modularity of linkages," A. Kumar, A.S. Chakraborti, A. Chakraborti, and T. Nandi, *Physica A: Statistical Mechanics and its Applications* 568, 125714 (2021).
- 12) "Phase separation and scaling in correlation structures of financial markets," A. Chakraborti, Hrishidev, K. Sharma, and H.K. Phorasi, *J. Phys. Complex.* 2, 015002 (2021).
- 13) "Emerging spectra characterization of catastrophic instabilities in complex systems," A. Chakraborti, K. Sharma, H.K. Phorasi, K.S. Bakar, S. Das, and T.H. Seligman, *New J. Phys.* 22, 063043 (2020).
- 14) "A novel approach for classification of mental tasks using multiview ensemble learning (MEL)," A. Gupta, R.U. Khan, V.K. Singh, M. Tanveer, D. Kumar, A. Chakraborti, and R.B. Pachori, *Neurocomputing* 417, 558-584 (2020).
- 15) "Interaction of fluorescent gold nanoclusters with transition metal dichalcogenides nanosheets: A spectroscopic study," A.S. Patel, A. Chakraborti, and P. Mishra, *Journal of Luminescence* 227, 117589 (2020).
- 16) "Identifying the global terror hubs and vulnerable motifs using complex network dynamics," S.S. Husain, K. Sharma, V. Kukreti, and A. Chakraborti, *Physica A* 540, 123113 (2020).
- 17) "Visible light driven photocatalysis of organic dyes using SnO₂ decorated MoS₂ nanocomposites," A. Rani, K. Singh, A.S. Patel, A. Chakraborti, S. Kumar, K. Ghosh, and P. Sharma, *Chemical Physics Letters* 738, 136874 (2020).
- 18) "Hamiltonian energy as an efficient approach to identify the significant key regulators in biological networks," S. Haider, K. Ponnusamy, R.K.B. Singh, A. Chakraborti, and R.N.K. Bamezai, *PLoS One* 14(8), e0221463 (2019).
- 19) "Identifying long-term precursors of financial market crashes using correlation patterns," H.K. Phorasi, K. Sharma, R. Chatterjee, A. Chakraborti, F. Leyvraz, and T.H. Seligman, *New Journal of Physics* 20, 103041 (2018).
- 20) "Gold nanoflowers as efficient hosts for SERS based sensing and bio-imaging," A.S. Patel, S. Juneja, P.K. Kanaujia, V. Maurya, G.V. Prakash, A. Chakraborti, and J. Bhattacharya, *Nano-Structures & Nano-Objects* 16, 329-336 (2018).
- 21) "Quantifying invariant features of within-group inequality in consumption across groups," A.S. Chakraborti, A. Chatterjee, T. Nandi, A. Ghosh, and A. Chakraborti, *J. Economic Interaction and Coordination* 13, 469-490 (2018).
- 22) "Role of a polymeric component in the phase separation of ternary fluid mixtures: a dissipative particle dynamics study," A. Singh, A. Chakraborti, and A. Singh, *Soft Matter* 14, 4317-4326 (2018).
- 23) "The SAGA of KPR: Theoretical and Experimental Developments," K. Sharma, Anamika, A.S. Chakraborti, A. Chakraborti, and S. Chakravarty, *Science and Culture (Kolkata, India)* 84, 31 (2018).
- 24) "Effect of bond-disorder on the phase-separation kinetics of binary mixtures: a Monte Carlo simulation study," A. Singh, A. Singh, and A. Chakraborti, *Journal of Chemical Physics* 147, 124902 (2017).
- 25) "A complex network analysis of ethnic conflicts and human rights violations," K. Sharma, G. Sehgal, B. Gupta, G. Sharma, A. Chatterjee, A. Chakraborti, and G. Shroff, *Scientific Reports* 7, 8283 (2017).
- 26) "Financial fluctuations anchored to economic fundamentals: A mesoscopic network approach," K. Sharma, B. Gopalakrishnan, A.S. Chakraborti, and A. Chakraborti, *Scientific Reports* 7, 8055 (2017).
- 27) "Investigating resonance energy transfer from protein molecules to van der Waals nanosheets," A.S. Patel, P. Mishra, P.K. Kanaujia, S.S. Husain, G.V. Prakash, and A. Chakraborti, *RSC Advances* 7 (42), 26250-26255 (2017).

- 28) "Quantifying invariant features of within-group inequality in consumption across groups," A.S. Chakrabarti, A. Chatterjee, T. Nandi, A. Ghosh, and A. Chakraborti, *Journal of Economic Interaction and Coordination*, 1-22 (2017).
- 29) "A model-free characterization of recurrences in stationary time series," R. Chicheportiche, and A. Chakraborti, *Physica A* 474, 312-318 (2017).
- 30) "Resonance Raman scattering and ab initio calculation of electron energy loss spectra of MoS₂ nanosheets," A. Chakraborti, A.S. Patel, P.K. Kanaujia, P. Nath, G.V. Prakash, and D. Sanyal, *Physics Letters A* 380, 4057-4061 (2016).
- 31) "Can an interdisciplinary field contribute to one of the parent disciplines from which it emerged?" A. Chakraborti, D. Raina, and K. Sharma, *European Physical Journal Special Topics* 225 (17-18), 3127-3135 (2016).
- 32) "Invariant features of spatial inequality in consumption: the case of India," A. Chatterjee, A.S. Chakrabarti, A. Ghosh, A. Chakraborti, and T.K. Nandi, *Physica A* 442, 169-181 (2016).
- 33) "Statistical mechanics of competitive resource allocation using agent-based models," A. Chakraborti, D. Challet, A. Chatterjee, M. Marsili, Y.-C. Zhang, and B.K. Chakrabarti, *Physics Reports* 552, 1 (2015).
- 34) "Ab initio calculation of magnetic properties of p-block element doped ZnO," P. Nath, A. Chakraborti, and D. Sanyal, *RSC Adv.* 4, 45598 (2014).
- 35) "Copulas and time series with long-ranged dependences," R. Chicheportiche, and A. Chakraborti, *Phys. Rev. E* 89, 042117 (2014).
- 36) "Kinetic exchange models: From molecular physics to social science," M. Patriarca, and A. Chakraborti, *American Journal of Physics* 81, 618 (2013).
- 37) "New classes of spin chains from $S\hat{O}(q)(N)$, $Sp(q)(N)$ Temperley-Lieb algebras: Data transmission and (q, N) parametrized entanglement entropies," A. Chakrabarti, A. Chakraborti, and E.G. Hidalgo, *J. Math. Phys.* 54, 013517 (2013).
- 38) "Entangled three-particle states in magnetic field: Periodic correlations and density matrices," A. Chakrabarti, and A. Chakraborti, *Indian J. Phys.* 86, 791 (2012).
- 39) "The near-extreme density of intraday log-returns," M. Politi, N. Millot, and A. Chakraborti, *Physica A* 391, 147 (2012).
- 40) "Econophysics review: II. Agent-based models," A. Chakraborti, I. Muni Toke, M. Patriarca, and F. Abergel, *Quantitative Finance* 11:7, 1013 (2011).
- 41) "Econophysics review: I. Empirical Facts," A. Chakraborti, I. Muni Toke, M. Patriarca, and F. Abergel, *Quantitative Finance* 11:7, 991 (2011).
- 42) "Threshold-induced phase transition in kinetic exchange models," A. Ghosh, U. Basu, A. Chakraborti, and B.K. Chakrabarti, *Phys. Rev. E* 83, 061130 (2011).
- 43) "Opinion formation in the kinetic exchange models: Spontaneous symmetry breaking transition," M. Lallouache, A.S. Chakrabarti, A. Chakraborti, and B.K. Chakrabarti, *Phys. Rev. E* 82, 056112 (2010).
- 44) "Quantum entanglement: The unitary 8-vertex braid matrix with imaginary rapidity," A. Chakrabarti, A. Chakraborti, and A. Jedidi, *J. Phys. A (Fast Track)* 43, 482001 (2010).
- 45) "Kinetic exchange models for social opinion formation," M. Lallouache, A. Chakraborti, and B.K. Chakrabarti, *Science and Culture (Kolkata, India)* 76, 485 (2010).
- 46) "Wealth distribution: To be or not to be a Gamma?" M. Lallouache, A. Jedidi, and A. Chakraborti, *Science and Culture (Kolkata, India)* 76, 478 (2010).
- 47) "Basic kinetic wealth-exchange models: common features and open problems," M. Patriarca, E. Heinsalu, and A. Chakraborti, *Eur. Phys. J. B* 73, 145 (2010).
- 48) "Variational Principle for the Pareto Power Law," A. Chakraborti, and M. Patriarca, *Phys. Rev. Lett.* 103, 228701 (2009).
- 49) "First-principles calculations of the optical properties of C_xN_y single walled nanotubes," D. Jana, A. Chakraborti, L.-C. Chen, C.W. Chen, and K.-H. Chen, *Nanotechnology* 20, 175701 (2009).
- 50) "Relaxation in Statistical Many-agent Economy Models," M. Patriarca, E. Heinsalu, A. Chakraborti, and G. Germano, *Eur. Phys. J. B* 57, 219 (2007).
- 51) "Econophysics: A brief introduction to modeling wealth distribution," A. Chakraborti, *Science and Culture (Kolkata, India)* 73, 55 (2007).
- 52) "Influence of saving propensity on the power law tail of wealth distribution," M. Patriarca, A. Chakraborti, and G. Germano, *Physica A* 369, 723 (2006).

- 53) "Financial and other spatio-temporal time series: Long-range correlations & Spectral properties," A. Chakraborti, and M.S. Santhanam, *Int. J. Mod. Phys. C* 16, 1733 (2005).
- 54) "Statistical model with a standard Γ distribution," M. Patriarca, A. Chakraborti, and K. Kaski, *Phys. Rev. E* 70, 016104 (2004).
- 55) "Searching good strategies in adaptive minority games," M. Sysi-Aho, A. Chakraborti, and K. Kaski, *Phys. Rev. E* 69, 036125 (2004).
- 56) "Dynamics of market correlations: Taxonomy and portfolio analysis," J.-P. Onnela, A. Chakraborti, K. Kaski, J. Kertesz, and A. Kanto, *Phys. Rev. E* 68, 056110 (2003).
- 57) "Intelligent Minority Game with genetic-crossover strategies," M. Sysi-Aho, A. Chakraborti, and K. Kaski, *Eur. Phys. J. B* 34, 373 (2003).
- 58) "Adaptation using hybridized genetic crossover strategies," M. Sysi-Aho, A. Chakraborti, and K. Kaski, *Physica A* 322, 701 (2003).
- 59) "Dynamic asset trees and portfolio analysis," J.-P. Onnela, A. Chakraborti, K. Kaski, and J. Kertesz, *Eur. Phys. J. B* 30, (Rapid Note) 285 (2002).
- 60) "Distributions of money in model markets of economy," A. Chakraborti, *Int. J. Mod. Phys. C* 13, 1315 (2002).
- 61) "Market application of the percolation model: Relative price distribution," A. Chakraborti, *Int. J. Mod. Phys. C* 13, 25 (2002).
- 62) "The Euclidean travelling salesman problem: Frequency distribution of neighbours for small-size systems," A. Chakraborti, *Int. J. Mod. Phys. C* 12, 857 (2001).
- 63) "A self-organising model of market with single commodity," A. Chakraborti, S. Pradhan, and B.K. Chakrabarti, *Physica A* 297, 253 (2001).
- 64) "Statistical mechanics of money: How saving propensity affects its distribution," A. Chakraborti, and B.K. Chakrabarti, *Eur. Phys. J. B* 17, 167 (2000).
- 65) "The travelling salesman problem on randomly diluted lattices: Results for smallsize systems," A. Chakraborti, and B.K. Chakrabarti, *Eur. Phys. J. B* 16, 677 (2000).
- 66) "Anomalous transmission in a hierarchical lattice," A. Chakraborti, B. Bhattacharyya, and A. Chakrabarti, *Phys. Rev. B* 61, 7395 (2000).

Edited Books, Proceeding volumes and others

- 67) "New Perspectives and Challenges in Econophysics and Sociophysics," Eds. F. Abergel, B.K. Chakrabarti, A. Chakraborti, N. Deo, and K. Sharma (Springer, Cham, 2019).
- 68) "Econophysics and Sociophysics: Recent Progress and Future Directions," Eds. F. Abergel, H. Aoyama, B.K. Chakrabarti, A. Chakraborti, N. Deo, D. Raina, and I. Vodenska (Springer, Cham, 2017).
- 69) "Proceedings of the STATPHYS-KOLKATA VIII," Eds. A. Chakraborti, S. Chatterjee, and P. Pradhan, *Journal of Physics: Conference Series* 638 (2015).
- 70) "Preface: STATPHYS-KOLKATA VIII," A. Chakraborti, S. Chatterjee, and P. Pradhan, *Journal of Physics: Conference Series* 638, 011001 (2015).
- 71) "Econophysics and Data Driven Modelling of Market Dynamics," Eds. F. Abergel, H. Aoyama, B.K. Chakrabarti, A. Chakraborti, and A. Ghosh, (Springer, Milan, 2015).
- 72) "Econophysics of Agent-based models," Eds. F. Abergel, H. Aoyama, B.K. Chakrabarti, A. Chakraborti, and A. Ghosh (Springer-Verlag (Italia), Milan, 2013).
- 73) "Econophysics of systemic risk and network dynamics," Eds. F. Abergel, B.K. Chakrabarti, A. Chakraborti, and A. Ghosh (Springer-Verlag (Italia), Milan, 2012).
- 74) "Econophysics of order-driven markets," Eds. F. Abergel, B.K. Chakrabarti, A. Chakraborti, and M. Mitra (Springer-Verlag (Italia), Milan, 2011).
- 75) "Fifteen Years of Econophysics Research," a special issue in *Science and Culture* (Kolkata, India), Guest Eds. B.K. Chakrabarti, and A. Chakraborti, Volume 76 (9-10) (2010).
- 76) "Econophysics and Sociophysics: Trends and Perspectives," Eds. B.K. Chakrabarti, A. Chakraborti, and A. Chatterjee (Wiley-VCH, Berlin, 2006).

Book Review

- 77) "Essentials of Econophysics Modelling," *Physics Today* 68, 1, 44 (2015), A. Chakraborti; Book written by František Slanina, Oxford U. Press, 2014. (411 pp.).

- 78) "Physicists' approach to studying socio-economic inequalities: Can humans be modelled as atoms?" K. Sharma, and A. Chakraborti, in Ed. Ashmita Gupta, *Social Statistics: Manifestation of Growth* (Primus Books, India, 2020) pp. 130-155.
- 79) "Complex market dynamics in the light of random matrix theory," H.K. Pharsai, K. Sharma, A. Chakraborti, and T.H. Seligman, in Eds. F. Abergel, B.K. Chakrabarti, A. Chakraborti, N. Deo, K. Sharma, *New Perspectives and Challenges in Econophysics and Sociophysics* (Springer, Cham, 2019), pp. 13-34.
- 80) "Multi-layered network structure: Relationship between financial and macroeconomic dynamics," K. Sharma, A.S. Chakrabarti, and A. Chakraborti, in Eds. F. Abergel, B.K. Chakrabarti, A. Chakraborti, N. Deo, K. Sharma, *New Perspectives and Challenges in Econophysics and Sociophysics* (Springer, Cham, 2019), pp. 117-131.
- 81) "Epilogue," K. Sharma, and A. Chakraborti, in Eds. F. Abergel, B.K. Chakrabarti, A. Chakraborti, N. Deo, and K. Sharma, *New Perspectives and Challenges in Econophysics and Sociophysics* (Springer, Cham, 2019), pp. 269-272.
- 82) "Distinguishing Two Different Mental States of Human Thought Using Soft Computing Approaches," A. Gupta, D. Kumar, A. Chakraborti, and V.K. Singh, *Machine Intelligence and Signal Analysis* (Springer, Singapore, 2019) pp. 323-333.
- 83) "Patterns of Linguistic Diffusion in Space and Time: The Case of Mazatec," J.L. Léonard, M. Patriarca, E. Heinsalu, K. Sharma, and A. Chakraborti, *Complexity Applications in Language and Communication Sciences* (Springer, Cham, 2019), pp. 139-170.
- 84) "Cognitive Task Classification Using Fuzzy Based Empirical Wavelet Transform," M. Tanveer, A. Gupta, D. Kumar, S. Priyadarshini, A. Chakraborti, and R. Mallipeddi, 2018 IEEE International Conference on Systems, Man, and Cybernetics (SMC), 1761-1766 (2018).
- 85) "Global income inequality and savings: A data science perspective," K. Sharma, S. Das, and A. Chakraborti, IEEE 5th International Conference on Data Science and Advanced Analytics, 496-503 (2018).
- 86) "Spatio-Temporal Networks of Social Conflicts: Analysis and Modeling," G. Sehgal, K. Sharma, A. Chatterjee, and A. Chakraborti, IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2018), 740-743 (2018).
- 87) "Hurst Exponent as a New Ingredient to Parametric Feature Set for Mental Task Classification," A. Gupta, D. Kumar, and A. Chakraborti, *Information and Decision Sciences* (Springer, Singapore, 2018), pp. 129-137.
- 88) "Sectoral Co-movements in the Indian Stock Market: A Mesoscopic Network Analysis," K. Sharma, S. Shah, A.S. Chakrabarti, and A. Chakraborti, in Eds. Y. Aruka and A. Kirman, *Economic Foundations for Social Complexity Science: Theory, Sentiments, and Empirical Laws* (Springer, Singapore, 2017), pp. 211-238.
- 89) "Reaction-Diffusion Equations with Applications to Economic Systems," S. Ganguly, U. Neogi, A.S. Chakrabarti, and A. Chakraborti, in Eds. F. Abergel, H. Aoyama, B.K. Chakrabarti, A. Chakraborti, N. Deo, D. Raina and I. Vodenska, *Econophysics and Sociophysics: Recent Progress and Future Directions* (Springer, Cham, 2017), pp. 131-144.
- 90) "Kinetic Exchange Models as D Dimensional Systems: A Comparison of Different Approaches," M. Patriarca, E. Heinsalu, A. Singh, and A. Chakraborti, in Eds. F. Abergel, H. Aoyama, B.K. Chakrabarti, A. Chakraborti, N. Deo, D. Raina and I. Vodenska, *Econophysics and Sociophysics: Recent Progress and Future Directions* (Springer, Cham, 2017), pp. 147-158.
- 91) "The Microscopic Origin of the Pareto Law and Other Power-Law Distributions," M. Patriarca, E. Heinsalu, A. Chakraborti, and K. Kaski, in Eds. F. Abergel, H. Aoyama, B.K. Chakrabarti, A. Chakraborti, N. Deo, D. Raina and I. Vodenska, *Econophysics and Sociophysics: Recent Progress and Future Directions* (Springer, Cham, 2017), pp. 159-176.
- 92) "Patterns of Linguistic Diffusion in Space and Time: The Case of Mazatec," J.L. Léonard, E. Heinsalu, M. Patriarca, K. Sharma, and A. Chakraborti, in Eds. F. Abergel, H. Aoyama, B.K. Chakrabarti, A. Chakraborti, N. Deo, D. Raina and I. Vodenska, *Econophysics and Sociophysics: Recent Progress and Future Directions* (Springer, Cham, 2017), pp. 227-251.
- 93) "Epilogue," D. Raina and A. Chakraborti, in Eds. F. Abergel, H. Aoyama, B.K. Chakrabarti, A. Chakraborti, N. Deo, D. Raina, and I. Vodenska, *Econophysics and Sociophysics: Recent Progress and Future Directions* (Springer, Cham, 2017), pp. 255-256.

- 94) "Power-Laws as Statistical Mixtures," M. Patriarca, E. Heinsalu, L. Marzola, A. Chakraborti, and K. Kaski, in Eds. Stefano Battiston, Francesco De Pellegrini, Guido Caldarelli, Emanuela Merelli, Proceedings of European Conference on Complex Systems (ECCS-2014) (2016), pp. 271-282.
- 95) "Group-Based Pricing to Shape Demand in Real-Time Electricity Markets," R. Agrawal, A. Chakraborti, K. Singh, G. Shroff, and V. Sarangan, Multi-Agent Systems and Agreement Technologies, Lecture Notes in Computer Science book series, volume 9571 (2016), pp. 121-128.
- 96) "Spatiotemporal pattern formation in a prey-predator model under environmental driving forces," A.K. Sirohi, M. Banerjee, and A. Chakraborti, Journal of Physics: Conference Series 638, 12004-12014 (2015).
- 97) "Physicists' Approaches to a Few Economic Problems," A. Chakraborti, Y. Fujiwara, A. Ghosh, J. Inoue, and S. Sinha, in Eds. F. Abergel, H. Aoyama, B. K. Chakraborti, A. Chakraborti and A. Ghosh, Econophysics and Data Driven Modelling of Market Dynamics (Springer, Milan, 2015), pp. 237-286.
- 98) "Maximizing a Psychological Uplift in Love Dynamics," M. Banerjee, A. Chakraborti, and J. Inoue, in Eds. R. Lopez-Ruiz, D. Fournier-Prunaret, Y. Nishio, C. Gracio, Nonlinear Maps and their Applications, Springer Proceedings in Mathematics & Statistics (Springer International Publishing, Switzerland, 2015), pp. 241-252.
- 99) "Kinetic Exchange Models in Economics and Sociology," S. Goswami, and A. Chakraborti, in Eds. R. Lopez-Ruiz, D. Fournier-Prunaret, Y. Nishio, C. Gracio, Nonlinear Maps and their Applications, Springer Proceedings in Mathematics & Statistics (Springer International Publishing, Switzerland, 2015), pp. 69-88.
- 100) "Statistical inference of co-movements of stocks during a financial crisis," T. Ibuki, S. Higano, S. Suzuki, J. Inoue, and A. Chakraborti, J. Phys.: Conf. Ser. 473, 012008 (2013).
- 101) "Themes and applications of kinetic exchange models: Redux," A. Ghosh, A.S. Chakraborti, A.K. Chandra, and A. Chakraborti, in Eds. F. Abergel, H. Aoyama, B. K. Chakraborti, A. Chakraborti and A. Ghosh, Econophysics of Agent-based models (Springer-Verlag (Italia), Milan, 2013), pp. 99-129.
- 102) "Study of statistical correlations in intraday and daily financial return time series," G. Tilak, T. Szell, R. Chicheportiche, and A. Chakraborti in Eds. F. Abergel, B. K. Chakraborti, A. Chakraborti and A. Ghosh, Econophysics of systemic risk and network dynamics (Springer-Verlag (Italia), Milan, 2012), pp. 77-104.
- 103) "Opinion formation in the kinetic exchange models," A. Chakraborti, and B.K. Chakraborti, in Eds. F. Abergel, B.K. Chakraborti, A. Chakraborti and M. Mitra, Econophysics of order-driven markets (Springer-Verlag (Italia), Milan, 2011), pp. 289-304.
- 104) "Agent-based models of socio-economic interactions," A. Chakraborti, and G. Germano, in Eds. L. Pareschi, G. Naldi and G. Toscani, Mathematical Modeling of Collective Behavior in Socio-Economic and Life Sciences (Birkhauser, Berlin, 2010), pp. 3-29.
- 105) "Gamma-distribution and Wealth Inequality," A. Chakraborti, and M. Patriarca, Pramana 71, 233 (2008).
- 106) "Financial time-series analysis: A brief overview," A. Chakraborti, M. Patriarca, M.S. Santhanam, in Eds. A. Chatterjee, and B.K. Chakraborti, Econophysics of Markets and Business Networks (Springer-Verlag (Italia), Milan, 2007), pp. 51-67.
- 107) "An Outlook on Correlations in Stock Prices," A. Chakraborti, in Eds. A. Chatterjee, and B.K. Chakraborti, Econophysics of Stock and other Markets (Springer-Verlag (Italia), Milan, 2006), pp. 13-23.
- 108) "Kinetic theory models for the distribution of wealth: power law from overlap of exponentials," M. Patriarca, A. Chakraborti, K. Kaski, and G. Germano, in Eds. A. Chatterjee, S. Yarlagadda and B.K. Chakraborti, Econophysics of Wealth Distributions (Springer-Verlag (Italia), Milan, 2005), pp. 93-110.
- 109) "Gibbs versus non-Gibbs distributions in money dynamics," M. Patriarca, A. Chakraborti, and K. Kaski, Physica A 340, 334 (2004).
- 110) "Asset trees and asset graphs in financial markets," J.-P. Onnela, A. Chakraborti, K. Kaski, J. Kertesz, and A. Kanto, Physica Scripta T 106, 48 (2003).
- 111) "Biology helps you to win a game," M. Sysi-Aho, A. Chakraborti, and K. Kaski, Physica Scripta T 106, 32 (2003).
- 112) "Dynamic asset trees and Black Monday," J.-P. Onnela, A. Chakraborti, K. Kaski, and J. Kertesz, Physica A 324, 247 (2003).

National conference proceedings (refereed)

- 113) "Statistical Physics of the Travelling Salesman Problem," B.K. Chakraborti, and A. Chakraborti, Ind. J. Theo. Phys. 47, 1 (1999).

TEACHING

Present (2017-2023)

- (i) Statistical Mechanics of Complex Systems for M.Sc. at School of Computational and Integrative Sciences, Jawaharlal Nehru University.
- (ii) Multi-agent modeling of complex systems, for M.Sc. year at School of Computational and Integrative Sciences, Jawaharlal Nehru University.
- (iii) Classical Mechanics/Quantum Mechanics/Statistical Mechanics, for M.Sc. at School of Computational and Integrative Sciences, Jawaharlal Nehru University.
- (iv) Social Network theory, for P.G. Diploma in Big Data at School of Computational and Integrative Sciences, Jawaharlal Nehru University.
- (v) Complexity Approaches to Public Policy, for M.A. at the CEASP, Jindal Global University.
- (vi) Data Science of Complex Systems, for B.Tech. Final Year at School of Engineering and Technology, BML Munjal University.
- (vii) Data Science of Complex Systems, for B.E.-MS at Department of Applied Mechanics, IIT Madras.

Past (2009-2016)

- (i) Taught Research Methodology for M.Tech.-Ph.D. students at School of Computational and Integrative Sciences, Jawaharlal Nehru University (2014-2016).
- (ii) Taught Quantitative Methods for Pre-Ph.D. course at School of Computational and Integrative Sciences, Jawaharlal Nehru University (2014-2015).
- (iii) Professor-in-charge and Tutor 2013-2014 Masters M2 Elective Course PH2821 «Applications of statistical physics to socio-economical complex systems» at Ecole Centrale Paris, France, in the S8 semester (36 hours).
- (iv) Professor-in-charge and Tutor 2012-2013 Masters M2 course «MA2821 Modélisation multi-agents des systèmes complexes» at Ecole Centrale Paris, France, in the S8 semester (36 hours).
- (v) Co-tutor 2012-2013 Masters M3 course «MA3216 Physique des marchés» at Ecole Centrale Paris, France.
- (vi) Professor-in-charge and Tutor 2011-2012 Master's degree elective course «Modélisation multi-agents des systèmes complexes» at Ecole Centrale Paris, France, in the S8 semester (36 hours).
- (vii) Professor-in-charge and Tutor 2010-2011 Master's degree elective course «Modélisation multi-agents des systèmes complexes» at Ecole Centrale Paris, France, in the S8 semester (36 hours).
- (viii) Professor-in-charge and Tutor 2009-2010 Master's degree elective course «Modélisation multi-agents des systèmes complexes» at Ecole Centrale Paris, France, in the winter S4 semester (36 hours).

Past (2008 and earlier)

- Taught Physics at Banaras Hindu University, Varanasi, India (November, 2005-September, 2008 @ 20 hours/week and 640+ hours/year).
 - Subjects at Undergraduate level: Statistical Physics, Nuclear and Particle Physics, Electronics (Laboratory).
 - Subjects at Postgraduate level: Advanced Statistical Physics, Quantum Mechanics, Molecular Biophysics, Computational Physics (Laboratory).
- Taught Programming in C as Guest-lecturer, Department of Computer Science, Mahila Mahavidyalaya, Banaras Hindu University (July-October, 2007 @ 3 hours/week).
- Taught Statistical Physics Tutorial Classes, Post M. Sc. Course, First semester, at Saha Institute of Nuclear Physics, Kolkata, India.

SUPERVISION

Post-doctoral fellows

- (i) **Dr. Akshansh Gupta** as DST-Research Associate at School of Computational and Integrative Sciences, Jawaharlal Nehru University (January 2016 – February 2020).
- (ii) **Dr. Amrita Singh** as CSIR-Research Associate at School of Computational and Integrative Sciences, Jawaharlal Nehru University (October, 2015 - September, 2018).

- (iii) **Dr. Arun Singh Patel**, School of Computational and Integrative Sciences, Jawaharlal Nehru University (August, 2015 - May, 2017).

Ph.D. students

- (i) **Dr. Rémy Chicheportiche** (with Frédéric Abergel as Co-supervisor), thesis defended on June 27, 2013.
▪ Ph.D. thesis entitled "*Non-linear Dependences in Finance*".
- (ii) **Dr. Anupama Singh** (with Ashwani Pareek as Co-supervisor), thesis defended on November 21, 2017.
▪ Ph.D. thesis entitled "*Study of Abiotic Stress Signaling Network in Rice: A Computational Approach using Gene Expression Data*".
- (iii) **Dr. Kiran Sharma**, thesis defended on October 9, 2019.
▪ Ph.D. thesis entitled "*Data Science Approaches to Complex Socio-economic Systems*".
- (iv) **Dr. Syed Shariq Husain**, thesis defended on June 26, 2021.
▪ Ph.D. thesis entitled "*Studies of Complex Dynamics in Socioeconomic Systems*".

Ongoing

- (i) **Vishwas Kukreti**, SCIS, JNU (2017- till date)
▪ Ph.D. thesis entitled "*Studies of critical dynamics in socio-economic systems using complexity theory*".
- (ii) **Praveen Mishra**, SCIS, JNU (2017- till date)
▪ Ph.D. thesis entitled "*Studies of Energy and Charge Transfer in Zero- and Two-dimensional Nanomaterials*".
- (iii) **Alka Yadav**, SCIS, JNU (2018- till date)
▪ Ph.D. thesis entitled "*Data Science Approaches to Environmental Systems and Climate Change*".
- (iv) **Hrishidev**, SCIS, JNU (2021-till date)
▪ Ph.D. thesis entitled "*Studies on Dynamics of Complex Systems: From Markets to Masses*".

M.S./M.Tech. Thesis students

- (i) Juhi Jain, Jawaharlal Nehru University, New Delhi, 2021.
▪ Master's thesis entitled— *Identification of crucial genes and pathophysiology associated with Depression* (M.Sc.)
- (ii) Adarsh Mishra, Jawaharlal Nehru University, New Delhi, 2020.
▪ Master's thesis entitled— *Topological Data Analysis of Complex Financial Markets* (M.Sc.)
- (iii) Hrishidev, IISER Pune, 2020.
▪ Master's thesis entitled— *Econophysics of Stock Market Dynamics* (M.Sc.)
- (iv) Shivani Choudhary, Jawaharlal Nehru University, New Delhi, 2019.
▪ Master's thesis entitled— *Financial time-series analysis from a chaotic aspect* (M.Sc.)
- (v) Deepender Dhillon, Jawaharlal Nehru University, New Delhi, 2019.
▪ Master's thesis entitled— *Aftershock Dynamics in Social Phenomena* (M.Sc.)
- (vi) Rahul Deo, Jawaharlal Nehru University, New Delhi, 2019.
▪ Master's thesis entitled— *An approach to quantify P&H value and prediction of Epileptic seizure* (M.Sc.)
- (vii) Neha Arora, Jawaharlal Nehru University, New Delhi, 2019.
▪ Master's thesis entitled— *Hierarchical structure and Prediction of Missing Links* (PGDC in Big Data)
- (viii) Varun Aggarwal, Jawaharlal Nehru University, New Delhi, 2018.
▪ Master's thesis entitled— *Analysis of Financial Return Series: Daily and intraday* (M.Sc.)
- (ix) Praveen Mishra, Jawaharlal Nehru University, New Delhi, 2016.
▪ Master's thesis entitled— *Nano-bio interaction: A case study of protein molecules with gold nanoparticles and two dimensional nanosheets*(M.Tech.)
- (x) Padam Kumar Singh (with A. Krishnamachari), Jawaharlal Nehru University, New Delhi, 2016.
▪ Master's thesis entitled— *Study of Random Walk Model in Genomic sequence of Prokaryotes and Eukaryotes* (M.Tech.)

- (xi) Anuj Kumar Sirohi, Jawaharlal Nehru University, New Delhi, 2015.
 - Master's thesis entitled— *Effect of noise on Spatio-temporal pattern formation for Interacting Population Models* (M.Tech.)
- (xii) Federico Bettin (with Damien Challet and Attilio Stella), Università degli Studi di Padova, Italy, 2014.
 - Master's thesis entitled— *The role of asymmetric gain and loss perception in Minority Games* (M.S.)
- (xiii) Gayatri Tilak, Université Paris-Dauphine, France, 2012.
 - Master's thesis entitled— *Analysis Studies of the Recurrence-time interval distribution in financial time-series data at low and high frequencies* (M.Tech.)
- (xiv) Esteban Guevara Hidalgo, École Polytechnique, France, 2012.
 - Master's thesis entitled— *Statistical analysis of high frequency financial time series: individual and collective stock dynamics* (M.S.)
- (xv) Gayatri Tilak, École Centrale d'électronique, France, 2011.
 - Master's thesis entitled— *Analysis of financial time series: moving averages and correlations* (M.Tech.)
- (xvi) Mehdi Lallouache, École Normale Supérieure de Cachan, France, 2010.
 - Master's thesis entitled— *Kinetic Wealth Exchange Models: Some Analytical Aspects* (M.S.)
- (xvii) Hazem Krichéne (with Frederic Abergel), École Polytechnique de Tunisie, Tunisia, 2010.
 - Master's thesis entitled— *L'application de la théorie des réseaux pour l'étude du risque systémique* (M.Tech.)
- (xviii) V. Sreeramulu, Banaras Hindu University, Varanasi, 2008.
 - Master's thesis entitled— *Statistical Methods of event generation studies* (M.Sc.)
- (xix) Manoj Kumar, Banaras Hindu University, Varanasi, 2007.
 - Master's thesis entitled— *DNA Transcription Regulation: A Network Study* (M.Sc.)
- (xx) Jukka-Pekka Onnela, Helsinki University of Technology (now Aalto University), Finland, 2002.
 - Master's thesis entitled— *Taxonomy of Financial Assets* (M.Tech.)

INVITED LECTURES

2023

- 1) Invited lecture entitled “Complex Systems Approach to Sustainability Development” at IMSc Chennai on February 23, 2023.

2022

- 2) Invited webinar entitled “Methods in Sociophysics” at the International Virtual Course on “Methods in Econophysics and Sociophysics”, at the Institut Teknologi Bandung, Indonesia on September 28, 2022.
- 3) Invited Lectures at the Research Workshop at IIM Kozhikode, Kerala, entitled “Uses of data science in Economics and Finance” on July 12, 2021.
- 4) Invited webinar at the Complex Systems and Dynamics Group, IIT Madras, Chennai, entitled “Complexity science approach to social progress and sustainability development” on July 8, 2021.
- 5) Invited webinar at the Indo-Mexican Workshop on “Multivariate Analysis & Machine Learning in Econophysics, Brain Activity, Sociophysics, and more” held during June 20-24, 2022, at the CiC AC, UNAM, Cuernavaca, Mexico, entitled “Applications of Network Theory: Biology to Finance”, on June 21, 2022.
- 6) Invited webinar at the International Gathering “Multivariate Analysis in Finance, Brain Research and more” held during February 7-11, 2022, at the CiC AC, UNAM, Cuernavaca, Mexico, entitled “Ranking Indian states chasing the sustainable development goals: A network-based approach”, on February 8, 2022.
- 7) Invited webinar at the International Conference on Advances in Biosciences and Biotechnology 2022, Jaypee Institute of Information Technology, Noida, entitled “Network Science Applications in Biology: Identifying Significant Key Regulators” during January 20-22, 2022.

2021

- 8) Invited webinar on “Econophysics” at National Institute of Chemical Physics and Biophysics, Tallinn, Estonia, on December 15, 2021.
- 9) Invited seminar on “Econophysics” at Akal University, Talwandi Sabo, Punjab, on December 14, 2021.
- 10) Invited webinar at the International Conference on “Current Trends in Non-Equilibrium Physics” held at the School of Physical Sciences, Jawaharlal Nehru University, New Delhi during November 22 -26, 2021, entitled “Deciphering Complexity of Financial Networks” on November 25, 2021.

- 11) Invited webinar at the International Mini-workshop “Multivariate Analysis and Applications”, at the CiC AC, UNAM, Cuernavaca, Mexico, entitled “Fluctuations and Disorder in Financial Markets”, on October 8, 2021.
- 12) Invited webinar at the International Workshop on “Networks & Dynamical Systems” held at the Complex Systems and Dynamics Group, IIT Madras, Chennai, during August 25 -28, 2021, entitled “Deciphering Complexity of Financial Networks” on August 26, 2021.
- 13) Invited webinar entitled “Sociophysics” at the International Virtual Course on Econophysics and Big Data Analytics in Global Socio-Economic Complexity, Institut Teknologi Bandung, Indonesia on August 23, 2021.
- 14) Invited webinar at Sabudh Foundation, Mohali, entitled “Bridging Data and Science for Deciphering Complexity” on February 6, 2021.

2020

- 15) Invited webinar at the International School and Gathering on “Multivariate analysis and some applications”, at the CiC AC, UNAM, Cuernavaca, Mexico, entitled “Correlation structures of financial markets” on December 14, 2020.
- 16) Invited webinar on “Econophysics of financial markets” at the Department of Physics, IIT(ISM) Dhanbad, on July 17, 2020.
- 17) Invited lecture at the International Conference on “Quantum Decision Theory and Complexity Modelling in Economics and Public Policy”, at the Jindal School of Government & Public Policy, O.P. Jindal Global University, entitled “Econophysics and Implications for Financial Systems” during February 19-20, 2020.
- 18) Invited lecture at the IISER Bhopal for the “Fourth Paradigm Conference”, entitled “Identifying Tipping-points in Financial Markets using Data Science methods”, during January 27-30, 2020.

2019

- 19) Invited lecture at the Department of Physics, IIT Madras, Chennai, on “Phase separation behavior in financial markets”, on December 19, 2019.
- 20) Invited lecture at International Workshop on “Data Science in Finance” in CMI, Chennai, on “Portfolio Optimization”, during December 18, 2019.
- 21) Invited lecture at International Workshop on “Data Science in Finance” in CMI, Chennai, on “Unsupervised Learning”, during December 17, 2019.
- 22) Invited lecture at the International Conference “Econophysics Colloquium 2019” at Nanyang Technological University, Singapore, on “Financial and macroeconomic dynamics using multi-layered networks”, during October 2, 2019.
- 23) Invited lecture at the International Conference “Conference on Complex Systems 2019” at Nanyang Technological University, Singapore, on “Criticality in Complex Systems: Extreme events, recurrences, power-laws and beyond”, during September 30, 2019.
- 24) Invited lecture at the Indira Gandhi Institute of Development Research, Mumbai, on “Predicting the unpredictable: A case study of financial market crashes”, during September 4, 2019.
- 25) Invited lecture at the Department of Physics, Bennett University, Greater Noida, on “Multi-agent modelling in Complex Socio-economical Systems”, during August 22, 2019.
- 26) Invited lecture at the International Conference on Discrete Simulations of Fluid Dynamics DSFD 2019 at JNCASR, Bangalore, on “Kinetic Exchange Models in D-Dimensions: Theory and Applications”, during July 22-26, 2019.
- 27) Invited lecture at ICTS-TIFR Bangalore on “Study of financial and macroeconomic dynamics using multi-layered networks”, on July 10, 2019.
- 28) Invited lecture at ICTS-TIFR Bangalore on “Multi-agent modelling in Complex Socio-economical Systems”, on July 8, 2019.
- 29) Invited lecture at JNCASR Bangalore on “Complex Socioeconomic Networks Redux”, on July 4, 2019.
- 30) Invited lecture at IISc. Bangalore on “Predicting the unpredictable: A case study of financial market crashes”, on July 3, 2019.
- 31) Invited lecture at ICTS-TIFR Bangalore on “Near-extreme events: Density, Copulas and beyond”, on July 1, 2019.
- 32) Invited lecture at ICTS-TIFR Bangalore on “Socio-economic inequalities: Can humans be modeled like atoms?” on June 27, 2019.
- 33) Invited lecture at ICTS-TIFR Bangalore on “Complex network studies of ethnic conflicts, human rights violations, terrorism and more”, on June 24, 2019.
- 34) Invited lecture at JNCASR Bangalore on “Critical dynamics in Complex Systems: From environment to markets”, on June 18, 2019.

- 35) Invited lecture at ICTS-TIFR Bangalore on “Critical dynamics in Complex Systems: From environment to markets”, on June 17, 2019.
- 36) Invited lecture at IISER Kolkata on “Predicting the unpredictable: A case study of financial market crashes”, on February 13, 2019.
- 37) Invited Colloquium at IIT Kanpur, Department of Physics, on “Predicting the unpredictable: A case study of financial market crashes” on January 25, 2019.

2018

- 38) Invited lecture at IIM Ahmedabad, International conference on "Network Science in Economics and Finance" during December 19-21, 2018, titled “Study of financial and macroeconomic dynamics using multi-layered networks”.
- 39) Invited lecture at CMI Chennai, International conference StatFin-2018 during December 17-20, 2018, titled “Mesoscopic Financial Network: Sectoral Co-movements & Core-periphery Structure”.
- 40) Invited lectures at CMI Chennai, “Data Science Winter School 2018” during December 3-13, 2018, titled “Data Science in Sociology” and “Data Science in Finance”.
- 41) Invited Colloquium at IMSc, Chennai, on “Predicting the unpredictable: A case study of financial market crashes” on December 11, 2018.
- 42) Invited Colloquium at IIT Chennai, Department of Physics, on “Predicting the unpredictable: A case study of financial market crashes” on December 7, 2018.
- 43) Invited lecture at the CIC A.C., UNAM, Cuernavaca, Mexico, on July 30th, 2018, titled “Critical dynamics in the light of random matrix theory”.
- 44) Invited lecture at the CIC A.C., UNAM, Cuernavaca, Mexico, on July 20th, 2018, titled “Multi-layered network study of financial markets and real economy”.
- 45) Invited lecture at the CIC A.C., UNAM, Cuernavaca, Mexico, on July 10th, 2018, titled “Global income inequality and savings: A data science perspective”.
- 46) Invited lecture at the Department of Physics, BUAP, Puebla, Mexico, on July 3rd 2018, titled “Network theory in Social Sciences”.
- 47) Invited lecture at the Department of Physics, BUAP, Puebla, Mexico, on July 3rd 2018, titled “Understanding complexity of market states and crashes”.
- 48) Invited lecture at the CIC A.C., UNAM, Cuernavaca, Mexico, on June 20th, 2018, titled “Near-extreme events: Density, Copulas...”

2017

- 49) Keynote lecture at the 5th Symposium on “Economics, Physics and Finance”, at the CIC A.C., UNAM, Cuernavaca, Mexico, on August 12th, 2017, titled “What does it take to beat the odds? — Lessons from game theory”.
- 50) Invited lecture at the IER, UNAM, Cuernavaca, Mexico, on August 3rd, 2017, titled “Socio-economic inequalities: Can humans be modeled like atoms?”
- 51) Invited Colloquium at the ICF, UNAM, Cuernavaca, Mexico, on August 2nd, 2017, titled “Socio-economic inequalities: Can humans be modeled like atoms?”
- 52) Invited talk at the Post Graduate School, Department of Physics, University of Guadalajara, Mexico, on July 20th, 2017, titled “Socio-economic inequalities: Can humans be modeled like atoms?”
- 53) Invited lecture at the Conference on “Chaos, scattering, and semi-classics” on July 14th, 2017, titled “Resonance Raman scattering and energy transfer in two dimensional nanosheets”.
- 54) Invited lecture at the “Gathering: Correlations in Time Series and Many-Body Systems” at the CIC A.C., UNAM, Mexico, on July 7th, 2017, titled “Sociophysics: Complex network analyses of languages and ethnic conflicts”.
- 55) Invited lecture at the conference “RMT, Time Series and Many-Body Systems”, at CIC A.C., UNAM, Mexico, on June 29th, 2017, titled “Complex network analysis of co-movements of stock indices”.
- 56) Invited lecture at the IISER, Pune, on June 20th, 2017, titled “Ethnic conflicts and human rights violations: A complex network analysis”.
- 57) Invited lecture at the Chennai Mathematical Institute, Chennai, on June 8th, 2017, titled “Financial fluctuations & economic fundamentals: A network approach”.

2016

- 58) Invited lecture at Institute of Mathematical Sciences, Chennai, on November 26th, 2016, titled "Correlations and co-movements in financial networks: A mesoscopic analysis".
- 59) Invited lecture at the Indian Statistical Institute, Chennai, on November 23rd, 2016, titled "Mesoscopic networks in socio-economic complex systems".
- 60) Invited lecture at "Statistical Methods in Finance 2016" at the Chennai Mathematical Institute, Chennai, on November 18th, 2016, titled "Financial time series analyses: Near extreme events, correlations and co-movements".
- 61) Invited lecture at Chuo University, Tokyo, Japan on November 29th, 2016, titled "Sectoral co-movements in the Indian stock market: A mesoscopic network analysis".
- 62) Invited lecture at BNERC, Toyo University, Saitama, Japan on November 24th, 2016, titled "Bio-nano interactions: A case study of resonance energy transfer from protein molecules to two dimensional nanosheets".
- 63) Invited lecture at Iwate Prefectural University, Takizawa, Japan on November 21st, 2016, titled "Mental Task Classification — Empirical Mode decomposition, Network and Clustering Analyses".
- 64) Invited lecture at the CentraleSupélec, Paris, France, on July 25th, 2016, titled "Sectoral co-movements and volatilities of Indian stock market: An analysis of daily returns data".
- 65) Invited lecture at International Conference on "Challenges in Data Science", on July 8th, Matera, Italy, organized by Politecnico di Torino, Italy, titled "Physicists' approach to studying socio-economic inequalities: Data analyses and modeling".
- 66) Invited lecture at Scuola Normale Superiore, Pisa, Italy on July 6th, 2016, titled "Sectoral co-movements and volatilities of Indian stock market: an analysis of daily returns data".
- 67) Invited lecture at the International Conference on "Social Statistics in India", at Asian Development Research Institute, Patna on June 24-27, 2016, titled "Physics of Socio-Economic systems: Modelling Inequalities".
- 68) Invited lecture at Indian Institute of Advanced Study, Shimla on May 25th, 2016, titled "Physicists' approach to studying socio-economic inequalities: Can humans be modelled as atoms?"
- 69) Invited Lecture at the Conference and 20th Annual Meeting of Japan Association for Evolutionary Economics (JAFEE) at the University of Tokyo, Tokyo, Japan during March 26-27, 2016, titled "Near-extreme events: Density, Copulas..."
- 70) Invited lecture at the Workshop of Financial and Economic Risk at the International Christian University, Tokyo, Japan, March 25, 2016, titled "Physicists' approach to studying socio-economic inequalities".

2015

- 71) Invited seminar at the RR Bawa DAV College for Girls, Batala on December 22nd, 2015, titled "Integrative Sciences: A Physicist's perspective".
- 72) Invited lectures at "Complex Systems Winter School 2015" held at IISER Mohali, on December 19th, 2015, titled "Econophysics I - Kinetic exchange models in complex socio-economic systems" and "Econophysics II - Statistical mechanics of competitive resource allocation: El Farol Bar to Kolkata Paise Restaurant".
- 73) Invited lecture at the UGC Human Resource Development Center, JNU on August 27th, 2015, titled "Complex Networks".
- 74) Invited lecture at the "Research Workshop and Conference on Statistical methods in finance" at the Chennai Mathematical Institute, Chennai July 17th, 2015, titled "Econophysics".
- 75) Invited lecture at the National Institute of Chemical Physics and Biophysics, Tallinn, Estonia on June 25th, 2015, titled "Opinion formation in the society using the kinetic exchange models".
- 76) Invited lectures at "Econophysics and Quantitative Finance workshop" at Indian Institute of Management, Indore on April 10th, 2015, titled "A Physicist's way of doing Computational Finance" and "Statistical mechanics of competitive resource allocation: El Farol Bar to Kolkata Paise Restaurant".
- 77) Invited lecture at the Department of Physics, Maharaja Agrasen University, Solan, India, on February 9th, 2015, titled "Do human beings behave like atoms?"
- 78) Invited lecture at the 102nd Indian Science Congress, held at the University of Mumbai, Mumbai, India, on January 5th, 2015, at the session "Application of Mathematical Modeling to Societal Issues", titled "Opinion formation in society using the kinetic exchange models"

2014

- 79) Invited lecture at TCS Innovation Labs, New Delhi, on December 10th, 2014, titled "Can we model human beings?"
- 80) Invited lecture at Department of Physics, University of Calcutta, Kolkata, on December 8th, 2014, titled "Statistical mechanics of competitive resource allocation: El Farol Bar to Kolkata Paise Restaurant".
- 81) Invited lectures at the UGC Academic Staff College, Jawaharlal Nehru University, New Delhi, on October 8-9, 2014, titled "Econophysics & Sociophysics".
- 82) Invited lecture at the UGC Academic Staff College, Jawaharlal Nehru University, New Delhi, on August 13th, 2014, titled "Computational Finance".

2013

- 83) Invited talk at the International Workshop on Nonlinear Maps and their Applications NOMA-2013, on September 4th, 2013 in Zaragoza, Spain, titled "Kinetic exchange models in economics and sociology".
- 84) Invited seminar at the Graduate School of Information Science & Technology, Hokkaido University, Sapporo, Japan on August 28th, 2013, titled "An Econophysicist's way of studying the dynamic evolution of the market."
- 85) Invited seminar at the Department of Computer Science, National Defense Academy, Yokosuka, Japan on August 22nd, 2013, titled "An Econophysicist's way of studying the dynamic evolution of the market."
- 86) Invited seminar at the Department of Software & Information Science, Iwate Prefectural University, Morioka, Japan, on August 9th, 2013, titled "An Econophysicist's way of studying the dynamic evolution of the market."
- 87) Invited talk at the ELC International Meeting on "Inference, Computation, and Spin Glasses" (ICSG2013), Sapporo, Japan, on July 28th, 2013, titled "Statistical inference of co-movements of stocks during a financial crisis."
- 88) Invited seminar at the Social Science Research Institute, International Christian University, Tokyo, Japan, on July 22nd, 2013, titled "Analyses of near-extreme events and recurrences in financial time series."
- 89) Invited seminar at the Bayesian & Interdisciplinary Research Unit, Indian Statistical Institute, India, on January 18th, 2013, titled "Time-series analyses by Econophysicists."
- 90) Invited seminar jointly organized by the School of Computational and Integrative Sciences & School of Computer and System Sciences, Jawaharlal Nehru University, New Delhi, on January 11th, 2013, titled "Visualization tools in Financial Markets."
- 91) Invited seminar at the School of Computational and Integrative Sciences, Jawaharlal Nehru University, New Delhi, on January 10th, 2013, titled "Multi-agent modelling of Complex Systems."
- 92) Invited seminar at the School of Computational and Integrative Sciences, Jawaharlal Nehru University, New Delhi, on January 9th, 2013, titled "Kinetic exchange models in complex socio-economic systems."

2012

- 93) Invited seminar at the School of Computer and System Sciences, Jawaharlal Nehru University, New Delhi, on November 21st, 2012, titled "Trends, Patterns and Co-movement in financial markets."
- 94) Invited lecture at the international meeting "Exploring an Interface Between Economics & Physics", held at the Department of Physics and Astrophysics, University of Delhi, New Delhi, on November 6-7, 2012, titled "Trends, Patterns and Co-movement in financial markets."
- 95) Invited Lectures at the Department of Physics Galileo Galilei, University of Padova, Italy, on June 27th and June 29th, 2012, titled "Multi-agent modeling of financial markets – Part 1 and 2"
- 96) Invited Lecture at the Department of Physics Galileo Galilei, University of Padova, Italy, on March 1st, 2012, titled "Can we model socio-economic phenomena using kinetic theory of gases?"
- 97) Invited Lecture at the Statistical Physics Group, University of Calcutta, Kolkata, India, on January 5th, 2012, titled "Kinetic exchange models in studying socio-economic phenomena".
- 98) Invited lecture at the International Conference "Contemporary Issues and Applications of Statistics" on January 4th, 2012 at the Indian Statistical Institute, Kolkata, India, titled "Correlations in Financial Time-series: An Econophysicist's Perspective".

2011

- 99) Invited lecture at the Theoretical Condensed Matter Physics Division, Saha Institute of Nuclear Physics, Kolkata, India, on December 30th, 2011, titled "Kinetic exchange formalism applied to socio-economic phenomena".
- 100) Invited lecture at the Department of Physics and Astrophysics, University of Delhi, India, on December 22nd, 2011, titled "Kinetic exchange models in studying socio-economic phenomena".

- 101) Invited lecture at the Centre d'analyse et de mathématique sociales, Ecole des Hautes Etudes en Sciences Sociales, Paris, France on December 9th, 2011, titled "Kinetic exchange models in studying socio-economic phenomena".
- 102) Invited lecture at the Unexpected Conference on "SOCIOPHYSICS: Do humans behave like atoms?" held at CREA, École Nationale Supérieure de Techniques Avancées, Paris, France on November 15th, 2011, titled "Opinion formation in the kinetic exchange models".
- 103) Invited lecture at International Workshop on "Econophysics of systemic risk and network dynamics", held at Saha Institute of Nuclear Physics, Kolkata, India on October 25th, 2011, titled "Correlations in financial time series".
- 104) Invited lecture at School and Workshop on Market Microstructure: Design, Efficiency and Statistical Regularities, ICTP, Italy on March 21st, 2011, titled "Statistical physics inspired models of financial markets".
- 105) Invited talk at Graduate School of Information Science & Technology, Hokkaido University, Japan on March 1st, 2011, titled "Opinion formation in the kinetic exchange models".
- 106) Invited talk at Department of Physics, Kyoto University, Japan on February 24th, 2011, titled "Opinion formation in the kinetic exchange models".
- 107) Invited lecture at First Workshop on Quantitative Finance and Economic: an Unconventional Meeting, International Christian University of Tokyo, Japan on February 21st, 2011, titled "Kinetic exchange models of wealth distribution".
- 108) Invited lecture at XII Workshop on Quantitative Finance, University of Padova, Italy on January 27th, 2011, titled "The near-extreme density of intraday log returns".

2010

- 109) Invited Seminar at Statistical Physics Group, Theoretical Condensed Matter Physics Division, Saha Institute of Nuclear Physics, India on November 22nd, 2010, titled "Kinetic Exchange Models of Socio-Economic problems".

2009

- 110) Invited Seminar at Laboratoire de Mathématiques Appliquées aux Systèmes, Ecole Centrale Paris, France on February 19th, 2009, titled "Unconventional Application of Statistical Physics: Econophysics".

2008

- 111) Invited Seminar on "An Outlook on Econophysics" at Laboratoire de Mathématiques Appliquées aux Systèmes, Ecole Centrale de Paris, France on May 23rd, 2008.
- 112) Invited colloquium at School of Physical Sciences, Jawaharlal Nehru University, New Delhi, India on May 7th, 2008 titled "An Outlook on Econophysics".
- 113) Invited Special Random Interactions Seminar on "Multi-agent Modelling of Complex Systems" at Department of Theoretical Physics, Tata Institute of Fundamental Research, India on March 7th, 2008.
- 114) Invited Special Theoretical Physics Colloquium on "An Outlook on Econophysics" at Department of Theoretical Physics, Tata Institute of Fundamental Research, India on March 6th, 2008.
- 115) International Workshop and Conference on "Statistical Physics Approaches to Multidisciplinary Problems" held at Indian Institute of Technology, Guwahati during January 7-13, 2008. Invited talk titled "Methods in Econophysics: Successes and Failures".
- 116) Invited Seminar on "What is Econophysics?" at Department of Economics, Banaras Hindu University, Varanasi on January 4th, 2008.

2006

- 117) Invited Lecture on "Physics of DNA Regulatory Networks" at "Physics Learning Camp" held at Department of Physics, Banaras Hindu University, Varanasi on October 18th, 2006.
- 118) Invited Indian Physics Association colloquium at Department of Physics, Banaras Hindu University, Varanasi on August 18th, 2006, titled "Unconventional Applications of Statistical Physics".

- 119) Invited lectures/tutorials at the SERC School on “Statistical Physics and Structural Phase Transitions” held at the Department of Material Sciences, Institute of Technology, Banaras Hindu University, Varanasi during March 1-7, 2006.
- 120) International Workshop on “Econophysics of Stock Markets and Minority Games”, held at Saha Institute of Nuclear Physics, Kolkata on February 14-17, 2006. Invited talk on “Studies on correlations in stock prices and adaptive minority games”.

2005

- 121) Invited Colloquium at the Mahila Maha Vidyalaya, Banaras Hindu University, Varanasi on November 29th, 2005 titled “Econophysics: Analyses & Modeling”.
- 122) Invited Seminar at the Institute for Physical Science and Technology, University of Maryland, Maryland on May 3rd, 2005 titled “Econophysics: Analyses & Modelling”.
- 123) Informal Seminar at the Bussemaker Laboratory, Department of Biological Sciences, Columbia University, New York on April 13th, 2005 titled “What is Econophysics?”
- 124) International Workshop on “Econophysics of Wealth Distributions”, held at Saha Institute of Nuclear Physics, Kolkata on March 15-19, 2005. Invited talk on “A Physicist’s attempt to model wealth distributions in Economic systems”.
- 125) Invited lectures at Physics Department, Bose Institute, Kolkata, India on March 11th, 2005 titled “What is Econophysics? Part I and II”.
- 126) Invited Colloquium at Physical Research Lab., Ahmedabad, India on March 9th, 2005 titled “Correlations and other studies in Financial Time Series”.
- 127) Invited talk at Physics Department, Delhi University, New Delhi, India on March 3rd, 2005 titled “Model to study Adaptation in Multi-Agent Systems”.
- 128) Invited talk at School of Physical Sciences, Jawaharlal Nehru University, New Delhi, India on March 2nd, 2005 titled “Correlations and other studies in Financial Time Series”.

2004

- 129) Invited talk at the second mini-symposium of the EXYSTENCE Thematic Institute “From Many-Particle Physics to Multi-Agent Systems” held at the Max Planck Institute for the Physics of Complex Systems (MPIPKS) in Dresden, Germany on August 23rd, 2004, titled “Adaptive Minority Games”.
- 130) Invited talk at the Lab. of Computational Engineering, Helsinki University of Technology, Helsinki, Finland on July 21st, 2004, titled “Genome-wide identification of transcription factor binding sites: A Physicist’s Viewpoint”.

2003

- 131) International Conference on “Unconventional Applications of Statistical Physics” held at Saha Institute of Nuclear Physics, Kolkata on March 20-22, 2003. Invited talk on “Biology helps you to win a game”.
- 132) Invited talk at the Biophysics and Statistical Mechanics Group, Laboratory of Computational Engineering, Helsinki University of Technology, Helsinki, Finland on February 26th, 2003, titled “An Introduction to the Travelling Salesman Problem”.

2001

- 133) Invited talk–“Erich Schneider Seminar” at Dept. of Economics, University of Kiel, Kiel, Germany, on September 18th, 2001 titled “The Distribution Functions of Money and Commodity Holdings in a Minimal Model of a Market Economy”.

2000

- 134) Invited talk at One-day seminar “Recent Trends in Condensed Matter Physics”, held at Visva-Bharati University, Santiniketan, India on December 17th, 2000, titled “Application of Statistical Physics to Economics: An Introduction”.

CONFERENCES, WORKSHOPS, PANEL DISCUSSIONS

- 1) 4th BRICS Mathematics Conference at IISER Thiruvananthapuram, Kerala during December 7-10, 2021
- Oral presentation on “Deciphering complexity of financial markets”.

- 2) Panel discussion on “Quantum Social Science and Public Policy” at the Center for Complexity Economics, Applied Spirituality and Public Policy (CEASP), JSGP, O.P. Jindal Global University, Sonapat, India on 21st October, 2020.
- 3) Panel discussion on “Complexity Economics” at the Center for Complexity Economics, Applied Spirituality and Public Policy (CEASP), JSGP, O.P. Jindal Global University, Sonapat, India on 23rd September, 2020.
- 4) International conference on Discrete Simulations of Fluid Dynamics (DSFD 2019) at JNCASR, Bangalore, during July 22-26, 2019.
 - Session Chairperson on July 25th, 11h00-13h00.
- 5) International conference "StatPhys26", July 18-22, Lyon, France, by the IUPAP-International Union of Pure and Applied Physics.
 - Poster presentation on “Statistical physics models of Language Dynamics: Role of Diversity”
- 6) Indo-US Bilateral Conference cum Workshop on "Big Data Analysis and Translation in Disease Biology" at Jawaharlal Nehru University, New Delhi, India, during January 18-22 2015.
 - Session Chairperson on January 20th, 15h00-19h00.
- 7) International Conference “STATPHYS-KOLKATA VIII”, held at Satyendra Nath Bose National Centre for Basic Sciences, Kolkata, India during December 1-5, 2014.
- 8) International Workshop on “Econophysics and data driven modelling of market dynamics”, held at Saha Institute of Nuclear Physics, Kolkata, India during March 14-17, 2014.
- 9) International Workshop on Nonlinear Maps and their Applications NOMA-2013, on September 3-4, 2013 in Zaragoza, Spain.
 - Session Chairperson on September 4th, 15h30-17h10.
- 10) International Workshop on “Statistical modeling, financial data analysis and applications”, held at the Istituto Veneto di Scienze Lettere ed Arti (IVSLA) in Venice, during September 11-14, 2013.
- 11) The International Conference “FNET 2013 Kyoto: Financial Networks and Systemic Risk”, held at Kyoto University, Kyoto, Japan during July 17-19, 2013.
 - Session Chairperson on July 19th, 09h30-11h40.
 - Oral presentation on “Visualization and analyses of co-movement of stocks during a financial crisis”.
- 12) International Workshop & Conference on “Diversity & Complexity: Realm of today’s Statistical Physics”, held at Saha Institute of Nuclear Physics, Kolkata, India during January 14-17, 2013.
- 13) International Workshop on “Econophysics of Agent-based models”, held at Saha Institute of Nuclear Physics, Kolkata, India during November 8-12, 2012.
- 14) The International Conference "Contemporary Issues and Applications of Statistics" held at the Indian Statistical Institute, Kolkata, India, during January 2-4, 2012.
- 15) The Unexpected Conference on “SOCIOPHYSICS: Do humans behave like atoms?” held at CREA, École Nationale Supérieure de Techniques Avancées, Paris, France during November 14-16, 2011.
- 16) International Workshop on “Econophysics of systemic risk and network dynamics”, held at Saha Institute of Nuclear Physics, Kolkata, India during October 21-25, 2011.
- 17) School and Workshop on “Market Microstructure: Design, Efficiency and Statistical Regularities”, held at the Abdus Salam ICTP, Trieste, Italy during March 21-25, 2011.
- 18) First Workshop on “Quantitative Finance and Economic: an Unconventional Meeting”, held at the International Christian University of Tokyo, Japan during February 21-23, 2011.
- 19) The XII Workshop on Quantitative Finance, held at the University of Padova, Italy during January 27-28, 2011.
- 20) International Conference on “Market Microstructure: confronting many viewpoints” held at the Institut Louis Bachelier, Paris, France during December 6-10, 2010.
- 21) International Workshop on “Statistical Physics of Complexity, Optimization and Biological information” held at Université Paris-Sud 11, Orsay, France during September 13-15, 2010.
- 22) International Workshop and Conference on “Statistical Physics Approaches to Multidisciplinary Problems” held at Indian Institute of Technology, Guwahati, India during January 7-13, 2008.
 - Poster presentation on “Interstate Pattern of Technology Achievement in India”.
- 23) International conference on “Recent Advances in the Interdisciplinary Applications of Statistical Physics” at Interdisciplinary Center of Theoretical Studies (ICTS), Chinese Academy of Sciences (CAS), Beijing, China on August 21st, 2006.
 - Oral presentation on “Genome-wide identification of transcription factor binding sites: A Physicist’s Viewpoint”.
 - Poster presentation on “Generalized statistical models of economy markets”.
- 24) International Conference entitled “93rd Statistical Mechanics Conference” held at Rutgers University, New Jersey on May 15-17, 2005.

- Oral presentation on “Statistical Mechanics of Money Savings”.
- 25) March Meeting of the American Physical Society, held at Los Angeles, California, during March 21-25, 2005.
 - Oral presentation on “Statistical model with a standard Gamma distribution”.
 - 26) One-day Special Plenary Session of the Conference in Computational Physics (CCP2005), held at Los Angeles, California on March 20th, 2005.
 - 27) Workshop “Multi-Agent Systems - Swarms, Ecology, and Society”, held at the Max Planck Institute for the Physics of Complex Systems (MPIPKS) in Dresden, Germany during August 30-September 3, 2004.
 - 28) Workshop entitled “BioMaPS/DIMACS/MBBC/PMMB Short Course: Transcriptional Regulation from Molecules to Systems and Beyond” held at the DIMACS Center - Rutgers University, New Jersey on June 21-25, 2004.
 - 29) International Conference entitled “91st Statistical Mechanics Conference” held at Rutgers University, New Jersey on May 16-18, 2004. Oral presentation on “Statistical Mechanics of Multiple Local Sequence Alignment”.
 - 30) International Workshop entitled “Workshop on Economics with Heterogeneous Interacting agents 2003” held at the Institute for World Economics, Kiel on May 29-31, 2003.
 - Oral presentation on “Adaptation amongst Heterogeneous Interacting Agents in a model Economy”.
 - 31) Santa Fe Institute-Saha Institute of Nuclear Physics Joint Workshop on “Dynamical and Spatially Extended Systems” held at Saha Institute of Nuclear Physics, Kolkata on January 21-23, 2002.
 - Poster presentation on “Market application of percolation theory”.
 - 32) International Conference STATPHYS-KOLKATA IV, held at the Indian Association for the Cultivation of Science and S. N. Bose National Centre for Basic Sciences, Kolkata during January 14-19, 2002.
 - Poster presentation on “Distribution Functions of Money in Model Market of Economy”.
 - 33) International Conference “Conference on Computational Physics (CCP 2001)”, held at Aachen, Germany during September 5-8, 2001.
 - Oral presentation entitled “Study of the distribution functions in minimal model market”.
 - 34) Workshop on “Probability and Statistical Physics”, held at S. N. Bose National Centre for Basic Sciences during February 19-23, 2001.
 - Poster presentation entitled “Study of the distribution functions in the minimal model market”.
 - 35) International Summer School and Workshop on “Second School on the Mathematics of Economics”, held at the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy from August 21-September 1, 2000.
 - Oral presentation entitled “The Statistical Mechanics of Money”.
 - 36) SERC School on “Field Theory in Condensed Matter Systems”, held at the Mehta Research Institute, Allahabad, India from February 13-March 4, 2000.
 - 37) International Conference on “NP-hardness and Phase transitions”, held at the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy from September 6-10, 1999.
 - Poster presentation entitled “The Travelling Salesman Problem on Manhattan Metric- A Physicist’s Approach”.
 - 38) International Summer School on “Statistical Physics and Probabilistic Methods in Computer Science: A Primer for Physicists, Mathematicians & Computer Scientists”, held at the Abdus Salam International Centre for Theoretical Physics, Trieste, Italy from August 23-September 3, 1999.

PROFESSIONAL ACCOMPLISHMENTS

Administration and Consultancy

- **Dean of Research and Development**, BML Munjal University (June 1, 2021—till date)
- **Registrar**, Jawaharlal Nehru University (March 2021– May 2021).
- **Dean**, School of Computational and Integrative Sciences, Jawaharlal Nehru University (December 15, 2014—December 14, 2016).
- **Coordinator**, Mathematical & Computational Empowerment Cell, Jawaharlal Nehru University (August 2014 – August 2019).
- **Coordinator**, Department of Biotechnology Centre of Excellence (Funded by Department of Biotechnology, Ministry of Science and Technology, Government of India) (2015-2016).
- **Member, Executive Council**, Jawaharlal Nehru University (2015-2016).
- **Member, Academic Council**, Jawaharlal Nehru University (2015-2016)(2018-till date).
- **Consultant**, Dono Consulting Pvt. Ltd. (2018- till date).
- **Consultant**, TCS Innovation Labs, New Delhi (2015-2017).

Editorial and reviewing activities

- **Editorial Board member** for the Series "*Physics of Society: Econophysics and Sociophysics*," Cambridge University Press.
- **Editorial Board member** for the journals:
 - (i) *J. Physics Complexity*, IOP Publishing, USA, and
 - (ii) *Complexity*, Wiley-Hindawi Publishing, UK.
- **Guest Associate Editor** for the journal *Frontiers in Physics*, section Social Physics; Research Topic Title "From Physics to Econophysics and Back: Methods and Insights."
- **Review Editor** for Interdisciplinary Physics, *Frontiers in Physics*
- **Reviewer** of papers submitted to journals:
 - (i) *Physical Review Letters*;
 - (ii) *Nature – Scientific Reports*;
 - (iii) *Physical Review E*;
 - (iv) *European Physical Journal B*;
 - (v) *Management Science*;
 - (vi) *Physica A*;
 - (vii) *Journal of Economic Behavior & Organization*;
 - (viii) *Communications in Mathematical Sciences*;
 - (ix) *Journal of Statistical Mechanics: Theory and Experiment*;
 - (x) *Fractals*;
 - (xi) *New Journal of Physics*;
 - (xii) *PLOS ONE*;
 - (xiii) *Economics e-journal*;
 - (xiv) *Indian Journal of Physics*;
 - (xv) *Quantitative Finance*;
 - (xvi) *Transactions on Modeling and Computer Simulation*;
 - (xvii) *Journal of Physics A: Mathematical and Theoretical*;
 - (xviii) *Entropy*;
 - (xix) *Journal of Physics: Conference Series*;
 - (xx) *Applied Mathematics and Computation*;
 - (xxi) *Journal of Econometrics*;
 - (xxii) *Intelligent Systems in Accounting*;
 - (xxiii) *Finance and Management*;
 - (xxiv) *International Journal of Computational Economics and Econometrics*;
 - (xxv) *Pramana - Journal of Physics*;
 - (xxvi) *Nonlinear Maps and their Applications (Springer Proceedings in Mathematics & Statistics)*;
 - (xxvii) *Chaos, Solitons & Fractals*;
 - (xxviii) *Market Microstructure and Liquidity*;
 - (xxix) *Dynamic Games and Applications*;
 - (xxx) *Complexity*;
 - (xxxi) *New Journal of Chemistry*
 - (xxxii) *Physics Letters A*
 - (xxxiii) *Fluctuation and Noise Letters*
 - (xxxiv) *Advances in Mathematical Physics*
 - (xxxv) *Current Science*,
 - (xxxvi) *Chemical Physics Letters*,
 - (xxxvii) *Journal of Physics: Complexity*
 - (xxxviii) *Frontiers in Physics*
 - (xxxix) *Applied Network Science*
 - (xl) *Journal of Molecular Liquids*
 - (xli) *Royal Society Open Science*
 - (xlii) *Asian Development Review*
 - (xliii) *Journal of Materials Science: Materials in Electronics*
 - (xliv) *Journal of Complex Networks*
 - (xlv) *Philosophical Transactions of the Royal Society A*

Organization of conferences, symposia, meetings, etc.

- **Organizer**, International Symposium on "Econophysics and Complex Systems Studies" held at the BML Munjal University, Gurugram, on November 23, 2022
- **Organizer**, International Conference on Computational Partial Differential Equations and Applications (ICPDEA-2022), at BML Munjal University, Gurugram, during September 06-08, 2022
- **Organizer**, Indo-Mexican Workshop and school on "Multivariate Analysis & Machine Learning in Econophysics, Brain Activity, Sociophysics, and more", at CIC, UNAM, Mexico, during June 13-24, 2022
- **Organizer**, International workshop and gathering on "Multivariate Analysis in Finance, Brain Research and more", at CIC, UNAM, Mexico, during February 7-11, 2022
- **Organizer**, International Conference on "AI in Complex Socio-Economic Systems and Public Policy", CEASP, O.P. Jindal Global University, during January 20-22, 2021
- **Organizer**, International workshop and gathering on "RMT, Complex Networks and Applications", at CIC, UNAM, Mexico, during July 19th - July 20th, 2018
- **Organizer**, International workshop and gathering on "Statistical techniques for correlation analysis: Quantum Many-Body Systems and more", at CIC, UNAM, Mexico, during July 08th - August 04th, 2018
- **Convenor**, International Workshop on "Econophys-2017 & Asia Pacific Econophysics Conference (APEC)-2017" at Jawaharlal Nehru University and Delhi University, New Delhi, to be held during November 15-18, 2017.
- **Organizer**, Symposium on "Applications of Pattern Recognition & Machine Learning in Medical Science", at School of Computational and Integrative Sciences, JNU, New Delhi, on September 18, 2017.
- **Convenor**, Symposium on "New Trends in Applied Mathematics: From Biology to Finance", at School of Computational and Integrative Sciences, JNU, New Delhi, on September 11, 2017.
- **Organizer**, "5th symposium: Economics, physics and finance", at CIC A.C., Cuernavaca, Mexico, during August 11-12, 2017.
- **Organizer**, a panel discussion jointly with JNU and Heidelberg University on "Big Data Science" on April 11, 2017.
- Member, Organizing Committee, Statphys-Kolkata IX, held at Kolkata on December 13-16, 2016.
- **Convenor**, International Conference/workshop on "Nano-BioInterface – 2016" at Jawaharlal Nehru University, New Delhi during March 18-20, 2016.
- **Convenor**, International Workshop on "Econophysics & Sociophysics" at Jawaharlal Nehru University and Delhi University, New Delhi during November 27-December 1, 2015.
- **Convenor and organizer**, Symposium on "Recent Trends in Mathematical Biology", at School of Computational and Integrative Sciences, JNU, New Delhi, on April 16, 2015.
- **Convenor and organizer**, Mini Symposium on Complex Systems, at School of Computational and Integrative Sciences, JNU, New Delhi, on February 2, 2015.
- **Convenor**, Organizing Committee, Statphys-Kolkata VIII, held at Kolkata on December 1-5, 2014.
- **Convenor**, Organizing Committee, Econophys-Kolkata VIII, held at Kolkata on March 14-17, 2014.
- Member, Organizing Committee, International Workshop on "Statistical modeling, financial data analysis and applications", held at the Istituto Veneto di Scienze Lettere ed Arti (IVSLA) in Venice, on 11-14 September 2013.
- Member, Organizing Committee, International workshop & conference "Diversity & Complexity: Realm of today's Statistical Physics", held at Kolkata on January 14-17, 2013.
- **Convenor**, Organizing Committee, Econophys-Kolkata VII, held at Kolkata on November 8-12, 2012.
- **Director**, Organizing Committee, School and Workshop on Market Microstructure: Design, Efficiency and Statistical Regularities, held at Abdus Salam ICTP, Trieste on March 21-25, 2011.
- **Convenor**, Organizing Committee, Econophys-Kolkata VI, held at Kolkata on October 21-25, 2011.
- **Convenor**, Organizing Committee, Econophys-Kolkata V held at Kolkata on March 9-13, 2010.
- Member, Organizing Committee, Preparatory SERC School in Theoretical High Energy Physics held at Department of Physics, Banaras Hindu University, Varanasi, India during November 26- December 15, 2007.
- Member, Career Counselling Camp held at Central Hindu School for Boys, Varanasi, organized by Rotary Club (North Chapter), Varanasi on November 16, 2007.
- Member, Organizing Committee, "Physics Learning Camp" held at Department of Physics, Banaras Hindu University, Varanasi, India during October 13-18, 2006.
- Member of the Advisory Committee for the International Conference "Unconventional Applications of Statistical Physics", Kolkata, 2003.

Thesis examiner, jury member, membership of bodies, etc.

- External Member, Promotion Selection Committee, Shiv Nadar University, 2020
- External Member, Faculty Selection Committee, Banaras Hindu University, 2020

- Examiner, Alexander Kindler, Hebrew University of Jerusalem, Israel, 2018
- Examiner, Santhust, Department of Physics and Astrophysics, University of Delhi, New Delhi, 2017
- Examiner, Shikha Dwivedi, Indian School of Mines, Dhanbad, 2017
- Examiner, Sanat Kumar, Indian School of Mines, Dhanbad, 2016
- Examiner, Marouane Anane, École Centrale Paris, 2015
- Examiner, Santanu Mandal, Jadavpur University, Kolkata, 2015
- Examiner, Ajanta Kundu, University of Calcutta, 2015
- Examiner, Manjori Mukherjee, Indian School of Mines, Dhanbad, 2014
- Examiner, Soumyajyoti Biswas, University of Calcutta, 2014
- Member of the jury, Ph. D. defense committee at Laboratoire MAS, Ecole Centrale Paris, France on June 27, 2013, for Rémy Chicheportiche.
- Member of the jury, Ph. D. defense committee at Laboratoire MAS, Ecole Centrale Paris, France on December 14, 2012, for Nicolas Huth.
- Member of the jury, Ph. D. defense committee at Department of Physics Galileo Galilei, University of Padova, Italy in February, 2012, for:
 - Alessandra Cagnazzo, Francesco Camana, Francesca Catino and Alessandra Gnecci.
- Member of the American Physical Society, 2004-2006.

ACADEMIC VISITS

2023

- Chennai Mathematical Institute, Chennai and Indian Institute of Technology Madras, Chennai during February 19-25, 2023.

2022

- O.P. Jindal Global University, during September 9-10, 2022
- Indian Institute of Management Kozhikode, Kerala during July 10-13, 2022
- Indian Institute of Technology Madras, Chennai during July 4-10, 2022

2021

- Akal University, Talwandi Sabo, Punjab, India during December 13-14, 2021
- IISER Thiruvananthapuram, Kerala during December 6-10, 2021
- O.P. Jindal Global University, Gurugram during April 1-4, 2021

2020

- IISER Bhopal, during January 27-30, 2020.

2019

- Chennai Mathematical Institute, Chennai and Indian Institute of Technology Madras, Chennai during December 16-31, 2019.
- Indira Gandhi Institute of Development Research, Mumbai during September 3-5, 2019.
- ICTS-TIFR, Bangalore, during June 9-July 12, 2019 as long-term faculty in “Dynamics of Complex Systems”
- IISER Kolkata, during February 11-14, 2019.
- IIT Kanpur, during January 23-26, 2019.

2018

- Chennai Mathematical Institute, Chennai during December 6-18, 2018.
- ICF, National Autonomous University of Mexico (UNAM), Cuernavaca, Mexico during June 17-August 1, 2018 as Visiting Professor.
- Université Grenoble-Alpes, Valence, France, during June 10-16, 2018.

2017

- ICF, National Autonomous University of Mexico (UNAM), Cuernavaca, Mexico during June 25-August 12, 2017 as Visiting Professor.

- University of Guadalajara, Mexico, during July 19-21, 2017.
- IISER, Pune during June 19-21, 2017.
- Chennai Mathematical Institute, Chennai during June 6-16, 2017.

2016

- Indian Statistical Institute, Chennai during December 23-26, 2016.
- Chennai Mathematical Institute, Chennai during December 18-22, 2016.
- Saha Institute of Nuclear Physics, Kolkata, India during December 8-17, 2016.
- Indian Institute of Technology, Kanpur during December 5-6, 2016.
- International Christian University — Mitaka, Tokyo, Japan during November 26-30, 2016.
- Toyo University, Tsurugashima-Saitama, Japan during November 23-26, 2016.
- Iwate Prefectural University, Morioka-Iwate, Japan, during November 20-22, 2016.
- Air Force Training Academy, Bangalore during November 8-9, 2016.
- Air Force Academy, Hyderabad during November 7-8, 2016.
- Politecnico di Torino, Torino, Italy during July 26-28, 2016.
- Ecole Centrale Paris, France during July 23-26, 2016.
- University of Padova, Padova, Italy during July 12-17, 2016.
- Scuola Normale Superiore, Pisa, Italy during July 5-7, 2016.
- University of Rome "La Sapienza", Roma, Italy during July 1-4, 2016.
- Indian Institute of Advanced Study, Shimla, Himachal Pradesh during May 19-June 18, 2016.
- Foundation for Ecological Security, Udaipur, Rajasthan during May 16-18, 2016.
- National Defense Academy, Pune during April 28-29, 2016.
- International Christian University — Mitaka, Tokyo, Japan during March 23-27, 2016.

2015

- IISER, Mohali during December 19-21, 2015.
- Chennai Mathematical Institute, Chennai for a conference during July 16-17, 2015.
- National Institute of Chemical Physics and Biophysics, Tallinn, Estonia during June 22-26, 2015 as Visiting Professor/Senior Researcher.
- Ecole Centrale Paris, France during June 8-19, 2015 as Visiting Professor.
- Indian Institute of Management, Indore for the workshop on "Econophysics" on April 10th, 2015.
- School of Basic & Applied Sciences, Department of Physics, Maharaja Agrasen University, Baddi on February 9th, 2015 as a resource person.

2014

- Condensed Matter Physics Division, Saha Institute of Nuclear Physics, India during November 28-December 8, 2014.
- Condensed Matter Physics Division, Saha Institute of Nuclear Physics, India during May 19-June 18, 2014.

2013

- Department of Computer Science, National Defense Academy, Yokosuka, Japan on August 22nd, 2013.
- Department of Software & Information Science, Iwate Prefectural University, Morioka, Japan, during August 8-9, 2013.
- Department of Economics, International Christian University, Tokyo, Japan during July 21-22, 2013.
- Graduate School of Information Science & Technology, Hokkaido University, Sapporo, Japan during July 7- August 31, 2013.
- Theoretical Condensed Matter Physics Division, Saha Institute of Nuclear Physics, India during January 12-19, 2013.
- School of Computational and Integrative Sciences & School of Computer and System Sciences, Jawaharlal Nehru University, India during January 8-11, 2013.
- Bayesian & Interdisciplinary Research Unit, Indian Statistical Institute, India during January 1-7, 2013.

2012

- Theoretical Condensed Matter Physics Division, Saha Institute of Nuclear Physics, India during December 20-31, 2012.
- Department of Physics Galileo Galilei, University of Padova, Italy during June 25-29, 2012.
- Department of Physics Galileo Galilei, University of Padova, Italy during February 27-March 2, 2012.
- Department of Physics, University of Calcutta, India during January 5-6, 2012.

2011

- Centre for Applied Mathematics and Computational Sciences, Saha Institute of Nuclear Physics, India during December 26-30, 2011.
- Department of Physics, Delhi University, India during December 19-23, 2011.

- Graduate School of Information Science & Technology, Hokkaido University, Japan during February 28- March 2, 2011.
- Department of Physics, Kyoto University, Japan during February 24-25, 2011.
- Department of Physics Galileo Galilei, University of Padova, Italy during January 24-28, 2011.

2010

- Centre for Applied Mathematics and Computational Sciences, Saha Institute of Nuclear Physics, India during October 28-November 25, 2010.

2009

- Department of Chemistry, Philipps-Universität Marburg, Germany, during September 15-18, 2009.

2008

- Centre for Applied Mathematics and Computational Sciences, Saha Institute of Nuclear Physics, India during November 14, 2008-January 31, 2009.
- Laboratoire de Mathématiques Appliquées aux Systèmes, Ecole Centrale Paris, France during May 21-24, 2008.
- School of Physical Sciences, Jawaharlal Nehru University, New Delhi, India during May 5-7, 2008.
- Department of Theoretical Physics, Tata Institute of Fundamental Research, India during March 1-8, 2008.

2007

- Centre for Applied Mathematics and Computational Sciences, Saha Institute of Nuclear Physics, India during January 29-February 2, 2007.

2006

- Interdisciplinary Center of Theoretical Studies (ICTS), Chinese Academy of Sciences (CAS), Beijing, China during September 9-25, 2006.
- Centre for Applied Mathematics and Computational Sciences, Saha Institute of Nuclear Physics, India during February 8-18, 2006.

2005

- Centre for Applied Mathematics and Computational Sciences, Saha Institute of Nuclear Physics, India during September 19-November 7, 2005.
- Kelloggs School of Management, Northwestern University, Illinois, USA on April 25th, 2005.
- Bose Institute, Kolkata, India during March 10-14, 2005.
- Physical Research Laboratory, Ahmedabad, India during March 5-10, 2005.
- School of Physical Sciences, Jawaharlal Nehru University, New Delhi and Department of Physics, Delhi University, New Delhi, India during March 1-4, 2005.

2004

- The EXYSTENCE Thematic Institute "From Many-Particle Physics to Multi-Agent Systems" held at the Max Planck Institute for the Physics of Complex Systems (MPIPKS) in Dresden, Germany during August 20-September 16, 2004.
- Laboratory of Computational Engineering, Helsinki University of Technology, Helsinki, Finland during July 18-25, 2004.
- King's College London, Dept. of Mathematics, London, UK during July 9-18, 2004.
- Rutgers University, Dept. of Physics, New Jersey, USA several times during January, 2004-May, 2005.

2002

- The Institute of Physics, Budapest University of Technology and Economics, Budapest, Hungary, during October 25-November 8, 2002.

2001

- The University of Kiel, Dept. of Economics, Kiel, Germany during September 16-21, 2001.
- The University of Cologne, Dept. for Theoretical Physics, Cologne, Germany during September 8-15, 2001.

2000

- The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy during August 20-September 01, 2000.

1999

- The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy during August 21-September 10, 1999.