

Saptarshi Ghosh

Researcher


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Neural Computation and Learning, Spiking Neural Networks, Neuromorphic Computing, Neuroinformatics, 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 maximally informative (*Relevant*) Neural representations

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 chimeric spatio-temporal patterns

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

2009 – 2014 **Bachelor of Sciences** Asutosh College, University of Calcutta
 Kolkata, India




Technical Skills

Programming		Software	
Julia, Python, Latex	Extensive User	MATLAB, Jupyter	Extensive User
C, C++, git	competent	Linux, Github	Daily User
R	Novice	Nengo, Keras	Novice

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

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, EK-91) for secured communications

- 2019 Research Visit to Prof. Jaroslav Hlinka at Institute of Computer Science, Czech Academy of Sciences, Prague for working on chimeric seizure dynamics
- 2018 Research Visit to Prof. Anna Zakarova at TU Berlin, Berlin, Germany for application of delay-guided scheme to solitary states
- 2018 Project Asistant in DST-DAAD Collaborative Grant for chimeric research
- 2017 Mentor: M.Sc Thesis (3) and Summer interns(2); Resulted in publications
- 2015 Teaching Assistant
 - Physics -I : Modern Physics (PH 105)
 - Physics Lab (PH 156)

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**
Depatment of Science and Technology , Govt. of India
- 2009 – 2014 **INSPIRE Scholarship**
Depatment 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)

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 