Prof. Uttam Ghosh

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Employment History

10.09.2008 – 08.12.2015 **Nabadwip Vidyasagar College.**
09.12.2015 —-Continue **University of Calcutta**

Education

2009 – 2014 **Ph.D., University of Kalyani, INDIA**
Thesis title: *Information Theory, Fractal Geometry and Percolation Theory for Studies of Environmental Complexities at Landscape Level.*

1999 – 2001 **M.Sc. in Applied Mathematics, University of Calcutta, Kolkata, India**
Stood First Class First Position in the University

Award and Research Project

Award I **Parimalkanti Ghosh Memorial Award for standing FIRST CLASS FIRST in Applied mathematics in 2001 by Calcutta Mathematical Society.**

Award II **National Eligibility Test-Junior Research Fellowship, December, 2000(CSIR).**

Research Project I **Bifurcation analysis of fractional differential equation model of ecosystem Study of memory dependence, TARE-DST-SERB (TAR/2018/000851): 2019-2022**

Research Project II **Characterization of Unreachable (Holderian) Functions via Local Fractional Derivative and Deviation Functions, BRNS: 2014-2017**

Research Interest

Specialization **Fractional Calculus, Non-Linear Dynamics, Ecological Modelling, Epidemic Modelling.**

Software **MATLAB-MAPLE**

PhD Supervision

Awarded –2021 **Dr. Rituporna Pakhira[Reg. NO.05036.09.07.2018]**
Thesis title: *Study of Fractional Calculus with Application to Inventory Problems*

Awarded –2022 **Dr. Jayanta Kumar Ghosh [Reg. NO.01847.12.03.2019]**
Thesis title: *Study Of Dynamical Behaviour And Optimal Control Of Some Epidemic Models With The Effect Of Awareness*

Awarded –2023 **Dr. Prahlad Majumdar [Reg. NO.04544.22.06.2018]**
Thesis title: *Study of Dynamical Behaviour of Some Ecological Models with Different Functional Responses and Ecological Effects*

PhD Supervision (continued)

- **Dr. Surajit Debnath [Reg. NO.03919.13.06.2019]**
  Thesis title: *Infuence Of Different Ecological Effects On Dynamical Complexity Of Some Ecological Models*
- **Dr. Sudhansu kumar Biswas [Reg. NO.07562.20.11.2017]**
  Thesis title: *Modeling And Analysis Of Some Vector Borne Diseases With Effect Of Awareness*
- **Dr. Prabir Chakroborty [Reg. NO.07567.20.11.2017]**
  Thesis title: *Study Of Bifurcation And Chaos Of Some Discrete Predator-Prey Models With Effects Of Harvesting Allee And Co-Operation*

Awarded –2025

- **Dr. Bapin Mandal [Reg. NO.04257IPh.D.(Sc.)Proceed/2021]**
  Thesis title: *Study Of The Dynamics Of Some Prey-Predator Models In Precise And Imprecise Environments*
- **Dr.Swpan Biswas [Reg. NO.01124/Ph.D(Sc.)Proceed/2022]**
  Thesis title: *Studies on formulation and solutions of fractional differential equations: in few physical phenomena*
- **Dr.Pritam Saha [Reg. NO.07931/Ph.D.(Sc.)Proceed/2021]**
  Thesis title: *Study of stability, bifurcation and optimal control of some epidemic models with limited treatment facility*

Thesis Submitted

- **Biswajit Paul [Reg. NO. 09745/Ph.D(Sc.)Proceed/2022]**
  Thesis title: *Study of some stochastic predator prey models with biological effects Allee, Hunting co-operation and Harvesting*

On Going

- **Ramjan Ali [Reg. NO.07288/Ph.D(Sc.)Proceed/2017]**
  Thesis title: *Application of Fractional Calculus in Physics and Biology*

- **Gopal Chandra Sikdar [Reg. NO.]**
  Thesis title: *x*
- **Sourav Chaudhury [Reg. NO.]**
  Thesis title: *x*
- **Shayon Roy [Reg. NO.]**
  Thesis title: *x*
- **Amrit Basu [Reg. NO.]**
  Thesis title: *x*
- **Sourav Basak [Reg. NO.]**
  Thesis title: *x*

Research Publications

Journal Articles

1. B. Paul, S. Pandey, and U. Ghosh, "Impact of memory in bazykin's type prey-predator systems considering mate-finding allee effects, cooperative hunting, and predator harvesting in both deterministic and stochastic environments: B. paul et al.," *Nonlinear Dynamics*, vol. 114, no. 1, p. 7, 2026.
2. S. Biswas, U. Ghosh, and S. Raut, "Kink, kink-lump, kink-breather and rough wave soliton solutions of the (3+ 1)-dimensional space-time fractional jimbo-miwa equation," *International Journal of Computer Mathematics*, pp. 1–20, 2025.
3. S. Chowdhury, B. Paul, and U. Ghosh, "Effect of stochastic transition in hiv infection model with cytotoxic t-lymphocytes and beddington–deangelis incidence and linear cure rate," *Mathematical Methods in the Applied Sciences*, 2025.

4 D. Das, S. Chakraborty, and U. Ghosh, "Effect of environmental toxicant, gestation delay, and toxicant accumulation delay in a two-dimensional predator-prey system," *International Journal of Modelling and Simulation*, pp. 1–34, 2025.

5 B. Paul, G. C. Sikdar, and U. Ghosh, "Effect of fear and non-linear predator harvesting on a predator–prey system in presence of environmental variability," *Mathematics and Computers in Simulation*, vol. 227, pp. 442–460, 2025.

6 P. Saha, A. Haque, M. S. Islam, and U. Ghosh, "Dynamic complexities of a modified leslie–gower model in deterministic and stochastic environments," *Modeling Earth Systems and Environment*, vol. 11, no. 2, p. 94, 2025.

7 S. Saha, R. Kumar, U. Ghosh, and K. P. Das, "A fractional order sir model with non-monotonous incidence rate and limited treatment facility," *Biophysical Reviews and Letters*, vol. 20, no. 03, pp. 139–167, 2025.

8 G. C. Sikdar, P. Saha, and U. Ghosh, "Effect of cross-immunity on the transmission of a two serotypes co-infected dengue model under deterministic and stochastic environments," *Nonlinear Dynamics*, pp. 1–42, 2025.

9 S. K. Biswas, U. Ghosh, and S. Sarkar, "A mathematical model of zika virus transmission with saturated incidence and optimal control: A case study of 2016 zika outbreak in puerto rico," *International Journal of Modelling and Simulation*, vol. 44, no. 3, pp. 172–189, 2024.

10 S. K. Biswas, P. Saha, and U. Ghosh, "Effects of sexual and vertical transmission on zika virus dynamics under environmental fluctuations," *International Journal of Biomathematics*, p. 2 450 019, 2024.

11 S. Chowdhury, J. K. Ghosh, and U. Ghosh, "Co-infection dynamics between hiv-htlv-i disease with the effects of cytotoxic t-lymphocytes, saturated incidence rate and study of optimal control," *Mathematics and Computers in Simulation*, vol. 223, pp. 195–218, 2024.

12 Q. Cui, C. Xu, Y. Xu, *et al.*, "Bifurcation and controller design of 5d bam neural networks with time delay," *International Journal of Numerical Modelling: Electronic Networks, Devices and Fields*, vol. 37, no. 6, e3316, 2024.

13 J. K. Ghosh, P. Biswas, S. K. Biswas, S. Sarkar, and U. Ghosh, "Qualitative and optimal control analysis of a two-serotype dengue model with saturated incidence in co-infection," *International Journal of Modelling and Simulation*, pp. 1–21, 2024.

14 U. Ghosh, S. Roy, S. Biswas, and S. Raut, "A non-autonomous fractional granular model: Multi-shock, breather, periodic, hybrid solutions and soliton interactions," *Chaos, Solitons & Fractals*, vol. 187, p. 115 393, 2024.

15 K. Mokni, M. Ch-Chaoui, B. Mondal, and U. Ghosh, "Rich dynamics of a discrete two dimensional predator–prey model using the nsfd scheme," *Mathematics and Computers in Simulation*, vol. 225, pp. 992–1018, 2024.

16 B. Mondal, U. Ghosh, S. Sarkar, and P. K. Tiwari, "A generalist predator–prey system with the effects of fear and refuge in deterministic and stochastic environments," *Mathematics and Computers in Simulation*, vol. 225, pp. 968–991, 2024.

17 R. Pakhira, B. Mondal, U. Ghosh, V. N. Mishra, *et al.*, "Valuation of memory effect of fuzzy eoq model with constant demand rate," *Discontinuity, Nonlinearity, and Complexity*, vol. 13, no. 03, pp. 437–453, 2024.

18 R. Pakhira, B. Mondal, U. Ghosh, and S. Sarkar, "An eoq model with fractional order rate of change of inventory level and time-varying holding cost," *Soft Computing*, vol. 28, no. 5, pp. 3859–3877, 2024.

19 S. Pandey, D. Das, U. Ghosh, and S. Chakraborty, "Bifurcation and onset of chaos in an eco-epidemiological system with the influence of time delay. chaos, interdiscip," *J. Nonlinear Sci*, vol. 34, no. 6, 2024.

20 S. Pandey, U. Ghosh, D. Das, S. Chakraborty, and A. Sarkar, "Rich dynamics of a delay-induced stage-structure prey–predator model with cooperative behaviour in both species and the impact of prey refuge," *Mathematics and Computers in Simulation*, vol. 216, pp. 49–76, 2024.

21 B. Paul, B. Mondal, and U. Ghosh, "Mathematical modeling of regime shifts in fluctuating environments: The impact of allee effects and cooperation," *The European Physical Journal Plus*, vol. 139, no. 6, p. 488, 2024.

22 P. Saha, K. K. Pal, U. Ghosh, and P. K. Tiwari, "Effects of vaccination and saturated treatment on covid-19 transmission in india: Deterministic and stochastic approaches," *Journal of Biological Systems*, pp. 1–47, 2024.

23 S. Biswas and U. Ghosh, "Formation and shock solutions of the time fractional (2+ 1) and (3+ 1)-dimensional boiti–leon–manna–pempinelli equations," *International Journal of Applied and Computational Mathematics*, vol. 9, no. 3, p. 20, 2023.

24 S. Biswas, U. Ghosh, and S. Raut, "Construction of fractional granular model and bright, dark, lump, breather types soliton solutions using hirota bilinear method," *Chaos, Solitons & Fractals*, vol. 172, p. 113 520, 2023.

25 S. Debnath, P. Majumdar, S. Sarkar, and U. Ghosh, "Complex dynamical behaviour of a delayed prey-predator model with square root functional response in presence of fear in the prey," *International Journal of Modelling and Simulation*, vol. 43, no. 5, pp. 612–637, 2023.

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27 J. K. Ghosh and U. Ghosh, "Three dimensional epidemic model with non-monotonic incidence and saturated treatment: A case study of sars infection of hong kong 2003 scenario," *Results in Control and Optimization*, vol. 11, p. 100 239, 2023.

28 J. K. Ghosh, U. Ghosh, M. Biswas, and S. Sarkar, "Qualitative analysis and optimal control strategy of an sir model with saturated incidence and treatment," *Differential Equations and Dynamical Systems*, vol. 31, no. 1, pp. 53–67, 2023.

29 J. Kumar Ghosh, P. Saha, M. Kamrujjaman, and U. Ghosh, "Transmission dynamics of covid-19 with saturated treatment: A case study of spain," *Brazilian Journal of Physics*, vol. 53, no. 3, p. 54, 2023.

30 P. Majumdar, S. Bhattacharya, S. Sarkar, and U. Ghosh, "On optimal harvesting policy for two economically beneficial species mysida and herring: A clue for conservation biologist through mathematical model," *International Journal of Modelling and Simulation*, vol. 43, no. 3, pp. 200–222, 2023.

31 P. Majumdar, S. Debnath, B. Mondal, S. Sarkar, and U. Ghosh, "Complex dynamics of a prey-predator interaction model with holling type-ii functional response incorporating the effect of fear on prey and non-linear predator harvesting," *Rendiconti del Circolo Matematico di Palermo Series 2*, vol. 72, no. 2, pp. 1017–1048, 2023.

32 P. Majumdar, U. Ghosh, S. Sarkar, and S. Debnath, "Study of co-dimension two bifurcation of a prey–predator model with prey refuge and non-linear harvesting on both species," *Rendiconti del Circolo Matematico di Palermo Series 2*, vol. 72, no. 8, pp. 4067–4100, 2023.

33 B. Mondal, S. Sarkar, and U. Ghosh, "A study of a prey-generalist predator system considering hunting cooperation and fear effects under interval uncertainty," *Journal of Uncertain Systems*, vol. 16, no. 02, p. 2 350 001, 2023.

34 B. Mondal, S. Sarkar, and U. Ghosh, "An autonomous and nonautonomous predator–prey model with fear, refuge, and nonlinear harvesting: Backward, bogdanov–takens, transcritical bifurcations, and optimal control," *Mathematical Methods in the Applied Sciences*, vol. 46, no. 16, pp. 17 260–17 287, 2023.

35 B. Mondal, K. Senapati, S. Pandey, and U. Ghosh, "Consequences of allee effect on the multiple limit cycles in a predator–prey model," *The European Physical Journal Plus*, vol. 138, no. 10, p. 919, 2023.

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44 M. R. Ali, U. Ghosh, S. Sarkar, and S. Das, "Analytic solution of the fractional order non-linear schrödinger equation and the fractional order klein gordon equation," *Differential Equations and Dynamical Systems*, vol. 30, no. 3, pp. 499–512, 2022.

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46 S. Biswas and U. Ghosh, "Formulation of conformable time fractional differential equation and q-ham solution comparison with adm," *Journal of the Physical Society of Japan*, vol. 91, no. 4, p. 044 007, 2022.

47 S. Debnath, P. Majumdar, S. Sarkar, and U. Ghosh, "Global dynamics of a prey–predator model with holling type iii functional response in the presence of harvesting," *Journal of Biological Systems*, vol. 30, no. 01, pp. 225–260, 2022.

48 J. K. Ghosh, S. K. Biswas, S. Sarkar, and U. Ghosh, "Mathematical modelling of covid-19: A case study of italy," *Mathematics and computers in simulation*, vol. 194, pp. 1–18, 2022.

49 U. Ghosh, S. Sarkar, and P. Chakraborty, "Stability and bifurcation analysis of a discrete prey-predator model with mate-finding allee, holling type-i functional response and predator harvesting," *Brazilian Journal of Physics*, vol. 52, no. 6, p. 190, 2022.

50 U. Ghosh, A. A. Thirthar, B. Mondal, and P. Majumdar, "Effect of fear, treatment, and hunting cooperation on an eco-epidemiological model: Memory effect in terms of fractional derivative," *Iranian Journal of Science and Technology, Transactions A: Science*, vol. 46, no. 6, pp. 1541–1554, 2022.

51 M. Kamrujjaman, P. Saha, M. S. Islam, and U. Ghosh, "Dynamics of seir model: A case study of covid-19 in italy," *Results in Control and Optimization*, vol. 7, p. 100 119, 2022.

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55 B. Mondal, U. Ghosh, M. S. Rahman, P. Saha, and S. Sarkar, "Studies of different types of bifurcations analyses of an imprecise two species food chain model with fear effect and non-linear harvesting," *Mathematics and Computers in Simulation*, vol. 192, pp. 111–135, 2022.

56 B. Mondal, S. Roy, U. Ghosh, and P. K. Tiwari, "A systematic study of autonomous and nonautonomous predator–prey models for the combined effects of fear, refuge, cooperation and harvesting," *The European Physical Journal Plus*, vol. 137, no. 6, p. 724, 2022.

57 R. Pakhira, U. Ghosh, S. Sarkar, L. N. Mishra, *et al.*, "Study of memory effect in an eoq model with fractional polynomial demand rate under fuzzy environment," *Discontinuity, Nonlinearity, and Complexity*, vol. 11, no. 04, pp. 583–598, 2022.

58 B. Paul, B. Mondal, J. K. Ghosh, and U. Ghosh, "Dynamic interactions between prey and predator with cooperation and allee effect: Deterministic and stochastic approach," *Journal of Biological Systems*, vol. 30, no. 04, pp. 799–836, 2022.

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63 S. K. Biswas, S. Sarkar, and U. Ghosh, "The role of isolation and vector control in the prevention of dengue: A case study of 2014 dengue outbreak in singapore," *International Journal of Applied and Computational Mathematics*, vol. 7, no. 6, p. 224, 2021.

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87 R. Denra, S. Paul, U. Ghosh, and S. Sarkar, "Nonlinear dust-acoustic wave propagation in a lorentzian dusty plasma in presence of negative ions," *Journal of Plasma Physics*, vol. 84, no. 5, p. 905 840 507, 2018.

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Conference Proceedings

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2 S. Sengupta, U. Ghosh, S. Sarkar, and S. Das, "Investigation of left ventricular hypertrophy using mean deviation function," vol. 2, 2019, pp. 41–46.

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