Dr. Shiva Dixit



Assistant Professor - I,
Department of Data Science,
Amity School of Integrative Sciences & Health
Amity University Haryana,
Panchgaon, Haryana, India - 122 412.

Email: sdixit@ggn.amity.edu
Google Scholar and Linkedin

Work Experience

- **Amity University Haryana**
  Assistant Professor - I *Oct 2023 – onwards*
  Teaching topics in the data science and machine learning. Interdisciplinary researcher in the field of machine learning and reservoir computing, nonlinear and complex systems.
- **IIT, Bombay**
  Institute Postdoctoral Fellow *June 2021 – Oct 2023*
  Active Matters and Dynamical Systems. Developed new methodologies and image analysis techniques in the interdisciplinary research linked to Computational Science, Nonlinear Dynamics, and Soft Matters.

Education

- **Ph.D. in Physics** **Aug 2015 – May 2021**
  Central University of Rajasthan, Ajmer
  Thesis Title: “Dynamics of Nonlinear Systems with Competitive and Dynamic Interaction"

  Thesis Advisor: Prof. Manish Dev Shrimali

- **M. Sc. (Physics)** **Banasthali University, Rajasthan**
  , 72 % *2012 - 2014*

- **B. Sc.** **G. F. College, Rohilkhand University**
  , 61 % *2012*

- **Higher Secondary** **U.P. Board**
  , 63 % *2009*

- **Secondary** **U.P. Board**
  , 66 % *2007*

Research Interest

- Machine learning and Reservoir computing: Learning dynamics using Eco-State Network, Model-free and Data-driven predictions using reservoir computing, Physics informed neural networks, Physical reservoir computing.

- Nonlinear and Complex Systems Dynamics: Synchronization and control, Suppression and revival of oscillations, Chimera states, Critical transitions in the coupled dynamical systems, Collective dynamics of the active Self Propelled 1- Pentanol Drop, and Camphor system.

Honors and Awards

2021: CSIR Direct SRF
2024: DST Travel Grant

Skills

1. Programming Languages: (in order of proficiency) Fortran, Python, C
2. Data Analysis: Data Visualization (Tableau), Opencv
3. Software: Mathematica, LaTeX, Inkscape, Blender, GIMP, ImageJ, XPPAUT, Xmgrace, Gnuplot, FFmpeg, Tracker, Operating Systems (Linux, windows, and Mac)

Online Courses

1. Association Rule Mining: Basic Theory & Practice
2. Neural Networks and Deep Learning
3. The Data Scientist's Toolbox

Teaching Experience

1. **Laboratory Courses**
   - DSEU1506: Spark (2023-26)
   - DSEU1514: Data Visualization (Tableau) (2023-26)
   - DSC4213: Association Rule Mining (2023-26)
   - DSEU1524: Natural Language Processing (2026-27)
   - DSEU1524: Programming Toolbox: R (2026-27)
   - Time Series Lab (2024-26)
   - DSEU4204 Big Data Tools & Technology (Hadoop, Pig, Hive, Sqoop, Hive, Hbase) (2024-26)
2. **Theory Courses**
   - DSC5002: Introduction to Data Science (Machine Learning, Deep Learning) (2023-24)
   - Time Series (2024-25)

Teaching Assistantship

- **Laboratory Courses**
  PH-231: Electronics Lab I @ IITB (2023-24)
  PH-204: Physics Lab IV @ CURaj (2016 - 2017)
  PE-402: Computational Physics @ CURaj (2017 -2018 & 2018 - 2019)

- **Theory Courses**

  PH-542: Nonlinear Dynamics @ IITB (2023-24)
  PH-792: Communication Skills II @ IITB (2022-23)

Journal Reviewer

1. Physical Review E, American Physical Society (APS)
2. Soft Matter, Royal Society of Chemistry (RSC)
3. Chaos: An Interdisciplinary Journal of Nonlinear Science

Publications

2026

1. "Predicting Phase Ordering in Chaotic Maps and Coupled Map Lattices"
   Shiva Dixit, Swati Chauhan, Manish Dev Shrimali
   submitted in *European Physical Letters*, (2026).
2. "Targeting amplitude-frequency of drive-response system through linear augmentation"
   Shivani Aggarwal, **Shiva Dixit**, Awadhesh Prasad, Manish Dev Shrimali
   European Physical Letters, in press (2026).

2025

3. "Predicting collective states of a star network using reservoir computing",
   Swati Chauhan, Swarnendu Mandal, **Shiva Dixit**, Manish Dev Shrimali
   Chaos: An Interdisciplinary Journal of Nonlinear Science, **35** (12), (2025).

2024

4. "Constant Production in an Orchard: An interaction-based approach "
   Swati Chauhan*, **Shiva Dixit***, Manish Dev Shrimali, Kenshi Sakai, and Awadhesh Prasad,
   Chaos, Solitons & Fractals, **181**, 114639, (2024).

5. "Principle of least action exhibited by active particles"
   Anjuman Ara Khatun, Aarsh Chotalia, Kalpita Das, **Shiva Dixit**, and P. Parmananda
   Physical Chemistry Chemical Physics, 26, 25590 (2024).
6. "Taming explosive growth through linear augmentation"
   Shivani Aggarwal, Richita Ghosh, **Shiva Dixit**, Awadesh Prasad, and Manish Dev Shrimali,
   *E*uropean Physical Letters, **148** (2), 23002 (2024).

2023

7. “Pathway selection by an active droplet "
   Shiva Dixit, Aarsh Chotalia, Shantanu Shukla, Tanushree Roy, and P. Parmananda,
   Soft Matter, **19**, 6844 (2023).

8. “ A Memory-Based Approach to Model Glorious Uncertainties of Love "
   Aarsh Chotalia*, **Shiva Dixit***, and P. Parmananda,
   Chaos: An Interdisciplinary Journal of Nonlinear Science , **33**, 113131 (2023).

2022

9. “Regulating dynamics through intermittent interactions"
   Shiva Dixit*, M. Aravind*, and P. Parmananda,
   Physical Review E, **106**, 014203, (2022).

2021

10. “Emergent rhythms in coupled nonlinear oscillators due to dynamic interactions"
    Shiva Dixit, S. N. Chowdhury, D. Ghosh, A. Prasad and M. D. Shrimali,
    *C*haos: An Interdisciplinary Journal of Nonlinear Science, **31**, 011105 (2021).

11. “Dynamic interaction induced explosive death"
    Shiva Dixit, S. N. Chowdhury, D. Ghosh and M. D. Shrimali,
    *E*uropean Physical Letters, **133**, 40003 (2021).

12. “Critical transition influenced by dynamic quorum sensing in nonlinear oscillators"
    P. Asir, **Shiva Dixit** and M. D. Shrimali,
    Eur. Phys. J. Special Topics, **230**, 3211, (2021).

13. “Enhanced synchronization due to intermittent noise"
    E Shajan, MP Asir, **Shiva Dixit**,and MD Shrimali *New Journal of Physics* **23**, 112001 (2021).

2020

14. “Static and dynamic attractive–repulsive interactions in two coupled nonlinear oscillators"
    Shiva Dixit, and M. D. Shrimali.
    Chaos: An Interdisciplinary Journal of Nonlinear Science, **30**(3), 033114 (2020).

15. “Aging in global networks with competing attractive-repulsive interaction"
Shiva Dixit, P. Asir and M. D. Shrimali.
Chaos: An Interdisciplinary Journal of Nonlinear Science, **30**(12), 123112 (2020) .

16. “Spatial feedback control on multi-stability in hidden attractors"
Shiva Dixit, P. Asir, A. Prasad, N. V. Kuznetsov and M. D. Shrimal,
Indian Academy of Sciences Conference Series, **3**, p.13, (2020).

2019

17. “Dynamics of nonlinear oscillator with transient feedback”
Shiva Dixit, A. Sharma, A. Prasad, and M. D. Shrimali.
International Journal of Dynamics and Control, 1-6 (2019).

18. “The dynamics of two coupled Van der Pol oscillators with attractive and repulsive coupling"
Shiva Dixit, A. Sharma, and M. D. Shrimali.
Physics Letters A, **383**(32), 125930 (2019).

2016

19. “Localized surface plasmon resonance based fiber optic ethanol and methanol sensor using UV light-based $AgNO_3$/ZnO Nanorods”
Shiva Dixit, P. Kumar, and R. K. Verma,
13th International Conference on Fiber Optics and Photonics, OSA Technical Digest (online) (Optical Society of America, 2016), paper **T**h3A.58.

2015

20. “Synthesis and structural properties of lead strontium titanate borosilicate glasses with addition of chromium trioxide and graphene nanoplatlets”
C. Gautam, **Shiva Dixit**, and A. Madheshiya,
Spectroscopy Letters **48.4**, 280-285 (2015).

Conferences/Workshop/Schools - Organized

2025

1. Participated in organizing “Basic Exposure to Microbiological and Biochemical Tools and Techniques,” a Scientific Social Responsibility (SSR) initiative held on March 5–6, 2025 at Amity University Haryana.

2024

2. **Dynamics Day Delhi 2024**, Amity University Haryana, India, November 16, 2024.

Conferences/Workshop/Schools - Invited Talk

1. **Workshop on "Big Data Tools and Technologies"**, being organized by Shri Mata Vaishno Devi University, Katra, September 15-16, 2026.
2. **Science Academies' Summer School on Dynamical Systems and Complexity**, UPES Dehradun, June 23 – July 11, 2025.

Conferences/Workshop/Schools/FDP - Participation

2025

1. Presented the project titled *"Analysis of the Dynamics of Camphor-Activated Disks"* at a two-day workshop on **"Designing & Prototyping of Laboratory Modules in Dynamical Systems,"** held during November 6–7, 2025, at the Design Innovation Centre (DIC), Cluster Innovation Centre (CIC), University of Delhi.
2. Delivered an oral presentation on *"Self-Propulsion Dynamics in Camphor-Based Active Systems"* at the **20th Dynamics Day Delhi**, organized by the School of Engineering & Technology, BML Munjal University, Gurugram, in collaboration with the **Society of Dynamical Systems (SDS)**, Ashoka University, Sonepat, India (November 8, 2025).
3. Participated in the **International Conference on "Biotechnology Education and Research: Inspiring the Scientists of Tomorrow,"** organized by the Amity Institute of Biotechnology, Amity University Haryana, held during September 10–12, 2025.
4. Participated in a **Five-Day Faculty Development Programme (FDP)** on *"Recent Frontiers in Disease Biology: Latest Innovations and Biotechnological Solutions,"* organized by the Academic and Administrative Development Centre (AIU–AUH–AADC) in collaboration with the Association of Indian Universities (AIU), held during July 21–25, 2025, at Amity University Haryana.
5. Participated in the **Faculty Development Programme (FDP) 2025** on *"From Research to Real World: Data Science Connecting Academia and Industry,"* held during June 30–July 4, 2025, at Amity University Haryana.

2024

6. Oral presentation on "Pathway Selection by an Active Droplet"in **Gordon Research Conference on Oscillations and Dynamic Instabilities in Chemical Systems** held at Les Diablerets Conference Center in Les Diablerets, Vaud (fr) Switzerland (July $14-19, 2024$).
7. Attended **School and Workshop on Dynamical Systems in (smr 3959)**, held at International Centre for Theoretical Physics, Trieste, Italy (July 22-August 3, 2024).

2023

8. Oral presentation on “Pathway Selection by an Active Droplet” in **SYMPHY 2022** held at Indian Institute of Technology, Bombay, India (January $28-29,2023$).

9. Oral presentation on “Navigation of an Active Drop in Geometrically and Chemically Asymmetric Environment” in Complexity and Nonlinear Dynamics in STEM **(CNLDS-2023)** held at Indian Institute of Technology Hyderabad, India (June $5-7,2023$).

10. Oral presentation on “Pathway Selection by an Active Droplet” in Perspectives in Nonlinear Dynamics **(PNLD-2023)** held at Indian Institute of Technology Madras, India (Aug $1-4,2023$).

2022

11. Oral presentation on “Pathway Selection by an Active Droplet” in Nonlinear Systems and Dynamics **(CNSD-2022)** held at IISER Pune, India (December $15-18,2022$).

2021

12. Oral presentation on “Regulating dynamics through intermittent interactions” in **SYMPHY 2021** held at Indian Institute of Technology, Bombay, India (December $11-12,2021$).

13. Oral presentation on “Dynamic Interaction in Coupled Chua Oscillators: Simulations And Experiments” in Nonlinear Systems and Dynamics **(CNSD-2021)** held at SASTRA Deemed University, Thanjavur, India (December $17-22,2021$).

2020

14. Oral presentation on “ Oscillators with Competitive Interactions” in Complex Dynamical Systems and Applications **(CDSA-2020)** held at Central University of Rajasthan, Ajmer, India (February $21-23,2020$).

2019

15. Oral presentation on “Nonlinear Oscillators with Competitive Interactions” in Nonlinear Systems and Dynamics **(CNSD-2019)** held at Indian Institute of Technology, Kanpur, India (December $12-15,2019$).

2018

16. Attended DST-SERB School on Nonlinear Dynamics, Savitribai Phule Pune University, Pune, India (January 2-29, 2018).

17. Attended and Poster presentation on *“ Feedback Control ”* in **Hands-on-Research in Complex Systems**, International Centre for Theoretical Physics, Trieste, Italy (July $16-27,2018$).

18. Poster presentation on *“Transient Feedback: Spatial and Temporal”* in Nonlinear Systems and Dynamics **(CNSD-2018)** held at Jawaharlal Nehru University, New Delhi, India (October $11-14,2018$).

19. Attended DST-SERB School on Nonlinear Dynamics, Guru Nanak Dev University, Amritsar, India (November 26 – December $23, 2018$).

2017

20. Attended School on *" Dynamics of Complex Systems"*, International Centre for Theoretical Science, Bangalore, India (May $10 - 25, 2017$).

21. Oral presentation on *"State space dependent coupling leading to death in coupled oscillators"* in **12th Dynamics Day Delhi**, Ashoka University, Sonepat, India (November 25, 2017).

22. Poster presentation on *" Transient uncoupling induced death "* in Complex Dynamical Systems and Applications **(CDSA-2017)** held at Indian Institute of Technology, Guwahati, India (December $4 - 6, 2017$).

2016

23. Poster presentation on *"SPR based sensor with extremely large dynamic range of refractive index measurement in the visible region "* in Workshop on Fiber Optics and Optical Communications, Government Women Engineering College, Ajmer, India (March 2-6, 2016).

24. Oral presentation on *"SPR based fiber optic sensor for the detection of adulteration in petrol and diesel by kerosene "* in International OSA Network of Students (IONS), Dhanbad, India (September 7-10, 2016).

25. Poster presentation on *"Localized surface plasmon resonance based fiber optic ethanol and methanol sensor using UV light-based"* in 13^{th} International Conference on Fiber Optics and Photonics (Photonics-2016) held at Indian Institute of Technology, Kanpur, India (December 5-8, 2016).

26. Poster presentation on *"Annealing effect on chemically synthesized ZnO nanoparticle"* in 2^{nd} International Conference on Soft Materials **(ICSM-2016)**, Malviya National Institute of Technology (MNIT), Jaipur, India (December 12-16, 2016).