

# DR. DIBAKAR GHOSH

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## Academic Career

- ⇒ 2009: **Ph D in Science**, Jadavpur University, Kolkata, India.
- ⇒ 2004: **M. Sc. in Applied Mathematics** from University of Calcutta, Kolkata.
- ⇒ 2002: **B.Sc. (Mathematics)** from Barackpur Rastraguru Surendranath College under University of Calcutta.
- ⇒ 1998: **Higher Secondary Examination** from Haracknagar A. M. Institution, Beldanga, Murshidabad with Board W.B.C.H.S.E.
- ⇒ 1996: **Secondary Examination** from Haracknagar A. M. Institution, Beldanga, Murshidabad with Board W.B.B.S.E.

## Teaching Experience

1. Assistant Professor in Physics and Applied mathematics Unit, Indian Statistical Institute, Kolkata  
From August, 2012 to present.
2. Assistant Professor in Mathematics, University of Kalyani, West Bengal-741235  
From April, 2012 to July, 2012.
3. Assistant Professor in Mathematics, Dinabandhu Andrews College, Garia, Kolkata-700084  
From 2006 to 2012.

## Research Areas

1. Dynamical Systems and its chaotic properties
2. Time delayed systems and its properties
3. Chimera states
4. Time-delayed Complex network
5. Cancer modelling and effect of drugs
6. Moving oscillators and multiplex network

## Publications

### 2017

- 1) S. Rakshit, B. K. Bera, M. Perc and **Dibakar Ghosh**: "Basin stability for chimera states", **Scientific Reports, accepted(2017)**.
- 2) R. Banerjee, B. Bera, **Dibakar Ghosh** and S.K. Dana: "Enhancing Synchronization in Chaotic Oscillators by Heterogeneity", **Euro.Phys. Special Topics (accepted, 2017)**.
- 3) C. Letellier, S.K. Sasmal, C. Draghi, F. Denis and **Dibakar Ghosh**: "A chemotherapy combine d with an anti-angiogenic drug applie d to a cancer model including angiogenesis", **Chaos, Solitons and Fractals, 99, 297-311, 2017**.
- 4) S.K.Sasmal and **Dibakar Ghosh**: " Effect of dispersal in two-patch prey–predator system with positive density dependence growth of preys", **Biosystems, 151, 8-20, 2017**.
- 5) S. Rakshit, B. K. Bera, S. Majhi, C. Hens and **Dibakar Ghosh**: "Basin stability measure of different steady states in coupled oscillators ", **Scientific Reports, 7, 45909, 2017**.

- 6) V. A. Maksimenko, M. V. Goremyko, V. V. Makarov, A. E. Hramov, **Dibakar Ghosh**, B. K. Bera, and S. K. Dana: "Excitation and Suppression of Chimeric States in the Multilayer Network of Oscillators with Nonlocal Coupling", **Bulletin of the Russian Academy of Sciences: Physics**, **81(1)**, 110-113, 2017.
- 7) A. Mishra, S. Saha, **Dibakar Ghosh**, G.V. Osipov, S. K. Dana: "Traveling chimera pattern in a neuronal network under local gap junctional and nonlocal chemical synaptic interactions ", **Opera Med Physiol**, **3(1)**, 14-18, 2017.
- 8) M. V. Goremyko, V. A. Maksimenko, V. V. Makarov, **Dibakar Ghosh**, B. K. Bera, S.K. Dana, A. E. Hramov: "Numerical analysis of the chimera states in the multilayered network model ", Proc. of SPIE, 10063, J1-6, 2017.

## 2016

- 9) S. Majhi, M. Perc and **Dibakar Ghosh**: "Chimera states in uncoupled neurons induced by a multilayer structure", **Scientific Reports**, **6**, 39033, 2016.
- 10) B. K. Bera, **Dibakar Ghosh** and M. Lakshmanan: "Chimera states in bursting neurons", **Physical Review E**, **93**, 012205, 2016.
- 11) B. K. Bera and **Dibakar Ghosh**: " Chimera states in purely local delay-coupled oscillators ", **Physical Review E**, **93**, 052223, 2016.
- 12) B. K. Bera, **Dibakar Ghosh** and T. Banerjee: " Imperfect traveling chimera states induced by local synaptic gradient coupling ", **Physical Review E**, **94**, 012215, 2016.
- 13) V. A. Maksimenko, V. V. Makarov, B.K. Bera, **Dibakar Ghosh**, S. K. Dana, M. V. Goremyko, N. S. Frolov, A.A. Koronovskii, and A. E. Hramov: " Excitation and suppression of chimera states by multiplexing ", **Physical Review E**, **94**, 052205, 2016.
- 14) B.K.Bera, C.Hens, S.K.Bhowmick,P.Pal and **Dibakar Ghosh**: "Transition from homogeneous to inhomogeneous steady states in oscillators under cyclic coupling", **Physics Letters A**, **380**, 130-134, 2016.
- 15) S. Majhi, B. K.Bera, S. K.Bhowmick, **Dibakar Ghosh**: " Restoration of oscillation in network of oscillators in presence of direct and indirect interactions ", **Physics Letters A**, **380**, 3617-24, 2016.
- 16) B. K. Bera, C. Hens, and **Dibakar Ghosh**: " Emergence of amplitude death scenario in a network of oscillators under repulsive delay interaction ", **Physics Letters A**, **380**, 2366-2373, 2016.
- 17) S. K. Bhowmick, and **Dibakar Ghosh**: "Targeting engineering synchronization in chaotic systems", **International Journal of Modern Physics C**, **27(1)**, 1650006, 2016.
- 18) S. Majhi, B.K.Bera,S.Banerjee and **Dibakar Ghosh**: "Synchronization of chaotic modulated time delay networks in presence of noise", **The European Physical Journal Special Topics**, **225**, 65-74, 2016

## 2015

- 19) S. K. Bhowmick, B. K. Bera and **Dibakar Ghosh**: "Generalized counter-rotating oscillators: Mixed synchronization", **Communication in Nonlinear Science and Numerical Simulations**, **22**, 692-701, 2015.
- 20) **Dibakar Ghosh** and Barnana Roy: "Nonlinear dynamics of classical counterpart of the generalized quantum nonlinear oscillator driven by position dependent mass", **Annals of Physics**, **353**, 222-237, 2015.
- 21) S. Khajanchi and **Dibakar Ghosh**: "The combined effects of optimal control in cancer remission", **Applied Mathematics and Computation**, **271**, 375-388, 2015.
- 22) B. K. Bera, S. Bhowmick and **Dibakar Ghosh**: "Mixed lag synchronization in chaotic oscillators and experimental observations", **International Journal of Dynamics and Control**, DOI 10.1007/s40435-015-0197-7 (2015).

## 2014

- 23) S. K. Bhowmick, **Dibakar Ghosh**, P. Roy, S. K. Dana, K. Murali, and S. Sinha, **International Journal of Bifurcation and Chaos**, **24(2)**, 1450014-1—1450014-9, 2014.
- 24) P. Saha, **Dibakar Ghosh**, A. Roy Chowdhury, "Modified projective Synchronization of different order chaotic system with adaptive scaling factor" **International Journal of Applied Nonlinear Science**, **1(3)**, 230-146, 2014.

## 2013

- 25) **Dibakar Ghosh** and S. Banerjee,  
"Projective synchronization of time-varying delayed neural network with adaptive scaling factors"  
**Chaos, Solitons & Fractals**, **53**, 1-9,2013.
- 26) A. Ray, A. Roy Chowdhury and **Dibakar Ghosh**,  
"Effect of noise on chaos synchronization in time-delayed systems: Numerical and experimental observations",  
**Physica A**, **392**, 4837-4849, 2013.
- 27) S. K. Bhowmick, **Dibakar Ghosh**, P. K. Roy, J. Kurths and S. K. Dana,  
"How to induce multiple delays in coupled chaotic oscillators?",  
**Chaos**, **23**, 043115-1--043115-7, 2013.

## 2012

- 28) S. K. Bhowmick, C. Hens, **Dibakar Ghosh** and S.K.Dana,  
"Mixed synchronization in chaotic oscillators using scalar coupling"  
**Physics Letters A**, **376(36)** (2012) 2490-2495.
- 29) **Dibakar Ghosh**, Ioan Grosu and S. K. Dana,  
"Design of coupling for synchronization in time-delayed systems"  
**CHAOS**, **22** (2012) 033111.
- 30) R. Banerjee, **Dibakar Ghosh**, E.Padmanaban, L.M.Pecora, R. Ramaswamy and S.K.Dana,  
"Enhancing synchrony in chaotic oscillators by dynamical relaying"  
**Physical Review E**, **85(2012)**, 027201.

## 2011

- 31) **Dibakar Ghosh** and Bidyut K. Bhattacharyya,  
"Generalized synchronization-based multiparameter estimation in modulated time-delayed systems"  
**AIP Advances**, **1(2011)**032144.
- 32) S.K.Bhowmick, **Dibakar Ghosh**, S. K. Dana,  
"Synchronization in counter-rotating coupled oscillators"  
**CHAOS**, **21(2011)** 033118.
- 33) **Dibakar Ghosh**,  
"Projective-dual synchronization in delay dynamical systems with time-varying coupling delay"  
**Nonlinear Dynamics** , **66(4)(2011)**,717-730.
- 34) S. Banerjee, A. Das, **Dibakar Ghosh**, M. Mitra and A.Roy Chowdhury  
" Existence of Hyperchaos and its Control in Kuramoto-Shivashinky Equation"  
**International Journal of Nonlinear Science**,**11(3)(2011)**338-347.
- 35) A. Mukherjee, **Dibakar Ghosh** and S. Banerjee,  
"Synchronization of time delayed systems by common delay time modulations"  
**ISRN Applied Mathematics**, Volume 2011, Article ID 218458, 8 pages. DOI:10.5402/2011/218458.

## 2010

- 36) **Dibakar Ghosh**, A. Ray and A. Roy Chowdhury,  
"Heteroclinic orbit, Forced Lorenz system and Chaos"  
**ASME, Journal of Computational and nonlinear dynamics**, **5 (2010)** 011008.
- 37) **Dibakar Ghosh**, P. Saha and A. Roy Chowdhury,  
" Linear observer based projective synchronization in delay Rossler system "  
**Communication in Nonlinear Sciences and Numerical Simulation**, **15(2010)** 1640-47.
- 38) **Dibakar Ghosh**  
"Nonlinear active observer based generalized synchronization in time delayed systems"  
**Nonlinear Dynamics**, **59 (2010)**289-296.
- 39) **Dibakar Ghosh** and Sikha Bhattacharya  
"Projective synchronization of new hyperchaotic system with fully unknown parameters"  
**Nonlinear Dynamics**, **61(2010)**11-21.

- 40) **Dibakar Ghosh** and A. Roy Chowdhury,  
"Lag and anticipatory synchronization based parameter estimation scheme in modulated time delayed systems"  
**Nonlinear Analysis: Real World Applications, 11(2010)3059-3065.**
- 41) **Dibakar Ghosh** and A. Roy Chowdhury,  
"Nonlinear observer-based impulsive synchronization in chaotic systems with multiple attractors"  
**Nonlinear Dynamics, 60(4) (2010)607-613.**
- 42) **Dibakar Ghosh** and A. Roy Chowdhury,  
"Parameter estimation of delay dynamical system from a scalar time series under external noise"  
**Applied Mathematics and Computation, 216(2010)2069-2076.**
- 43) **Dibakar Ghosh** and A. Roy Chowdhury,  
"Dual-anticipating, dual and dual-lag synchronization in modulated time-delayed systems",  
**Physics Letters A, 374(2010)3425-3436.**
- 44) **Dibakar Ghosh,**  
"Projective synchronization in multiple modulated time-delayed systems with adaptive scaling factor"  
**Nonlinear Dynamics, 62(4)(2010)751-759.**
- 45) **Dibakar Ghosh,** Santo Banerjee, and A. Roy Chowdhury,  
"Generalized and projective synchronization in modulated time delayed systems"  
**Physics Letters A, 374 (2010)2143-2149.**
- 46) **Dibakar Ghosh,**  
"Erratum:Generalized projective synchronization in time-delayed systems—Nonlinear observer approach"  
**CHAOS, 20(2010)029902.**
- 47) **Dibakar Ghosh** and S. Banerjee,  
"Exponential stability criterion for chaos-synchronization in modulated time-delayed systems"  
**Nonlinear Analysis Series B: Real World Applications, 11(2010)3704-3710.**

**2009**

- 48) **Dibakar Ghosh,**  
"Generalized projective synchronization in time-delayed systems—Nonlinear observer approach"  
**CHAOS, 19(2009)013102.**
- 49) **Dibakar Ghosh,**  
"Stability and projective synchronization in multiple delay Rossler system"  
**International Journal of Nonlinear Science, Vol.7, No. 2 (2009)207-214.**
- 50) **Dibakar Ghosh,**  
"Time scale synchronization between two different time-delayed systems"  
**Electronic Journal of Theoretical Physics, 6(21) (2009)125-138.**
- 51) A. Ray, **D. Ghosh** and A. Roy Chowdhury,  
"Topological study of multiple co-existing attractor in a nonlinear system"  
**Journal of Physics A: Mathematical and Theoretical, 42 (2009) 385102.**

**2008**

- 52) **Dibakar Ghosh,**  
"Nonlinear observer-based synchronization scheme for multiparameter estimation"  
**Europhysics Letters, 84 (2008)40012.**
- 53) **Dibakar Ghosh,** S. Banerjee,  
"Adaptive scheme for synchronization-based multiparameter estimation from a single chaotic time series and its applications"  
**Physical Review E, 78(2008)056211.**
- 54) A. P. Misra, **Dibakar Ghosh** and A. Roy Chowdhury,  
"A novel Hyperchaos in the quantum Zakharov system for plasmas"  
**Physica Letters A, 372(2008)1469-1476.**
- 55) **Dibakar Ghosh,** P. Saha and A. Roy Chowdhury,  
"On the study of delay feedback control and adaptive synchronization near sub-critical Hopf bifurcation"  
**International Journal of Modern Physics C, 19(1) (2008)169-185.**

- 56) S. Banerjee, **Dibakar Ghosh** and A. Roy Chowdhury,

"Multiplexing synchronization and its applications in cryptography"  
**Physica Scripta, 78 (2008), 015010 .**

- 57) A. Ray, **Dibakar Ghosh** and A. Roy Chowdhury,  
"On the chaotic aspects of three wave interaction in a magnetized plasma"  
**Physica Letters A, 372(2008)5329-5335.**
- 58) **Dibakar Ghosh**, A. Roy Chowdhury and P. Saha,  
"Bifurcation continuation, chaos and chaos control in nonlinear Bloch system"  
**Communication in Nonlinear Sciences and Numerical Simulation, 13(2008)1461-71.**
- 59) **Dibakar Ghosh**, A. Roy Chowdhury and P. Saha,  
"Multiple delay Rossler System --Bifurcation and chaos control"  
**Chaos, Soliton & Fractals, 35 (2008)472-485.**
- 60) **Dibakar Ghosh**, A. Roy Chowdhury and P. Saha,  
"On the various kinds of synchronization in delayed Duffing--Van der Pol system"  
**Communication in Nonlinear Sciences and Numerical Simulation, 13(2008)790-803.**
- 61) **Dibakar Ghosh** and A. Roy Chowdhury,  
"Comparison of Empirical Mode Decomposition and Wavelet Approach for the Analysis of Time Scale Synchronization"  
**Chaos and Complexity Letters, Vol. 3(2)(2008)97-110.**
- 62) **Dibakar Ghosh**, A. Ray and A. Roy Chowdhury,  
"Generalized and phase synchronization between two different time-delayed systems"  
**Modern Physics Letters B, 22(19)(2008)1867-1878.**
- 63) S. Banerjee, **Dibakar Ghosh**, A. Ray and A. Roy Chowdhury,  
"Synchronization Between Two Different Time Delayed Systems and Image Encryption"  
**Europhysics Letters, 81(2008)20006.**

**2007**

- 64) **Dibakar Ghosh**, S. Banerjee and A. Roy Chowdhury,  
"Synchronization between variable time delayed systems and cryptography"  
**Europhysics Letters, 80(2007)30006.**
- 65) **Dibakar Ghosh** and A. Roy Chowdhury,  
"Various Types of Chaos Synchronization - A Comparative Study of Empirical Mode Decomposition and Wavelet Approach"  
**International Journal of Nonlinear Science, 4(1)(2007)52-66.**
- 66) **Dibakar Ghosh** and A. Roy Chowdhury,  
"On the Bifurcation Pattern and Normal Form in a Modified Predator-Prey Nonlinear System"  
**ASME, Journal of Computational and Nonlinear Dynamics, 2(2007)267-273.**
- 67) **Dibakar Ghosh**, P. Saha and A. Roy Chowdhury,  
"On synchronization of a forced delay dynamical system via the Galerkin approximation"  
**Communication in Nonlinear Sciences and Numerical Simulation, 12(2007)928-41.**

**Journal Editorial Board Member**

1. Journal of Nonlinear Dynamics
2. Journal of Applied Mathematics
3. Frontiers in Computational Neuroscience

**Externally funded Project work as Principal investigator:**

**National Projects:**

S.No.	Project Title	Sponsoring Agency	Budget	Status
1.	Macroscopic dynamics in ensembles of dynamical systems: some challenging issues	SERB-DST (Department of Science and Technology), Government of India	Rs. 26,00,000 /-	April 2017 - March 2020

**International Projects:**

Project no.	Project Title	Name of the Collaborating Scientist & Institute	Sponsoring Agency	Budget	Status
INT/RUS/RFBR/P-181	Synchronization, clustering and death in Networks of Complex systems (Theory and Application to Biology and Neurophysiology)	Prof. Alexander E. Hramov  Saratov State Technical University, 77, Politekhnikeskaya, Saratov,410054,Russia	SERB-DST (Department of Science and Technology), Government of India and Russian Foundation for Basic Research (RFBR)	Rs. 9,42,400/	Ongoing