

# Naveen Kumar Mendola

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Personal Website | Google Scholar | ORCID

## 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, thounaojam.singh@bennett.edu.in  
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**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, Graph.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 Kumar 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 Kumar 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 Kumar 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 Kumar 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<sup>th</sup> 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<sup>th</sup> 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. Subhadeep Mondal (Associate Professor)  
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**Email** [subhadeep.mondal@bennett.edu.in](mailto:subhadeep.mondal@bennett.edu.in)  
**Phone** +91 - 9748081024

**Referee III:** Prof. Awadhesh Prasad (Professor)  
**Department** Department of Physics & Astrophysics, University of Delhi  
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