

Deeptajyoti Sen

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LINK ResearchGate; GoogleScholar; ORCID

CURRENT POSITION Researcher II (January, 2022 - present)

RESEARCH INTERESTS I am working on the area of applied mathematics. My long-term research goal is to establish an autonomous research group with an independent researcher in a broad field of Complex system research. My research work mainly focused on the dynamical analysis of mathematical models for interacting populations, using tools of non-linear dynamics like stability analysis, local and global bifurcation analysis, derivation of normal forms, numerical construction of complete bifurcation structure, etc. In my post-doctoral tenure, I am exploring extreme events, rare event that is uncorrelated with time and has a potential impact on their occurrence, in the population models using the tools of nonlinear dynamics. My future plan is to study the network models which are applied to mathematical biology, which is also considered a part of Complex system research.

EDUCATION & WORK EXPERIENCE

1. Post-doctoral Fellow, Department of Physical Sciences, at IISER Mohali, Mohali, Punjab, India, (Sept 2020 - Dec 2021)
2. PhD in Applied Mathematics at Indian Institute of Technology, Kanpur, Kanpur, Uttar Pradesh, India, August 2020.
 - Title of dissertation: *Interacting Population Models with Complex Dynamics: Local and Global Bifurcation Analysis*
 - Advisers: Prof. Malay Banerjee, Prof. S. Ghorai, IIT Kanpur
3. M.Sc. in Mathematics (with CPI 7.9) at Indian Institute of Technology, Kanpur, Kanpur, Uttar Pradesh, India, July 2014.
4. B.Sc. (Hons) in Mathematics (With 79.38 %) at University of Burdwan, Bardhaman, West Bengal, India, July 2012.

PUBLICATIONS (IN JOURNAL)

1. **D. Sen**, S. Ghorai & M. Banerjee, Complex dynamics of a three species prey-predator model with intraguild predation, *Ecological Complexity* 34:9-22, 2018.
2. Y. Tyutyunov, **D. Sen**, L. Titova & M. Banerjee, Predator overcomes the Allee effect due to indirect prey-taxis, *Ecological Complexity*, 39:100772, 2019.
3. **D. Sen**, S. Ghorai & M. Banerjee, Allee Effect in Prey versus Hunting Cooperation on Predator — Enhancement of Stable Coexistence, *International Journal of Bifurcation and Chaos*, 29:1950081, 2019.
4. **D. Sen**, S. Petrovskii, S. Ghorai & M. Banerjee, Rich bifurcation structure of prey-predator model induced by the Allee effect in the growth of generalist predator, *International Journal of Bifurcation and Chaos*, 30:2050084, 2020.

5. **D. Sen**, S. Ghorai, S. Sharma, M. Banerjee, Allee effect in prey's growth reduces the dynamical complexity in prey-predator model with generalist predator, *Applied Mathematical Modelling*, 91:768-790, 2021.
6. **D. Sen**, S. Sinha, Enhancement of Extreme Events through the Allee effect and its Mitigation through Noise in a Three Species System, *Scientific Reports*, 11:1-12, 2021.
7. **D. Sen**, A. Morozov, S. Ghorai, M. Banerjee, Bifurcation analysis of the prey-predator model with the Allee effect in the predator, *Journal of Mathematical Biology*, 84:1-27, 2022
8. **D.Sen**, S. Sinha. Influence of Allee Effect on Extreme Events in Coupled Three Species Systems, *Journal of Biosciences*, 47:30, 2022

PUBLICATIONS (IN CONFERENCE)

1. Y. Tyutyunov, **D. Sen**, L. Titova & M. Banerjee, Indirect tropho-taxis in predator-prey model with Allee effect in predator population [in Russian], Ecology, Economy, Informatics, System analysis and mathematical modeling of ecological and economic systems, *Rostov-on-Don: Southern Scientific Center for RAS Publishers*, 2018

AWARDS

- Received Marie Skłodowska-Curie Actions grant for Individual post-doctoral fellow, going to start from 1st December, 2022,
- Senior Research Fellowship (University Grants Commission, India) – 2017-2019
- Junior Research Fellowship (University Grants Commission, India) – 2015-2016.
- 2nd position in the University of Burdwan –2012.

PRESENTATIONS

- 11th Conference on Dynamical Systems Applied To Biology and Natural Sciences, Universities de Trento, Trento, Italy February 2020
- International Conference on Differential Equations and Control Problems: Modelling, Analysis and Computations, Indian Institute of Technology, Mandi, Himachal Pradesh, India June 2019
- International Conference on Mathematical Analysis and Application in Modeling, Jadavpur University, Kolkata, India January 2018

TEACHING EXPERIENCE

Teaching Assistant Summer 2016
 - Ordinary and Partial differential equations with S. Ghorai
 IIT Kanpur

SOFTWARE SKILLS Matlab, Maple, XPP-AUTo, Matcont, Latex

REFERENCES

Prof. Sudeshna Sinha
 - Department of Physical Science IISER Mohali Email: sudeshna@iisermohali.ac.in

Prof. Malay Banerjee
 - Department of Mathematics & Statistics IIT Kanpur E-mail: malayb@iitk.ac.in

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- Department of Mathematics & Statistics
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