

Department of Mathematics

Dr. Naresh Chandra Pati, Ph.D.

Assistant Professor

Department of Mathematics

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Brief Profile:

Dr. Naresh Chandra Pati is an Assistant Professor in the Department of Mathematics at the Central University of Jharkhand, Ranchi. He completed his B.Sc.(H) in Mathematics from Bankura Christian College (under the University of Burdwan, West Bengal) in the year 2011, securing second position in the University, and M.Sc. in Mathematics in the year 2013 from the University of Burdwan, where he secured first position and received the University Gold Medals. He earned his Ph.D. in Mathematics in the year 2020 from the University of Burdwan and subsequently carried out postdoctoral research at IIT Indore. He also qualified CSIR-JRF (Dec, 2013) with **AIR 66** and GATE Mathematics (2014) with **AIR 19**. Dr. Pati's research focuses on nonlinear dynamics, chaos, fractals, mathematical modelling, and population dynamics, with *particular emphasis on organized structures in bi-parameter spaces of dissipative dynamical systems*. Prior to joining the Central University of Jharkhand, Dr. Pati served as an Assistant Professor at BIT Mesra, Ranchi and at Bidhan Chandra College, Asansol.

Research Profile:

- ❖ **Google Scholar:** <https://scholar.google.com/citations?user=wcrxovMAAAAJ&hl=en>
- ❖ **ResearchGate:** <https://www.researchgate.net/profile/N-C-Pati>
- ❖ **ORCID:** <https://orcid.org/0000-0001-9906-5557>
- ❖ **Scopus:** <https://www.scopus.com/authid/detail.uri?authorId=57195674400>

Educational Qualifications:

- ❖ Ph.D. in Mathematics from the University of Burdwan, West Bengal in the year 2020 (Oct)
Thesis Title: Quantifications of Chaotic Motions

- ❖ M.Sc. in Mathematics from the University of Burdwan, West Bengal, in the year 2013 with 1st class securing 92.30 %.
- ❖ B.Sc. (H) in Mathematics from Bankura Christian College (affiliated to the University of Burdwan) in the year 2011 with 1st class securing 80%

Courses Taught:

- **UG and PG:** Analytical Geometry, Vector Analysis, C Programming, Linear Algebra, Differential Equations, Numerical Analysis, C programming, LaTeX, Statistics, Optimization Techniques, Fluid Mechanics.
- **B.Tech.:** Mathematics-I, Discrete Mathematics.

Research Interests:

Nonlinear Dynamics: Multistability, Chaos, and Organized Structures; Thermo-fluid convection; Mathematical Biology: Modelling and Simulation; Delay Differential Equations.

List of Selected Publications:

1. **N. C. Pati**, P. Datta, B. Ghosh: Exploring quasi-periodic shrimps in the parameter space of a discrete-time food chain model. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, **35**, 023101 (2025).
2. **N. C. Pati**: Spiral organization of quasi-periodic shrimp-shaped domains in a discrete predator–prey system. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, **34**, 083126 (2024) [published under Featured Section]
3. **N. C. Pati**, B. Ghosh: Impacts of time delay in a bistable predator–prey system. *Nonlinear Dynamics*, **111**, 22707-22726 (2023)
4. **N. C. Pati**, B. Ghosh: Stability scenarios and period-doubling onset of chaos in a population model with delayed harvesting. *Mathematical Methods in the Applied Sciences*, **46**, 12930-12945 (2023). DOI: 10.1002/mma.9223
5. **N. C. Pati**: Bifurcations and multistability in a physically extended Lorenz system for rotating convection. *The European Physical Journal B*, **96**, 119 (2023).
6. S. Garai, **N. C. Pati**, N. Pal, G. C. Layek: Organized periodic structures and coexistence of triple attractors in a predator–prey model with fear and refuge. *Chaos, Solitons & Fractals*, **165**, 112833 (2022).
7. **N. C. Pati**, B. Ghosh: Delayed carrying capacity induced subcritical and supercritical Hopf bifurcations in a predator–prey system. *Mathematics and Computers in Simulation*, **195**, 171-196 (2022).
8. A da Silva, **N. C. Pati**, P. C. Rech: Multistability and period-adding in a logarithmic Lorenz system. *International Journal of Modern Physics C*, **33**, 2250062 (2022).

9. **N. C. Pati**, S. Garai, M. Hossain, G. C. Layek, N. Pal: Fear Induced Multistability in a Predator–Prey Model. *International Journal of Bifurcation and Chaos*, **31**, 2150150 (2021).
10. M.Hossain, **N. C. Pati**, S.Pal, S.Rana, N.Pal, G.C.Layek: Bifurcations and multistability in a food chain model with nanoparticles. *Mathematics and Computers in Simulation*, **190**, 808-825 (2021).
11. **N. C. Pati**, P. C. Rech, G.C. Layek: Multistability for nonlinear acoustic-gravity waves in a rotating atmosphere. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, **31**, 023108 (2021).
12. **N. C. Pati**, G.C. Layek, N. Pal: Bifurcations and organized structures in a predator-prey model with hunting cooperation. *Chaos, Solitons & Fractals*, **140**, 110184 (2020).
13. S.Pal, M.Hossain, P.Panday, **N.C. Pati**, N.Pal, J.Chattopadhyay: Cooperation delay induced chaos in an ecological system. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, **30**, 083124 (2020).
14. G. C. Layek, and **N.C. Pati**: Period-bubbling transition to chaos in thermo-viscoelastic fluid systems. *International Journal of Bifurcation and Chaos*, **30**, 2030013 (2020).
15. **N. C. Pati** and P.C. Rech: Dynamics of a high-order generalized Lorenz model for magnetoconvection. *International Journal of Bifurcation and Chaos*, **30**, 2050187 (2020).
16. G. C. Layek and **N. C. Pati**: Organized structures of two bidirectionally coupled logistic maps. *Chaos: An Interdisciplinary Journal of Nonlinear Science*, **29** 093104 (2019).
17. PC Rech, S Dhua, **N. C. Pati**: Multistability and bubbling route to chaos in a deterministic model for geomagnetic field reversals. *International Journal of Bifurcation and Chaos*, **29**, 1930034 (2019).
18. G. C. Layek, and **N. C. Pati**: Chaotic thermal convection of couple-stress fluid layer. *Nonlinear Dynamics*, **91**, 837-852 (2018).
19. G. C. Layek and **N. C. Pati**: Bifurcations and hyperchaos in magnetoconvection of non-Newtonian fluids. *International Journal of Bifurcation and Chaos*, **28**, 1830034 (2018).
20. G. C. Layek and **N. C. Pati**: Bifurcations and chaos in convection taking non-Fourier heat-flux. *Physics Letters A*, **381**, 3568-3575 (2017).

Teaching and Research Experience:

- Working as an Assistant Professor in the Department of Mathematics at Central University of Jharkhand, Ranchi, India since February 2026.
- Worked as an Assistant Professor in the Department of Mathematics, Bidhan Chandra College, Asansol (W.B.) from December 2023 to February 2026
- Worked as an Assistant Professor in the Department of Mathematics, Birla Institute of Technology, Mesra, Ranchi from March 2023 to December 2023.
- Postdoc (RA) from IIT Indore, Madhya Pradesh, India from February 2021 to March 2023.

Seminar/Workshop/Conference:

✚ **Organized:** Organized a two-day National Conference on “*Recent Trends on Mathematics and its Applications (RTMA-2025)*” during 4th -5th April, 2025 as a Joint Convenor.

✚ **Participated:**

1. Presented a paper at the International Conference on Frontiers in Mathematics (ICTM-2015) organized by Gauhati University, Assam.
2. Presented a paper in the National Seminar on Recent Advances in Computational Mathematics(RACM-2016) organized by Department of Applied Mathematics, University of Calcutta, West Bengal.
3. Presented a paper in the National Seminar on Advanced Level of Mathematical Science (ALMS-2017) organized by Raja N. L. Khan Womens’ College and Chandrakona Vidyasagar Mahavidyalaya, Paschim Midnapore, West Bengal.
4. Presented a paper at the National Conference on Futuristic Trends in Applied and Computational Mathematics (NCFTACM-2017) organized by Department of Applied Mathematics with Oceanology and Computer Programming, Vidyasagar University, Midnapore, West Bengal.
5. Participated in the International Conference on Mathematics and its Applications (ICMA-2018) organized by Department of Mathematics, The University of Burdwan, West Bengal.
6. Participated in the National Seminar on Recent Trends in Mathematical Science (RTMS-2019) organized by Department of Mathematics, The University of Burdwan.
7. Presented a paper at the 2nd International Conference on Frontiers in Biological, Environmental, and Medical Sciences organized by The University of Burdwan, West Bengal, 2019.
8. Attended an online Faculty Development Programme (FDP) on “Recent Trends in PDEs: Theory and Computations”, organized by Department of Mathematics, NIT Andhra Pradesh during November 2-6, 2020.
9. Participated in the International Workshop on “Fractional Derivatives: Theory and Computations with Applications (FDTCA 2021)” organized by IIT BHU during November 12-14, 2021 in online mode.

10. Participated in the “National Symposium on Mathematics and Applications (NSMA 2021)” held on 22 December 2021 at Department of Mathematics IIT Madras.
11. Participated in the Beginner to Advanced MATLAB workshop, jointly conducted by the MathWorks team and IEEE student Branch IIT Indore on May 5, 2022.
12. Participated in a two-day workshop on “Mathematical Ecology and Epidemiology” organized by Department of Mathematics, IIT Indore during June 17-18, 2022.
13. Participated in International Symposium on “Recent Advances in Computational Analysis and Modelling” organized by Department of Mathematics, IIT Roorkee during June 20-24, 2022.
14. Participated in “International Conference on Mathematical Analysis and Applications (ICOMAA-2022)” organized by Department of Mathematics, University of Kalyani, West Bengal during June 28-29, 2022.
15. Presented a contributory talk entitled “Effects of time delay in a bistable predator-prey system” at the “International Conference on Dynamical Systems, Control Theory & their Applications (ICDSCA-2022)” organized by Department of Mathematics, IIT Roorkee during 1-3 July 2022.
16. Presented a paper entitled "Dynamics of a predator-prey model with delay harvesting" at the International Conference on "Mathematical Modelling and Computational Intelligence" organized by the Department of Engineering Mathematics, Lakshmi Narain College of Technology and Science, Bhopal (M.P.) India in association with Rajiv Gandhi Prodyodiki Vishwavidyalaya, Bhopal (M.P.), India during 15th-16th July 2022.
17. Presented a paper "Delayed carrying capacity induced stability scenarios in a predator-prey system" at the "5th International Conference on Mathematical Modelling, Applied Analysis and Computation-2022 (ICMMAAC-22)" organized by the Department of Mathematics, JECRC University, Jaipur (Raj.), India during 4-6 August 2022.
18. Delivered a Technical Session in Techno-Sangbad-2022 organized by the Academic Council, IIT Indore during 22-24 August 2022.
19. Delivered a talk on "Some Discussions on Delay Differential Equations" in Student-Seminar Series organized by Department Student Seminar Committee held in the Department of Mathematics, IIT Indore on 11th February 2022.
20. Actively participated and contributed in organizing the workshop "Hands-on Training using MATLAB" at the Bhaskaracharya Mathematics Laboratory (funded by DST-FIST), Department of Mathematics, IIT Indore on October 6, 2022.
21. Attended the ICTP-ICTS Winter School on Quantitative Systems Biology organized by ICTP-Strada Costiera, Italy from December 05, 2022 to December 16, 2022.
22. Presented a paper and received the best paper presentation award at the International Conference on `Mathematical Analysis and Applications & 50th Annual Conference (Golden Jubilee) of the Odisha Mathematical Society, held in Institute of Mathematics and Applications, Bhubaneswar, Odisha during 21-22th January 2023.

23. Participated in the Lecture Series on "Nonlinear Dynamics and Applications" organized by Department of Mathematics, IIT Indore, India during 13-16th February 2023.
24. Participated in and Contributed to One-day Workshop on "Enriching the Quality of Teaching Learning Process in the Present Scenario" organized by BIT Mesra during May 4-11, 2023.

Membership in Professional Bodies:

Life Member of the **Odisha Mathematical Society**.

Awards and Recognitions:

- Selected for SERB (now ANRF), GoI sponsored project, 2023.
- Received *Best Paper Presentation Award and Prize* in the International Conference on "Mathematical Analysis and Applications" & 50th Annual Conference (Golden Jubilee) of the *Odisha Mathematical Society*, held in Institute of Mathematics and Applications (IMA), Bhubaneswar, Odisha during January 21-22, 2023.
- Selected for Inspire Research Fellowship, GoI in 2014 (not availed)
- Qualified GATE 2014 with AIR 19.
- Qualified CSIR NET 2013 (Dec) with AIR 66.
- Received University Gold Medals for First in First Class in M.Sc. Mathematics Exam., 2013, The University of Burdwan.
- Received Sitaram Jindal Scholarship (2011- 2013) by the Sitaram Jindal Foundation, India.
- Received Merit Cum Means Scholarship by the Govt. of West Bengal.

Other Activities:

- Serving as an *Editorial Board Member* of the prestigious "Scientific Reports" Journal since 2025.
- Active reviewer of many reputed international journals such as Chaos, Chaos, Solitons and Fractals, International Journal of Bifurcations and Chaos, Nonlinear Dynamics, Scientific Reports, Results in Physics, International Journal of Heat and Mass Transfer, Digital Signal Processing, Qualitative Theory of Dynamical Systems, etc.

(Dr. Naresh Chandra Pati)