

Short Profile - Dr. Indranath Chaudhuri

1 Contact Information:

- **Address:** Department of Physics, St. Xavier's College (Autonomous), 30 Mother Teresa Sarani, Kolkata - 700016, India.
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2 Academic Qualifications:

- **Ph.D. in Physics**, University of Calcutta, 2009
Thesis: Dynamics And Steady-State Properties Of Self-Organised Systems
Guide: Prof. Indrani Bose
- **M.Sc. in Physics**, University of Calcutta, 1995
- **B.Sc. in Physics**, University of Calcutta, 1993

3 Current Positions:

- **Assistant Professor**, Postgraduate and Research Department of Physics, St. Xavier's College (Autonomous), Kolkata.

4 Special Responsibilities:

- Lab. in Charge, Physics Management of the U.G and P.G Physics Laboratories, St. Xavier's College (2013-2016)
- Head of the department of Physics (2019 July -2023 June)
- Dean of Science (2023 July – Present)

5 Awards and Recognitions:

- **GATE, IIT, 1995**
- **CSIR/UGC-NET (CSIR Fellow), UGC-CSIR, 1995**

6 Publications (SCI Journals, Most Recent to Earliest)

1. Chowdhury, Sourav; Bose, Indrani; Roychowdhury, Suparna; Chaudhuri, Indranath. Universal features of epidemic and vaccine models. Accepted in *Physical Review E* (2025).
2. Roy, Bedaprana; Maitra, Debapriya; Chakraborty, Archishman; Basak, Pijush; Chaudhuri, Indranath; Ghosh, Jaydip; Mitra, Arup Kumar. A detailed study Biofilm forming Polyextremophilic Firmicutes from the Himalayas and exploration of their plant growth promoting potential. *bioRxiv* (2025). DOI: <https://doi.org/10.1101/2025.05.29.656832>.
3. Maitra, Debapriya; Roy, Bedaprana; Das, Debdatta; Chakraborty, Archishman; Das, Anirban; Chaudhuri, Indranath; Choudhury, Sudeshna Shyam; Mitra, Arup Kumar. Organic farming in the improvement of soil health and productivity of tea cultivation: A pilot study. *Environmental Quality Management*, 34(1), e22193 (2024).
4. Chowdhury, Sourav; Ghosal, Apratim; Roychowdhury, Suparna; Chaudhuri, Indranath. Studying ECG signals using nonlinear oscillators and Genetic Algorithm. *International Journal of Dynamics and Control*, 13(3), 105, 2025. Springer Berlin Heidelberg.

5. Chowdhury, Sourav; Roychowdhury, Suparna; Chaudhuri, Indranath. Simulating the spread of COVID-19 with cellular automata: A new approach. *International Journal of Modern Physics C*, 35(12), 2450157, 2024. World Scientific Publishing Company.
6. Chowdhury, Sourav; Roychowdhury, Suparna; Chaudhuri, Indranath. Quantitative Relationships Between Air Pollution and Growth of Diabetic Population in Different Countries of the World. *Journal of Environment and Sociobiology*, 135–140, 2023.
7. Chowdhury, Sourav; Roychowdhury, Suparna; Chaudhuri, Indranath. A robust prediction from a minimal model of COVID-19—Can we avoid the third wave? *International Journal of Modern Physics C*, 33(07), 2250098, 2022. World Scientific.
8. Chowdhury, Sourav; Roychowdhury, Suparna; Chaudhuri, Indranath. Cellular automata in the light of COVID-19. *The European Physical Journal Special Topics*, 231(18), 3619–3628, 2022. Springer Berlin Heidelberg.
9. Chowdhury, Sourav; Roychowdhury, Suparna; Chaudhuri, Indranath. Universality and herd immunity threshold: Revisiting the SIR model for COVID-19. *International Journal of Modern Physics C*, 32(10), 2150128, 2021. World Scientific.
10. Chowdhury, Sourav; Manna, Sourabh Kumar; Roychowdhury, Suparna; Chaudhuri, Indranath. Mathematical model of ingested glucose in glucose-insulin regulation. *arXiv preprint arXiv:2003.02573*, 2020. [arXiv:2003.02573](https://arxiv.org/abs/2003.02573).
11. Bose, Indrani; Chaudhuri, Indranath. Bacterial evolution and the Bak–Sneppen model. *International Journal of Modern Physics C*, 12(05), 675–683 (2001). World Scientific.
12. Bose, Indrani; Chaudhuri, Indranath. Percolation-like phase transition in a nonequilibrium steady state. *International Journal of Modern Physics C*, 12(02), 247–256 (2001). World Scientific.
13. Chaudhuri, Indranath; Bose, Indrani. Punctuated equilibrium in an evolving bacterial population. *Physica A: Statistical Mechanics and its Applications*, 270(1-2), 63–68 (1999).
14. Bose, Indrani; Chaudhuri, Indranath. Effect of randomness and anisotropy on Turing patterns in reaction-diffusion systems. *Physical Review E*, 55(5), 5291 (1997).

7 Books, Reports, Chapters, and General Articles

- Chaudhuri, Indranath; Bose, Indrani. Pattern formation in reaction-diffusion systems. *Nonlinear Dynamics: Integrability and Chaos*, Narosa, 1998.

8 Additional Information

My primary research interest lies in the statistical mechanics of self-organised systems and their application to a wide array of complex systems. I am particularly fascinated by the emergence of order and patterns both at and away from equilibrium, exploring how simple local interactions can give rise to intricate global structures. Within this broad domain, my special focus is on pattern formation phenomena in non-equilibrium systems. From the grandeur of astrophysical structures to the intricacies of microscopic objects, nature abounds with striking patterns whose origins often trace back to fundamental physical laws and stochastic processes. Currently, I am expanding my research into the mathematical modelling of disease dynamics and other real-world, interdisciplinary problems. By leveraging tools from statistical mechanics and nonlinear dynamics, I aim to uncover the underlying principles governing the spread of diseases and the formation of patterns in biological, ecological, and social systems. My approach is highly interdisciplinary, integrating concepts from physics, mathematics and computational science to address pressing challenges in both fundamental and applied contexts.