Naveen Kumar Mendola

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Research Areas

• Complex Systems • Computational Neuroscience • Emergent Phenomena • Network Science

Education

Ph.D. in Physics 2022–Present
Department of Physics, School of Engineering & Applied Science, Bennett University

M.Sc. in Physics 2017-2019
Department of Physics, Indian Institute of Technology (IIT), Indore

B.Sc. (Hons.) in Physics, 2013-2016
Department of Physics, University of Delhi

Ph.D. Thesis title	*Study of Collective Behaviour in Coupled Oscillators on Complex Networks*
Advisor	Dr. Thounaojam Umeshkanta Singh (Associate Professor)
Department	Department of Physics, Bennett University
Email	`umeshkanta@gmail.com`
Phone	+91-7727029192

M.Sc. Thesis title	*Chimera in multiplex networks*
Advisor	Dr. Sarika Jalan (Professor)
Department	Department of Physics, Indian Institute of Technology (IIT), Indore
Email	`sarika@iiti.ac.in`
Phone	+91- 8305010001

Awards & Scholarship

Best Presentation Award, Dynamics Day Delhi —DDD Nov. 2024

INSPIRE scholarship, Department of science and Technology (DST) 2013-2016

Computational Skills

Programming Languages: Julia, Python, Mathematica

Julia (Practical expertise with):

- **DynamicalSystems.jl**, **DifferentialEquations.jl**, **BifurcationKit.jl** – dynamical systems simulation, integration, and bifurcation analysis.
- **Makie.jl**, **Plots.jl** – advanced visualization and animations.

Python (Practical expertise with):

- **NEURON** – To simulate biophysical neurons and neural networks.
- **Tkinter** - Built a GUI simulator for simple dynamical systems with user defined parameters and networks.
- **JITCDDE** – For solving Delay differential equations in dynamical systems.

Publications

Journal Articles

1. **Naveen Mendola**, Thounaojam Umeshkanta Singh. Collective dynamics and phase transitions of Stuart-Landau oscillators on a ring network: Interplay of asymmetric and symmetric couplings, *Phys. Rev. E*, 111, 054218 (2025).
2. **Naveen Mendola**, Thounaojam Umeshkanta Singh. Collective rotation-flips and explosive synchronization in a ring of limit cycle oscillators, *Chaos, Solitons & Fractals*, vol. 180, 114588 (2024).
3. Niraj Kushwaha, **Naveen Mendola**, Saptarshi Ghosh, Ajay Deep Kachhvah, Sarika Jalan. Machine Learning Assisted Chimera and Solitary States in Networks, *Frontiers in Physics*, vol. 9, 513969, (2021).
4. MA Ganaie, Saptarshi Ghosh, **Naveen Mendola**, Muhammad Tanveer, Sarika Jalan, Identification of chimera using machine learning, Chaos 30, 063128 (2020).

Manuscripts in Preparation

1. **Naveen K. Mendola**, Awadhesh Prasad, Thounaojam Umeshkanta Singh, Emergence of asymmetric coherent cluster from symmetric clusters, *Manuscript in preparation*, 2025.
2. Kumar Sourav **Naveen K. Mendola**, Awadhesh Prasad, Thounaojam Umeshkanta Singh, Disorder-Order transition and explosive synchronization in heterogeneous Ginzburg-Landau oscillators on directed networks, *Manuscript in preparation*, 2025.
3. **Naveen K. Mendola**, Thounaojam Umeshkanta Singh, Synchronization transition with rotation flip in coupled nonlinear oscillators, *Manuscript in preparation*, 2025.

Conferences

1. Conference on Nonlinear Systems and Dynamics —CNSD 10-13 Mar. 2025
   Oral presentation on ***Collective rotational-flips and explosive synchronization in coupled nonlinear oscillators***
2. Dynamics Day Delhi —DDD 16^{th} Nov. 2024
   Oral presentation on ***Collective rotational-flips and explosive synchronization in coupled nonlinear oscillators***
3. Conference on Complex Dynamical Systems & Applications —CDSA 25-27 Jan. 2024
   Poster presentation on ***Dynamical states of an asymmetric ring of coupled limit cycle oscillators***
4. Dynamics Day Delhi —DDD 19^{th} Nov 2022
   Oral presentation on ***Heterogeneity-induced synchronization in time-delay coupled Stuart-Landau oscillators***

5. Conference on Computational Intelligence and Networks —CINE 27-29 Feb. 2020
   Oral presentation on ***Engineering solitary states in multiplex networks through inter-layer delays***

Workshops

1. *Computational Approaches to Memory and Plasticity —CAMP*, 3-17 July 2025, IISER, Pune, India
2. *Machine Learning for health and Disease*, 24 July - 04 August 2023, ICTS-TIFR, Bengaluru, India
3. *Bangalore school of Statistical Physics XIV*, 11-23 September 2023, ICTS-TIFR, Bengaluru, India

References

Referee I:	Dr. Thounaojam Umeshkanta Singh (Associate Professor)
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Referee II:	Dr. Sarika Jalan (Professor)
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Referee III:	Dr. Subhadeep Mondal (Associate Professor)
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Email	subhadeep.mondal@bennett.edu.in
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