

# Dr. Swarup Poria

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Date of Birth : 29<sup>th</sup> January, 1974  
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## Educational Qualifications :

Degree / Examination	University /Institute	Year	Discipline	Division/ Class
Ph.D.	Indian Statistical Institute (Jadavpur University)	2005	Fluid Mechanics	
NET	U.G.C.-C.S.I.R.	1998	Mathematical Sciences	
M.Sc.	University of Calcutta (University College of Science, Rajabazar)	1997	Applied Mathematics	1
B.Sc.	University of Calcutta (Scottish Church College)	1994	Mathematics (Hons.)	1

Thesis Title (Ph. D.) : Some Problems of Laminar and Turbulent Incompressible Fluid Flows

## Research Experience :

Institutions	Designation	From	To	Total Period	Nature of Experience
Indian Statistical Institute, Kolkata	Research Scholar	17-08-1998	25-02-2001	2 years and 6 months	Research and Teaching
The Institute of Mathematical Sciences, Chennai	IMSc Associate	01/01/06	31/12/08	3 years	Research
Inter-University Centre for Astronomy and astrophysics (IUCAA), Pune.	Visiting Associate	01/08/2017	31/07/2020	3years	Research

## Teaching Experience :

Institutions	Designation	From	To	Total Period	Nature of Experience
University of Calcutta	Associate Professor	10/05/13	Till date		Teaching, Research and Evaluation
University of Calcutta	Reader in Applied Mathematics	10/05/10	09/05/13	3years	Teaching, Research and Evaluation
University of Calcutta	Senior Lecturer	25/11/08	09/05/10	1year 6months (approx)	Teaching, Research and Evaluation
Midnapore College, Midnapore	Lecturer in Mathematics	26/02/01	24/11/08	7 years and 9 months (approx).	Teaching and Evaluation
The International Statistical Education Center, Kolkata	Teacher (Research Scholar, PAMU, ISI)	17-08-1998	25-02-2001	2 years and 6 months	Teaching

### Research Interests:

- Nonlinear Dynamics and Chaos
- Mathematical Ecology
- EEG signal Analysis
- Modeling and Analysis of psychiatric disorders

### 9. Research Projects :

Sl. No.	Title	Agency	Period	Grant/Amount Mobilized(Rs. in lakhs)
1.	Electro-physiological and Neuro-imaging Studies Including Mathematical Modeling	UGC Scheme of Centre with potential for excellence in Particular Area (CPEPA), Government of India	04 years (Jan 2014- Mar 2019)	615 Rs. In Lakhs. Per Scientist 68.33 Lakhs

### Collaborating Institutes

1. Institute of Mathematical Sciences (IMSc), Chennai
2. Indian Institute of Science, Bangalore
3. Indian Institute of Science Education & Research, Mohali
4. Indian Statistical Institute, Kolkata.

<b>Details of PhD students(Guided and Ongoing)</b>			
<b>Sl. No.</b>	<b>Name of Student(s)</b>	<b>Title of the Dissertation(s)</b>	<b>Status [Awarded (with date)/Submitted(with date)/ongoing]</b>
1.	Sanjib Kumar Kundu	Studies on some problems of non linear wave propagation in plasma	Awarded (05.10.2013) (V.B.U.)
2.	Banshidhar Sahoo	Impacts of additional food on the dynamics of predator-prey systems	Awarded (09.07.2015) (C.U.)
3.	Md. Ali Khan	Chaos control, chaos synchronization and its applications	Awarded (09.09.2015) (C.U.)
4.	Santinath Pal	Dynamics of coupled nonlinear systems	Awarded (29.03.2016) (C.U.)
5.	Dibyendu Biswas	Study of non linear growth processes through phenomenological approach	Awarded (09.03.2017) (J.U.)
6.	Barnali Pal	Study of nonlinear phenomenon through dynamical system approach with application in plasmas	Awarded(25.07.2017) (C.U.)
7.	Mayurakshi Nag	Synchronization and collective dynamical phenomenon in nonlinear systems	Awarded (16.01.2018) (C.U.)
8.	Santu Ghorai	Spatiotemporal patterns in predator-prey systems	Awarded (08.05.2018) (C.U.)
9.	Priyanka chakraborty	Properties of coupled nonlinear systems with applications in EEG signal analysis	Awarded (06.08.2019) (C.U.)
10.	Aman Dhiman	A study on evolutionary game theory and its applications	Ongoing (C.U.)
11.	Sayantani Mondal	Study on dispersal effects on the dynamics of metapopulation models	Ongoing (C.U.)
12.	Abul Hossian	A study on evolutionary dynamics of biological games	Ongoing (C.U.)
13.	Mousumi Roy	Analysis of Neuronal Models	Ongoing (C.U.)
14.	Mrinal Kanti Pal	Analysis of Ecological Models	Ongoing (C.U.)
15.	Swapan Kumar Jana	A study on nonsmooth ODEs	Ongoing (C.U.)

RESEARCH ACTIVITIES					
(a)	Paper(s) Publication in SCI/Scopus Journal(s)				
Sl.No.	Title of the paper	Name of co-authors	Name of journal	Pages	Volume & year
1.	Chaos in positive ion–negative ion magnetized plasmas	S Ghosh, B Maity	Journal of Plasma Physics		86(6),2020
2.	Enhancement of synchronized chaotic state in a delay-coupled complex neuronal network	M Roy	Nonlinear Dynamics	745-758	102(2), 2020
3.	Effects of time delay on the synchronized states of globally coupled network	M Nag	Chaos: An Interdisciplinary Journal of Nonlinear Science	093122	30(9),2020
4.	Nonlinear dynamics of ion-acoustic waves in quantum plasmas with exchange-correlation effects	P Shome, B Sahu	Zeitschrift für Naturforschung		2020
5.	Complex dynamics of coupled map lattices under random asynchronous updating	M Nag	Physica Scripta	045218	95(4), 2020
6.	Dispersal-induced pattern-forming instabilities in host–parasitoid metapopulations	S Ghorai, P Chakraborty, N Bairagi	Nonlinear Dynamics	1-14	3, 2020
7.	Inventory Modeling and Inventory Control Application	S Mondal, A Khatoun,	Supply Chain Intelligence	131-154	2020
8.	Li–Yorke Chaos in Globally Coupled Map Lattice with Delays	M Nag	International Journal of Bifurcation and Chaos	1950183	29(13), 2019
9.	Extreme multistable synchronisation in coupled dynamical systems	P Chakraborty	Pramana	19	93(2), 2019
10.	Dynamics of predator–prey system with fading memory	B. Sahoo	Applied Mathematics and Computation	319-333	347, 2019
11.	Short Test of Mental Status in Detection of Mild Cognitive Impairment in India	Sreerupa Ghose, Tapalagna Das, Sanjukta Das	Indian Journal of Psychiatry	184	61(2) 2019
12.	Multistability in coupled different dimensional dynamical systems	Mohammad Ali Khan, Mayurakshi Nag	Pramana	89	91(6),2018
13.	Analysis of a harvested tritrophic food chain model in the presence of additional food for top predator	Prabir Panja, Shyamal Kumar Mondal	International Journal of Biomathematics	1850059-1 1850059-29	11(4), 2018
14.	Allee effect induced diversity in evolutionary dynamics	Aman Dhiman	Chaos, Solitons & Fractals	32-38	108,2018
15.	Neural oscillations in resting state EEG in ADHD children-A preliminary study.	Piya Saha, Pritha Mukhopdhyay, Priyanka Chakraborty, CR Mukundan, Sumit Sharma, Pratip Ghosh, Mohini Vijay, Saswati Nath, Sayanti Ghosh	Journal of Indian Association for Child & Adolescent Mental Health	13(3)	2017

16.	Existence and Uniqueness of Solution to ODEs: Lipschitz Continuity	Aman Dhiman	Resonance – Journal of Science Education	491-507	22(5),2017
17.	Prey-predator dynamics with prey refuge providing additional food to predator	J Ghosh, B Sahoo	Chaos, Solitons & Fractals	110-119	96,2017
18.	Emergent impacts of quadratic mortality on pattern formation in a predator-prey system	S Ghorai	Nonlinear Dynamics	2715-2734	87 (4),2017
19.	Analysis of different growth mechanisms from phenomenological consideration	D Biswas, SN Patra	Journal of Interdisciplinary Mathematics	443-459	20 (2),2017
20.	Pattern formation in a system involving prey-predation, competition and commensalism	S Ghorai	Nonlinear Dynamics	1-18	2017
21.	Impacts of additional food on diffusion induced instabilities in a predator-prey system with mutually interfering predator	S Ghorai	Chaos, Solitons & Fractals	68-78	103,2016
22.	Complex dynamics of a particle in an oscillating potential field	B Pal, D Dutta	Pramana	32	89(2),2016
23.	Design of multi-stable systems via partial synchronization	MA Khan, M Nag	Pramana	19	89(2),2016
24.	Phenomenological approach to describe logistic growth and carrying capacity-dependent growth processes	D Biswas, SN Patra	Pramana	80	87 (5),2016
25.	Turing patterns induced by cross-diffusion in a predator-prey system in presence of habitat complexity	S Ghorai	Chaos, Solitons & Fractals	421-429	91, 2016
26.	Synchronization in a network of delay coupled maps with stochastically switching topologies	M Nag	Chaos, Solitons & Fractals	9-16	91,2016
27.	Chaotic behavior of collective ion dynamics in the presence of an external static magnetic field	S Ghosh	Physics of Plasmas	062315	23 (6),2016
28.	A generalized scheme for designing multistable continuous dynamical systems	S Pal, B Sahoo	Pramana	1183-1193	86 (6),2016
29.	Pattern formation and control of spatiotemporal chaos in a reaction diffusion prey-predator system supplying additional food	S Ghorai	Chaos, Solitons & Fractals	57-67	85, 2016
30.	Qualitative analysis of certain generalized classes of quadratic oscillator systems	B Bagchi, S Ghosh, B Pal	Journal of Mathematical Physics	022701	57(2),2016
31.	Nonlinear dynamics of ion acoustic waves in quantum pair-ion plasmas	B Sahu, B Pal, R Roychoudhury	Journal of Plasma Physics		81(5),2015
32.	Synchronized states and multi-stability in a random network of coupled discontinuous maps	M Nag	Chaos: An Interdisciplinary Journal of Nonlinear Science	083114	25(8),2015
33.	Bistable dynamics of an insect-pathogen model	N Mukherjee	Pramana	65-75	85(1),2015
34.	Effects of allochthonous inputs in the control of infectious disease of prey	B Sahoo	Chaos, Solitons & Fractals	1-19	75,2015
35.	Instability saturation by the oscillating two-stream instability in a weakly relativistic plasma	B Pal, B Sahu	Physics of Plasmas	042306	22 (4),2015
36.	Effects of additional food in a delayed predator-prey model	B Sahoo	Mathematical biosciences	62-73	261,2015
37.	Uncertain destination dynamics of delay coupled systems	S Pal	Physica Scripta	035203	90 (3),2015
38.	Effects of additional food on an ecoepidemic model with time delay on infection	B Sahoo	Applied Mathematics and Computation	17-35	245,2015
39.	Properties of threshold coupled bistable maps	M Nag	Physica Scripta	095205	89 (9),2015
40.	Effects of allochthonous resources in a three species food chain model with harvesting	B Sahoo	Differential Equations and Dynamical Systems	257-279	23(3),2015
41.	Effects of supplying alternative food in	B Sahoo	Applied	150-166	234, 2014

	a predator–prey model with harvesting		Mathematics and Computation		
42.	Multistable behaviour of coupled Lorenz–Stenflo systems	S Pal, B Sahoo	Physica Scripta		89 (4), 2014
43.	The chaos and control of a food chain model supplying additional food to top-predator	B Sahoo	Chaos, Solitons & Fractals	52-64	58, 2014
44.	Diseased prey predator model with general Holling type interactions	B Sahoo	Applied Mathematics and Computation	83-100	226, 2014

## Books

Title of the Book	Publisher	ISBN	Year
Samay Jekhane Aapekshik : Bisesh Aspekshikatar Sahaj Path (in Bengali)	Setu Prakashani, 12/A, Sankar Ghosh Lane, Kolkata-700006	978-93-80677-90-3	2016

## Book chapters

Title of the Book	Title of the Chapter	Publisher	Editors	ISBN	Year
Understanding Facial Expressions in Communication (Cross-cultural and Multidisciplinary Perspectives)	Evaluation of the Intricacies of Emotional Facial Expression of Psychiatric Patients Using Computational Models	Springer India	Manas K. Mandal And Avinash Awasthi	978-81-322-1933-0 and 978-81-322-1934-7(ebook)	2015

## Work Done (01.04.2014 – 31.03.2019)

Study of Synchronization behavior of some coupled nonlinear discrete and continuous dynamical systems with its applications in physical and biological systems have been done. Applications of partial synchronization in designing extreme multistable dynamical systems is shown. Stability analysis of the synchronization states under time independent and time dependent coupling are done. Mathematical modelling and analysis of some ecological systems are reported. Condition for pattern forming instabilities in some ecological models are investigated. Collection and mathematical analysis of human EEG signal are done to understand human brain dynamics.

## Future Plan

Stability analysis of synchronized states of dynamic random network of coupled nonlinear dynamical systems. Identification of extreme multistable dynamical systems of nature. Applications of dynamical system theory to study nonlinear waves in plasma and fluid systems. Mathematical modelling and analysis of ecological systems to preserve biodiversity and to control weather pollution. Condition for stability of pattern forming instability of biological and neuronal systems. Analysis of human brain EEG signals using the tools of dynamical system theory.

## Invited Lectures and Chairmanships at National or International Conference/Seminar

Sl. No.	Title of the Lecture / Academic Session	Title of Conference / Seminar	Organized By	Whether International / National / State / Regional / College or University level
1.	Dynamical System (25 <sup>th</sup> and 31 <sup>st</sup> May, 2018)	Teachers Enrichment workshop	Calcutta Mathematical Society	National
2.	Mathematical Modeling of Biological Systems (28 <sup>th</sup> March, 2018)	National Seminar	Ramananda College, Bishnupur	National

3.	Mathematical Modeling and Analysis of ecological systems (28 <sup>th</sup> and 31 <sup>st</sup> March 2017)		Central University of Rajasthan	University
4.	Nonlinear Ordinary Differential Equations and Dynamical systems (8 <sup>th</sup> February,2017 )	National Seminar	Vidyasagar College, Kolkata	National
5.	A pedestrian view of mathematical modeling		JIS University	State
6.	Solution of Wave Equation in 1,2, & 3 space dimensions (10-12 <sup>th</sup> August,2016)	Workshop on “ Hyperbolic Partial Differential Equations (HPDE) and Conservation Laws (CL)”	Indian Institute of Science, Bangalore & Calcutta University	National level
7.	Existence and Uniqueness of solution of ODE: an overview (4 <sup>th</sup> May,2016)		Indian Statistical Institute, Kolkata	Institute level
8.	Emergent Collective Behaviours of Coupled Map Lattices (6 <sup>th</sup> January,2016)		Institute of Mathematical Sciences, Chennai	Institute level
9.	A Pedestrian View of Ordinary Differential Equation (1 <sup>st</sup> October,2015)		Sarat Centenary College	College level

### Member

1. Calcutta Mathematical Society (Life member)
2. Advanced center for Nonlinear & Complex Phenomena (Life member)

### Award

Young Scientist Award in Mathematics (Calcutta Mathematical Society 2002)