

Saptarshi Ghosh

Researcher

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Research Interests

Spiking Neural Networks, Neuromorphic Computing, Learning, Computational Neuroscience, Graph Theory, Non-linear Dynamics, Neural Dynamics

Appointments

2020 – Present **Researcher** Kavli Institute for Systems Neuroscience
 PI: Prof. Yaseer Roudi Trondheim, Norway

- Characterization of *Relevant* Neurons coding in multiple time-scales

Education

2014 – 2020 **Ph.D. in Network Science** Indian Institute of Technology Indore
 Title: Chimera State in Multiplex Networks Indore, India
 Supervisor: [Prof. Sarika Jalan](#)
 • Demonstrated Chimera States in Multiplex Networks with delay and inhibition
 • Developed a delay-guided scheme to design chimera state without special prerequisites

2012 – 2014 **Master of Science in Physics** Indian Institute of Technology Kanpur
 CGPA: 7.7 Kanpur, India

2009 – 2014 **Bachelor of Sciences** Asutosh College, University of Calcutta
 Percentage: 61.6% Kolkata, India

Experiences

2020 Article reviewer: Chaos, Solitons & Fractals, Elsevier , Chaos, AIP

2020 Co-participant in [Neuromatch Academy \(2020\)](#) Group [Project](#) “Neural integration of reward information in subsequent decisions”

- Identified brains area relevant for Reward and Response and demonstrated possible association between Reward and Response (Action) in single trail history using Granger causality
- Source Steinmetz Dataset, [Article](#), [Dataset](#)
- [Project Overview and Codes](#) and [Project presentation](#)

2019 Research Visit to Prof. Jaroslav Hlinka at Institute of Computer Science, Czech Academy of Sciences, Prague

2018 Research Visit to Prof. Anna Zakarova at TU Berlin, Berlin, Germany

2018 Project Asistant in DST-DAAD Collaborative Grant with German Research Group

2017 Mentored 3 M.Sc Students (thesis) and 2 summer interns, both resulted in publications

2015 Teaching Assistant

- Physics -I : Modern Physics (PH 105)
- Physics Lab (PH 156)

- 2014 M.Sc. Project on “Making Physically Useful Nanostructures with Focused Ion Beam”
 Advisor: Prof. H.C. Verma, Indian Institute of Technology Kanpur, Kanpur, India
- Fabricated micro- and nano- scale capacitors of various thickness and separation using Focused Ion Beam to investigate geometrical correction to the Child-Langmuir law
 - Designed a micro- and nano- scale radiation detector
- 2013 Summer Project on “Different aspects of Quantum Communication”
 Advisor: Dr. Ujjwal Sen, Harish-Chandra Research Institute, Prayagraj, India
- Investigated quantum cryptographic protocols (BB-84, Ekert-91) for secured communications

Talks and Posters

- September, 2019 **Delivered a talk on “Taming chimera state using heterogeneous Delays”**
 Dynamic Days Europe, Rostock, New Germany
- September, 2019 **Delivered a talk on “Taming chimera state in Networks”**
 Research Visit to Kavli-NTNU, Trondheim, Norway
- August, 2019 **Delivered a talk on “Taming chimera state in Networks”**
 Research Visit to ICS-CAS, Prague, Czech Republic
- July, 2019 **Presented a Poster on “Taming chimera state using heterogeneous Delays”**
 INSPIRE meet, New Delhi, India
- December, 2018 **Delivered a talk on “Chimera in Networks”**
 DDST-DAAD collaborative visit to TU Berlin, Berlin, Germany
- October, 2018 **Delivered a talk on “Chimera in Multiplex Networks”**
 Conference on Non-linear Systems and Dynamics, JNU, New Delhi
- March 2015 **Presented a poster on “Delay enhances synchronization in distant entities”**
 Conference on Non-linear Systems and Dynamics, IISER Mohali, Punjab

Merits

- 2015 – 2020 **INSPIRE Fellowship**
 Department of Science and Technology, Govt. of India
- 2009 – 2014 **INSPIRE Scholarship**
 Department of Science and Technology, Govt. of India
- March, 2015 **MCM Scholarship**
 Govt. of West Bengal

Organization Experiences

- Member of the organizing team for Global Initiative of Academic Networks (GIAN) workshop on “Network Science and Multi-Agent Systems” held during May 30 - June 10, 2016 at Indian Institute of Technology Indore
- Aided in organizing GIAN workshop on “Biomathematics: from gene expression to bone mechanics” during August 15 - 19, 2016 at Indian Institute of Technology Indore.
- Organizing team member of short-term course on “Statistics in Systems Biology and Programming in R” under GIAN scheme of MHRD, Government of India, held during August 22 - 27, 2016 at Indian Institute of Technology Indore.
- Coordinator of Weekly Journal Club and other academic activities at Complex Systems Lab
- Active member of Mystic Hues (Photography Club, IIT-Indore)

Technical Skills

Programming		Software	
Julia, Python, Latex	Extensive User	MATLAB, Jupyter, Office/G-Suite	Extensive User
C,C++,git,bash	competent	Linux, Github	Daily User
R	Novice	Nengo, SciML, Networkx, Cytoscape	competent

Language

Bengali (Mother Tongue), English (Fluent), Hindi (Intermediate)

Publications

Dissertation Work

1. **S Ghosh**, L Schülen, AD Kachhvah, A Zakharova and S Jalan (2019) Taming chimeras in networks through multiplexing delays, EPL (Europhysics Letters) 127 (3), 30002
2. **S Ghosh** and S Jalan (2018) Engineering chimera patterns in networks using heterogeneous delays, Chaos (Fast Track) 28, 071103 (Selected as Editor's Pick article)
3. **S Ghosh**, A Zakharova and S Jalan (2018) Non-identical multiplexing promotes chimera states, Chaos, Solitons & Fractals, 106, 56-60
4. S Jalan, **S Ghosh** and B Patra (2017) Is repulsion good for the health of chimeras?, Chaos (Fast Track) 27 (10), 101104
5. **S Ghosh**, A Kumar, A Zakharova and S Jalan (2016) Birth and death of chimera: Interplay of delay and multiplexing, EPL (Europhysics Letters) 115 (6), 60005
6. **S Ghosh**, S. K. Dwivedi, MV Ivanchenko, Sarika Jalan (2016) Interplay of inhibition and multiplexing: Largest eigenvalue statistics, EPL (Europhysics Letters) 115 (1), 10001
7. **S. Ghosh**, S. Jalan (2016) Emergence of Chimera in Multiplex Network, International Journal of Bifurcation and Chaos 26 (07), 1650120

Collaborative Work

1. N Kushwaha, NK Mendola, **S Ghosh**, AD Kachhvah and S Jalan (2021) Machine Learning Assisted Chimera and Solitary States in Networks, Front. Phys. 9, 513969
2. MA Ganaie, **S Ghosh**, N Mendola, M Tanveer and S Jalan (2020) Identification of chimera using machine learning, Chaos 30 (6), 063128
3. L Schülen, **S Ghosh**, AD Kachhvah, A Zakharova and S Jalan (2019) Delay engineered solitary states in complex networks, Chaos, Solitons & Fractals 128, 290-296
4. J Sawicki, **S Ghosh**, S Jalan and A Zakharova (2019) Chimeras in multiplex networks: interplay of inter-and intra-layer delays, Frontiers in Applied Mathematics and Statistics 5, 19
5. A Singh, **S Ghosh**, S Jalan and J Kurths (2015) Synchronization in delayed multiplex networks, EPL (Europhysics Letters) 111 (3), 30010 (Selected as Editor's Pick Article)

References

Available on request 