

CURRICULUM VITAE



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Previous Work Experience:

Status	Duration	Organization
Assistant Professor	08.08.2016 to 05.11.2021	Department of Mathematics, SRM University, Kattankulathur-603 203, Tamil Nadu, India

❖ Ongoing Research Projects:

	Project Title	Granting Authority and Scheme	Duration	Amount (in Rupees)	Reference No. of the Sanction Order
1	Explosive predator and mutualistic preys: A comparative study of Pattern formation and the Turing-Hopf bifurcation before, on and after blow-up	Mathematical Research Impact Centric Support (MATRICS) by SERB, Govt. of India	2020-2023 (3 years)	6,60,000/-	MTR/2019/000788
2	Comparative study of the spatio-temporal variability on the dynamics of explosive food chain models: Mutualistic preys with restricted growth rates and sexually reproductive generalist predator interaction as case study	Core Research Grant (CRG) by SERB, Govt. of India	2021-2024 (3 years)	20,46,000/-	CRG/2020/003479

❖ Invited Talks delivered:

▪ International:

(i) 83rd Annual conference of Indian Mathematical Society-An International Meet, Sri Venkateswarar University, Tirupati, India-2017.

(ii) Marine Ecosystem Dynamics Research Group, Japan Agency for Marine-Earth Science and Technology, Kanagawa, Japan, 2015.

(iii) Department of Mathematics, City University, London, 2013.

▪ National:

(i) Webinar talk, Department of Mathematics, ICFAI University, Tripura, 2020.

(ii) National Conference on Modeling, Analysis and Simulation (MAS-2019), Department of Mathematics and Computing, IIT (ISM) Dhanbad.

(iii) Department of Mathematics, Tripura University (Central), Agartala, Tripura, India-2017.

(iv) Department of Mathematics, NIT-Agartala, Tripura, India-2017.

(v) One Week Workshop & Symposium on "Applied Nonlinear Dynamics and Chaos" (ANDC-2014) during 26-31 May, 2014 under the TEQIP-II project (Faculty Development Program) at Government College of Engineering & Textile Technology, Berhampore, Murshidabad, West Bengal (Workshop) and Dumkal Institute of Engineering & Technology, Basantapur, Murshidabad, West Bengal (Symposium).

❖ Paper Presentations:

▪ National:

(i) UGC Sponsored National Seminar on "Emerging Trends in Mathematics", December 19 – 20, 2012, organized by Vidyasagar University (Applied Mathematics with Oceanology and Computer Programming as a nodal department), Midnapore.

(ii) National Seminar on Mathematical modelling of Natural Phenomena - 2010 (NSMMNP - 2010) at Bose Institute, Kolkata, jointly organized by Indian Society of Nonlinear Analysis (ISNA) and Department of Mathematics, University of Calcutta.

(iii) National Meet of Research Scholars in Mathematical Sciences, 2010 (NMRSMS) at IIT Madras, jointly organized by Department of Mathematics, IIT Madras and DST India.

(iv) National Conference on Mathematical Sciences and Applications : State of Art (NCMSA 2010) at Jadavpur University, Kolkata, organized by Department of Mathematics, in collaboration with Center for Mathematical Biology and Ecology, Jadavpur University.

▪ International:

(i) International Conference on Nonlinear Dynamics and its Applications in Physical and Biological Sciences (CNDAPBS-14), 2014, Darjeeling, jointly organized by Darjeeling Govt. Collage and Bose Institute.

(ii) India Biodiversity Meet, 2013 at ISI Kolkata.

❖ Poster Presentation:

(i) International Conference on Mathematical Biology at Indian Institute of Science, Bangalore, 2011, jointly organized by DST Centre for Mathematical Biology and IISC, Bangalore.

(ii) International Conference on Environmental Biology and Ecological Modelling, 2014, organized by Department of Zoology, Visva-Bharati University, supported by International Society for Ecological Modelling.

❖ Participation in Conferences:

▪ National:

(i) Recent Perspectives on Nonlinear Mathematics and its Applications (RPNMA-2014), Visva Bharati University, organized by Department of mathematics, Visva-Bharati University.

(ii) National Conference on Theoretical Biology and Biomathematics, 2010 (NCTBB) at Jadavpur University, jointly organized by Center for Mathematical Biology and Ecology, Jadavpur University & Biomathematical Society of India.

▪ International

(i) International Conference on Dynamical System and its Application, 2012 at Jadavpur University, Kolkata, India.

❖ Workshop attended:

- (i) DST-SERC School, 2014 on Nonlinear Dynamics at Panjab University, Chandigarh.
- (ii) Advance Level Workshop on Differential Equation in Ecology and Epidemiology under auspices of National Program on Differential Equations: Theory, Computation & Applications (NPDE-TCA) sponsored by DST, Government of India, held in IIT Roorkee on October, 2012.
- (iii) Workshop on Stability & Bifurcation Analysis and Pattern Formation in Mathematical Ecology and Epidemiology, at Department of Mathematics and Statistics, I.I.T. Kanpur, organized by Department of Science and Technology, Government of India on 2011.
- (iv) Workshop on MATLAB and Simulink Toolboxes - 2010 at St. Xavier's College [Autonomous] in association with Computer Society of India Kolkata Chapter.

• Research publications:

Google Scholar Link: <https://scholar.google.co.in/citations?user=P2aGDRwAAAAJ&hl=en>

2021:

1. Pankaj Kumar Tiwari, Rajesh Kumar Singh, **Debaldev Jana**, Yun Kang, Arvind Kumar Misra: A Nonautonomous Mathematical Model to Assess the Impact of Algae on the Abatement of Atmospheric Carbon Dioxide. *International Journal of Biomathematics* ((*SCI Expanded*, *Scopus*, *ISSN (print): 1793-5245*, *ISSN (online): 1793-7159*, *IF: 0.846*), *DOI: 10.1142/S1793524521500595*
2. Saikat Batabyal, **Debaldev Jana**, Ranjit Kumar Upadhyay: Diffusion driven finite time blow-up and pattern formation in a mutualistic preys-sexually reproductive predator system: A comparative study. *Chaos, Solitons & Fractals*, *Volume 147*, *June 2021*, *110929*.
3. N S N V K Vyshnavi Devi, **Debaldev Jana**: Impact of stochastic perturbation on the persistence and extinction risk of a multi-delayed prey–predator system in non-autonomous environment. *Modeling Earth Systems and Environment*, *7(2)*, *1241-1267*.
4. Soumen Kundu, **Debaldev Jana**, Sarit Maitra: Study of a Multi-delayed SEIR Epidemic Model with Immunity Period and Treatment Function in Deterministic and Stochastic Environment. *Differential Equations and Dynamical Systems* (*Scopus*, *ISSN (online): 0974-6870*, *ISSN (print): 0971-3514*), <https://doi.org/10.1007/s12591-021-00568-6>
5. N S N V K Vyshnavi Devi, **Debaldev Jana**: The role of fear in a time-variant prey–predator model with multiple delays and alternative food source to predator. *International Journal of Dynamics and Control* (*Scopus*, *ISSN (Print): 2195-268X*, *ISSN (Online): 2195-2698*), <https://doi.org/10.1007/s40435-021-00809-0>
6. Saikat Batabyal, **Debaldev Jana**, Rana D Parshad, Aladeen Al Basheer, Ranjit Kumar Upadhyay: Pattern formation in an explosive food chain model: the case of “apparent” mutualism. *The European Physical Journal Plus* (*SCI*, *SCI Expanded*, *SCOPUS*, *ISSN: 2190-5444*, *IF: 3.228*), *136 (4)*, *1-28*.
7. Arthita Batabyal, **Debaldev Jana**: Significance of additional food to mutually interfering predator under herd behavior of prey on the stability of a spatio-temporal system.

Communications in Nonlinear Science and Numerical Simulation (SCI, Scopus, ISSN: 1007-5704, IF: 4.115), 93, 105480.

2020:

8. **Debaldev Jana**, Saikat Batabyal and M. Lakshmanan: Self-diffusion Driven Pattern Formation in Prey-Predator System with Complex Habitat under Fear Effect. *The European Physical Journal Plus* (SCI, SCI Expanded, SCOPUS, ISSN: 2190-5444, IF: 3.228), 135(11), Article number: 884.
9. N. S. N. V. K. Vyshnavi Devi, **Debaldev Jana** and M. Lakshmanan: Interplay between reproduction and age selective harvesting delays of a single population non-autonomous system. *Indian Journal of Pure and Applied Mathematics* (SCI Expanded, Scopus, ISSN (online): 0975-7465, ISSN (print): 0019-5588, IF: 0.516), 51(4), 1857-1891.
10. N. S. N. V. K. Vyshnavi Devi and **Debaldev Jana**: Impact of stochastic perturbation on the persistence and extinction risk of a multi-delayed prey-predator system in non-autonomous environment. *Modeling Earth Systems and Environment* (Scopus, ISSN (Print): 2363-6203, ISSN (Online): 2363-6211), DOI: 10.1007/s40808-020-01027-x
11. Jai Prakash Tripathi, **Debaldev Jana**, N. S. N. V. K. Vyshnavi Devi, Vandana Tiwari and Syed Abbas: Intraspecific competition of predator for prey with variable rates in protected areas. *Nonlinear Dynamics* (SCI, SCI Expanded, Scopus, ISSN (Print): 0924-090X, ISSN (Online): 1573-269X, IF: 4.867), <https://doi.org/10.1007/s11071-020-05951-6>
12. Vandana Tiwari, Jai Prakash Tripathi, **Debaldev Jana**, Satish Tiwari, R K Upadhyay: Exploring the complex dynamics of a spatial predator-prey system: role of predator interference and additional food. *International Journal of Bifurcation and Chaos* (SCI, SCI Expanded, Scopus, ISSN (online): 1793-6551, ISSN (Print): 0218-1274, IF: 2.145), 30(7), 2050102 (26 pages).
13. Nilesh Kumar Thakur, Archana Ojha, **Debaldev Jana**, Ranjit Kumar Upadhyay: Modeling the plankton–fish dynamics with top predator interference and multiple gestation delays. *Nonlinear Dynamics* (SCI, SCI Expanded, Scopus, ISSN (Print): 0924-090X, ISSN (Online): 1573-269X, IF: 4.867), <https://doi.org/10.1007/s11071-020-05688-2>
14. **Debaldev Jana**, Ranjit Kumar Upadhyay, Rashmi Agrawal, Rana D. Parshad and Aladeen Basheer: Explosive tritrophic food chain models with interference: A comparative study. *Journal of the Franklin Institute* (SCI Expanded, Scopus, ISSN: 0016-0032, IF: 4.036), 357, 385-413.
15. Saikat Batabyal, **Debaldev Jana**, Jingjing Lyu and Rana D. Parshad: Explosive predator and mutualistic preys: A comparative study. *Physica A* (SCI, Scopus, ISSN: 0378-4371, IF: 2.924), 541, 123348.

2019:

16. N. S. N. V. K. Vyshnavi Devi, **Debaldev Jana**: Shape effects on herd behavior in prey-predator interaction with multiple delays and alternative food source to predator in non-autonomous environment. *International Journal of Applied and Computational Mathematics* (Scopus, ISSN (online): 2199-5796, ISSN (Print): 2349-5103), 5: 162. <https://doi.org/10.1007/s40819-019-0746-4>.

17. **Debaldev Jana**, G. P. Samanta, Ashok Mondal, Sudeshna Mondal, A. K. Pal and Debasis Manna: Explosive tritrophic food chain model with herd behaviour of prey and finite time blow-up of the top predator. *International Journal of Dynamical Systems and Differential Equations* (Scopus, ISSN (online): 1752-3591, ISSN (print): 1752-3583), *In Press*.
18. N. S. N. V. K. Vyshnavi Devi, **Debaldev Jana** and M. Lakshmanan: Dynamics of a non-autonomous prey-predator model with age-structured growth in prey and predation of Beddington-DeAngelis type with reliance on alternative food. *Proceedings of the National Academy of Sciences, India Section A: Physical Sciences* (SCI Expanded, Scopus, ISSN (print): 0369-8203, ISSN (online): 2250-1762, IF: 0.681), *In Press*.
19. Jyotiska Dutta, **Debaldev Jana**, Ranjit Kumar Upadhyay: Bifurcation and Bio-Economic analysis of a prey-generalist predator model with Holling type IV functional response and nonlinear age-selective prey harvesting. *Chaos, Solitons & Fractals* (SCI, Scopus, ISSN: 0960-0779, IF: 3.764), 122, 229–235.
20. **Debaldev Jana**, Sachidananda Dutta, G. P. Samanta: Interplay between reproduction and age selective harvesting: A case study of Hilsa (*Tenuulosa ilisha*) fish at Sundarban estuary of northern Bay of Bengal, India. *International Journal of Biomathematics* (SCI Expanded, Scopus, ISSN (print): 1793-5245, ISSN (online): 1793-7159, IF: 0.846), Vol. 12(02), 1950023 (2019).
- 2018:
21. Zhijian Yao, Jehad Alzabut and **Debaldev Jana**: Dynamics of the Almost Periodic Discrete Mackey–Glass Model. *Mathematics* (SCI Expanded, ISSN: 2227-7390, IF: 1.746), 6(12), 333; doi:10.3390/math6120333.
22. Jai Prakash Tripathi, Syed Abbas, Gui-Quan Sun, **Debaldev Jana**, Cui-Hua Wang: Interaction between prey and mutually interfering predator in prey reserve habitat: Pattern formation and the Turing-Hopf Bifurcation. *Journal of the Franklin Institute* (SCI Expanded, Scopus, ISSN: 0016-0032, IF: 4.036), 355, 7466-7489.
23. Jai Prakash Tripathi, **Debaldev Jana**, Vandana Tiwari: A Beddington-DeAngelis type one-predator two-prey competitive system with help. *Nonlinear Dynamics* (SCI, SCI Expanded, Scopus, ISSN (Print): 0924-090X, ISSN (Online): 1573-269X, IF: 4.867), 94(1), 553-573.
24. **Debaldev Jana**, G. P. Samanta: Significance of prey harvesting in prey-predator system in discrete time scale using interval parameters. *International Journal of Ecological Economics and Statistics* (ISSN (Online): 0973-7537, ISSN (Print): 0973-1385), 39(2), 46-60.
25. Rashmi Agrawal, **Debaldev Jana**, Ranjit Kumar Upadhyay, V. Sree Hari Rao: Dynamic relationship between mutual interference and gestation delay of hybrid tritrophic food chain model. *Australian and New Zealand Industrial and Applied Mathematics Journal* (Scopus, ISSN: 1446-8735, 1442-4436, 1446-1811), 59(3), (2018), 370-401.
- 2017:
26. **Debaldev Jana**, Aniket Banerjee, G. P. Samanta: Degree of prey refuges: control the competition among prey and foraging ability of predator. *Chaos, Solitons & Fractals* (SCI, Scopus, ISSN: 0960-0779, IF: 3.764), 104, 350-362.

27. Rana D. Parshad, Aladeen Basheer, **Debaldev Jana**, Jai Prakash Tripathi: Do prey handling predators really matter: Subtle effects of a Crowley-Martin functional response. *Chaos, Solitons & Fractals (SCI, Scopus, ISSN: 0960-0779, IF: 3.764)*, 103, 410-421.
28. Susmita Paul, **Debaldev Jana**, Sankar Prasad Mondal and Paritosh Bhattacharya: Optimal Harvesting of two species Mutualism model with Interval parameters. *Journal of Intelligent and Fuzzy Systems (Scopus, ISSN (online): 1875-8967, ISSN (print): 1064-1246 IF: 1.426)*, 33(4), 1991-2005.
29. **Debaldev Jana**, R. Gopal and M. Lakshmanan: Complex dynamics generated by negative and positive feedback delays of a prey-predator system with prey refuge: Hopf bifurcation to Chaos. *International Journal of Dynamics and Control (Scopus, ISSN (Print): 2195-268X, ISSN (Online): 2195-2698)*, 5(4), 1020-1034.
30. Rashmi Agrawal, **Debaldev Jana**, Ranjit Kumar Upadhyay, V. Sree Hari Rao: Complex dynamics of sexually reproductive generalist predator and gestation delay in a food chain model: Double Hopf-bifurcation to Chaos. *Journal of Applied Mathematics and Computing (Scopus, ISSN (Print): 1598-5865, ISSN (Online): 1865-2085, IF: 1.242)*, 55(1-2), 513-547.
31. **Debaldev Jana**, Jai Prakash Tripathi: Impact of generalist type sexually reproductive top predator interference on the dynamics of a food chain model. *International Journal of Dynamics and Control (Scopus, ISSN (Print): 2195-268X, ISSN (Online): 2195-2698)*, 5(4), 999-1009.

2016:

32. **Debaldev Jana**, Rashmi Agrawa, Ranjit Kumar Upadhyay, G. P. Samanta: Ecological dynamics of Age Selective Harvesting of Fish Population: Maximum Sustainable Yield and its Control Strategy. *Chaos, Solitons & Fractals (SCI, Scopus, ISSN: 0960-0779, IF: 3.764)*, 93, 111-122.
33. **D. Jana**, P. Doloi, A. K. Pal, G. P. Samanta: On the stability of Hopf-bifurcation of a multi-delayed competitive population system affected by toxic substances with imprecise biological parameters. *Modeling Earth Systems and Environment (Scopus, ISSN (Print): 2363-6203, ISSN (Online): 2363-6211)*, 3(2), DOI 10.1007/s40808-016-0156-0.
34. **Debaldev Jana**, Santanu Ray: Impact of physical and behavioral prey refuge on the stability and bifurcation of Gause type Filippov prey-predator system. *Modeling Earth Systems and Environment (Scopus, ISSN (Print): 2363-6203, ISSN (Online): 2363-6211)*, 2:24, DOI 10.1007/s40808-016-0077-y
35. **Debaldev Jana**, Rachana Pathak, Manju Agarwal: On the stability and Hopf bifurcation of a prey-predator system with independent age-selective harvesting. *Chaos, Solitons & Fractals (SCI, Scopus, ISSN: 0960-0779, IF: 3.764)*, 83, 252-273.
36. **Debaldev Jana** and Elsayed M, Elsayed: Interplay between strong Allee effect, harvesting and hydra effect of a single population discrete time system. *International Journal of Biomathematics (SCI Expanded, Scopus, ISSN (print): 1793-5245, ISSN (online): 1793-7159, IF: 0.846)*, Vol.9, No.1(2016) 1650004 (25pages) doi: 10.1142/S1793524516500042.

2015:

37. **Debaldev Jana**, Rashmi Agrawal and Ranjit Kumar Upadhyay: Dynamics of generalist predator in a stochastic environment: effect of delayed growth and prey refuge. *Applied*

Mathematics and Computation (SCI, Scopus, ISSN: 0096-3003, IF: 3.472), 268, 1072-1094.

38. Joyita M, Debaldeb J, Moitreyee B, Phani Bhusan G and Santanu R: Utilization of Carbon in NPZ Model of Hooghly Estuarine System, India. *Journal of Earth Science & Climatic Change* (ISSN: 2157-7617, IF: 1.16), 6(8), 2-8.

39. Vlastimil Krivan, Debaldev Jana: Effects of animal dispersal on harvesting with protected areas. *Journal of Theoretical Biology* (Scopus, ISSN: 0022-5193, IF: 1.833), 364(2015)131-138.

2014:

40. Debaldev Jana, Rashmi Agarwal, Ranjit Kumar Upadhyay: Top-predator interference and gestation delay as determinants of the dynamics of a realistic model food chain. *Chaos, Solitons and Fractal* (SCI, Scopus, ISSN: 0960-0779, IF: 3.764), 69, 50-63.

41. Debaldev Jana : Impact of Habitat Complexity on Discrete Predator-Prey System. *Journal of Ecology, Photon* 108, 353-357.

42. Debaldev Jana, G. P. Samanta: Role of multiple delays in ratio-dependent prey-predator system with prey harvesting under stochastic environment. *Neural, Parallel, and Scientific Computations* (ISSN: 1061-5369), 22, 205-222.

43. Debaldev Jana: Stabilizing effect of prey refuge and predator's interference on the dynamics of prey with delayed growth and generalist predator with delayed gestation. *International Journal of Ecology* (Scopus), Volume 2014, Article ID 429086, 12pages, <http://dx.doi.org/10.1155/2014/429086>.

44. Debaldev Jana: Influence of Gestation Delay and Predator's Interference in Predator-Prey Interaction under Stochastic Environment. *International Journal of Stochastic Analysis*, Volume 2014, Article ID 501836, 9 pages, <http://dx.doi.org/10.1155/2014/501836>.

45. D. Jana, N. Bairagi: Habitat complexity, dispersal and metapopulations: Macroscopic study of a predator-prey system. *Ecological Complexity* (SCI Expanded, Scopus, ISSN: 1476-945X, IF: 1.634), 17, 131-139.

2013:

46. Debaldev Jana: Chaotic Dynamics of a Discrete Predator-Prey System with Prey Refuge. *Applied Mathematics and Computation* (SCI, Scopus, ISSN: 0096-3003, IF: 3.472), 224 (2013) 848-865.

47. D. Jana, N. Bairagi, R. Agrawal, R.K. Upadhyay: Modeling the Effect of Gestation Delay of Predator on the Stability of Bifurcating Periodic Solutions in Wetland Ecosystem, *Journal of Ecology, Photon* 107 (2013) 175-189.

48. S. Mandal, D. Jana, A. B. Roy, N. C. Majee: Chaotic behavior of a class of neural network with discrete delays. *International Journal of Modern Nonlinear Theory and Application* (ISSN (Print): 2167-9479, ISSN (Online): 2167-9487), 2, 97-101.

49. D. Jana, N. Bairagi: Habitat Complexity, Stochasticity and the Stability of Predator-Prey Interactions. *Journal of Control Engineering and Technology* (ISSN (print): 2329-5430, ISSN (online): 2329-5449), Vol. 3(2), 76-83.

2012:

50. N. Bairagi and D. Jana: Age-structured predator–prey model with habitat complexity: oscillations and control. *Dynamical Systems: An International Journal (Scopus, ISSN: 1468-9367, IF: 0.476)*, 2012, 1-25, iFirst, DOI: 10.1080/14689367.2012.723678, 2012.

51. Debaldev Jana, Swapan Chakraborty and Nandadulal Bairagi: Stability, Nonlinear Oscillations and Bifurcation in a Delay-Induced Predator-Prey System with Harvesting. *Engineering Letters (Scopus, ISSN (Online): 1816-0948, ISSN (Print): 1816-093X)*, 20:3, EL_20_3_05, 2012.

2011:

52. N. Bairagi and D. Jana: On the Stability and Hopf Bifurcation of a Delay-induced Predator-Prey System with Habitat Complexity. *Applied Mathematical Modelling (SCI Expanded, Scopus, ISSN: 0307-904X, IF: 2.617)*, 35, 3255-3267.

• **M.Sc. Students' Dissertations Supervised/Guided so far:**

	Name of the scholar	Subject	Status
1	Mr. Rohit Roy	Dynamical impact of sexually-reproductive generalist predator on the age-selective harvesting of prey	Completed (2018)

• **PhD Students' Theses Supervised/Guided so far:**

	Name of the scholar	Subject	Status
1	Dr. N. Vyshnavi Devi	Nonlinear dynamics of non-autonomous dynamical system: hilasa fish harvesting as a case study	Successfully completed on 12.04.2021 and PhD degree awarded
2	Mr. Saikat Batabyal	Finite time blow up in a realistic food chain model and control population explosion	Pre-PhD seminar and synopsis meeting completed

• **Editorial Board Memberships:**

1. Computer Simulation in Application [Whoice Publishing Pte. Ltd.]
2. Finance Forum [PiscoMed Publishing Pte. Ltd.]
3. Ecology: An International Journal (ECOJ) [AIRCC Publishing Corporation].
4. International Journal of Biomedical Engineering and Science (IJBES, ISSN: 2394-0832) [AIRCC Publishing Corporation].
5. Life Sciences: an International Journal (LSIJ) [AIRCC Publishing Corporation].
6. Mathematical Modelling and Applications [Science Publishing Group].

• **Life Memberships:**

1. International Association of Engineers (IAENG) from 2013.
2. Biomathematical Society of India from 2010.

□ **Research Activities and Research Interests:**

Research activities and research interests are in the area of Applied Mathematics with special reference to application of Nonlinear Dynamics in Biological Systems. Presently working extensively with Ordinary Differential Equations (ODEs), Delay Differential Equations (DDEs), Difference Equations and Stochastic Differential Equations (SDEs), Partial Differential Equations (PDEs) and solving different ecological problems on different contexts. Presently I am involving with four major research activities:

(A) Finite time blow-up phenomenon of Ecological Models: Observation of temporal and spatio-temporal dynamics.

(B) Impact of age-selective harvesting on hilsha fish at Sundarban Mangrove ecosystem on non-autonomous environment and this ecosystem's food-web networking and

(C) Spatio-temporal dynamics of prey-predator systems under group defense of prey by making herd with different shapes and additional food to predator.

(D) Multimedia analysis of Indian classical dance: Bharatanatyam as a case study.

□ **Ongoing Collaborative research work with the following collaborators:**

In India:

- **Prof. M. Lakshmanan**, Centre for Nonlinear Dynamics, School of Physics, Bharathidasan University, Tiruchirapalli - 620 024, India.
- **Prof. R. K. Upadhyay**, Department of Applied Mathematics, Indian Institute of Technology (ISM), Dhanbad - 826004, Jharkhand, India.
- **Prof. Guru Prasad Samanta**, Department of Mathematics, Indian Institute of Engineering Science & Technology, Shibpur, Howrah-711103, West Bengal, India.
- **Prof. Partha Pratim Das**, Department of Computer Science & Engineering, Kharagpur 721302, West Bengal, India.
- **Dr. Jai Prakash Tripathi**, Department of Mathematics, Central University of Rajasthan, NH-8, Bandarsindri, Kishangarh-305817, Distt.-Ajmer, Rajasthan, India.
- **Dr. Paritosh Bhattacharya**, Department of Mathematics, National Institute of Technology, Agartala, Tripura-799 046, India.
- **Dr. Nilesh Kumar Thakur**, Department of Mathematics, National Institute of Technology Raipur, CG 492010, India.
- **Dr. Soumen Kundu**, Department of Mathematics, ICFAI University, Agartala-799210, Tripura.
- **Dr. Syed Abbas**, School of Basic Sciences, Indian Institute of Technology Mandi, Mandi, Himachal Pradesh 175001.
- **Dr. Rashmi Agrawal**, Department of Science & Humanities, Indian Institute of Information Technology Dharwad, Hubli 580029, Karnataka.
- **Dr. Sarit Maitra**, Department of Mathematics, National Institute of Technology Durgapur, Durgapur-713209.
- **Dr. Susmita Paul**, Department of Mathematics, Dibrugarh University Institute of Engineering and Technology (DUIET).

In countries abroad:

- **Prof. Vlastimil Krivan**, Biology Centre AS CR, Institute of Entomology and Faculty of Science, University of South Bohemia, Branišovská 31, 37005 České Budějovice, Czech Republic.
- **Prof. Elsayed Muhammod**, Department of Mathematics, Faculty of Science, Mansoura University, Mansoura, 35516, Egypt.
- **Dr. Rana D. Parshad**, Department of Mathematics, Iowa State University, Ames, IA 50011, USA.
- **Dr. Aladeen Basheer**, Department of Mathematics, University of Georgia, Athens, GA 30602, USA.
- **Dr. Jingjing Lyu**, Department of Mathematics, Chengdu University, Chengdu, Sichuan-610000, China.
- **Dr. Sachinandan Dutta**, Department of Marine Science and Fisheries, College of Agricultural and Marine Sciences, Sultan Quaboos University, PO Box 34, Al-khod 123, Sultanate of Oman.

□ Cultural Interests and Accomplishments:

Well-trained and accomplished Bharatanatyam (classical dance art form of the Southern part of India) dancer. Learnt Bharatanatyam under renowned gurus (teacher-guide-mentors) like Guru Kalaimamani Thanjavur Herembanathan Pillai, Guru Kalamandalam V. R. Venkitt and Preetha Venkitt. Empanelled artist of ICCR (Indian Council for Cultural Relations, Ministry of External Affairs, Government of India) and Doordarshan Television. Extensively performed at major festivals in India and abroad.