

Subhas Khajanchi

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Personal Information

Father Name: **Rabindra Nath Khajanchi**
Date of Birth: **October 07, 1987**
Marital Status: **Married**
Nationality: **Indian**
Sex: **Male**



Research Interests

Mathematical Biology, Mathematical Modeling, Nonlinear Dynamics

- Tumor - immune competitive system.
- Game theory & Adaptive dynamics.
- Infectious diseases (COVID 19, TB transmission, HTLV-I viral dynamics, SEIR models etc.).
- Ecological modeling.

Education

- **Indian Institute of Technology (IIT) Roorkee**, Uttarakhand, India.
 - PhD in Mathematics (July 25, 2011 - March 04, 2016).
 - Dissertation Title: Mathematical Modeling of Malignant Brain Tumor with T11 Target Structure.
 - Thesis Supervisor: Dr. Sandip Banerjee.
 - Date of Completion/Defense: February 29, 2016.
- **Jadavpur University**, Kolkata, West Bengal, India.
 - Master of Science in Applied Mathematics (2010) with First class.
- **Jadavpur University**, Kolkata, West Bengal, India.
 - Bachelor of Science; Mathematics (major), Physics, Chemistry & Computer Programming (2008), First class with distinction.
- **Nimpith Ramkrishna Vidyabhavan (WBCHSE)**, Nimpith, South 24 Parganas, West Bengal, India.
 - Higher Secondary (HS); Bengali, English, Physics, Chemistry, Mathematics, Biology (2005) with First class.
- **Moukhali Chandiban Fanindra Vidyamandir (WBBSE)**, Moukhali, South 24 Parganas, West Bengal, India.

- Madhyamik; Bengali, English, Physical & Life Science, History, Geography, Mathematics, Additional Mathematics (2003) with First class.

Teaching Experience

Assistant Professor

- *Department of Mathematics, Presidency University, Kolkata*, August 09, 2018 - Ongoing.
- *Department of Mathematics, Bankura University*, September 15, 2015 - August 08, 2018.
- *Faculty of Mathematics, Dinabandhu Andrews College (Calcutta University)*, March 09, 2015 - September 14, 2015.

PhD Guidance

- **Dhiraj Kumar Das**, Dynamics of tuberculosis transmission with exogenous reinfections and endogenous reactivation. **Awarded PhD Degree** (with Prof. T. K. Kar, IESTS).
- **Kankan Sarkar**, Dynamical system modeling of nonlinear complex ecological systems. **Thesis submitted for PhD Degree**.
- **Sovan Bera**, Mathematical modeling of HTLV-I infection with CTL immune response. **Thesis submitted for PhD Degree** (with Prof. T. K. Kar, IESTS).
- **Mrinmoy Sardar**, Mathematical modeling of tumor-immune competitive system: model analysis and validation. **Ongoing**.
- **Suparna Dash**, Mathematical modeling of ecological system with application to evolutionary game theory (Date of joining 01-11-2021). **Ongoing**.
- **Santana Mondal**, Adaptive dynamics of the ecological systems (Date of joining 31-08-2022). **Ongoing**.
- **Mitali Maji**, Exploring the dynamics of Alzheimer's Disease (Date of joining 30-06-2022). **Ongoing**.

List of Publications

- Biswas S, Ahmad B, **Subhas Khajanchi**, Exploring dynamical complexity of a cannibalistic eco-epidemiological model with multiple time delay, **Mathematical Methods in the Applied Sciences**, (2022) 1-28. <https://doi.org/10.1002/mma.8749> **(IF: 3.007, Q1)**
- Mondal J, **Subhas Khajanchi**, Samui P, Impact of media awareness in mitigating the spread of an infectious disease with application to optimal control, **The European Physical Journal Plus**, 137 (2022) 938. **(IF: 3.911, Q2)**
- Sarkar K, Mondal J, **Subhas Khajanchi**, How do the contaminated environment influence the transmission dynamics of COVID-19 pandemic?, **The European Physical Journal Special Topics**, 00 (2022) 00 doi:10.1140/epjs/s11734-022-00648-w. **(IF: 2.891, Q1)**
- Bera S, **Subhas Khajanchi**, Roy TK, Dynamics of an HTLV-I infection model with delayed CTLs immune response, **Applied Mathematics and Computation**, 430 (2022) 127206. **(IF: 4.397, Q1)**
- Sarkar K, **Subhas Khajanchi**, An eco-epidemiological model with the impact of fear, **Chaos**, 32(8) (2022) 083126. **(IF: 3.642, Q1)**
- **Subhas Khajanchi**, Sardar M, Nieto JJ, Application of non-singular kernel in a tumor model with strong Allee effect, **Differential Equations and Dynamical Systems**, 00 (2022) 00 doi.org/10.1007/s12591-022-00622-x. **(IF: Q3)**

- Dwivedi A, Keval R, **Subhas Khajanchi**, Modeling optimal vaccination strategy for dengue epidemic model: a case study of India, **Physica Scripta**, 97(8) (2022) 085214. (IF: 3.081, Q1)
- Sarkar K, **Subhas Khajanchi**, Mali PC, A delayed eco-epidemiological model with weak Allee effect and disease in prey, **International Journal of Bifurcation and Chaos**, 32(8) (2022) 2250122. (IF: 2.836, Q1)
- Mollah S, Biswas S, **Subhas Khajanchi**, Impact of awareness program on diabetes mellitus described by fractional-order model solving by homotopy analysis method, **Ricerche di Matematica**, (2022) <https://doi.org/10.1007/s11587-022-00707-3>. (IF: 1.166, Q2)
- Bera S, **Subhas Khajanchi**, Roy TK, Stability analysis of fuzzy HTLV-I infection model: a dynamic approach, **Journal of Applied Mathematics and Computing**, 68 (2022) 1–29. (IF: 2.196, Q2)
- Mondal, J, **Subhas Khajanchi**, Mathematical modeling and optimal intervention strategies of the COVID-19 outbreak, **Nonlinear Dynamics**, 109 (2022): 177–202. (IF: 5.022, Q1)
- Rai RK, **Subhas Khajanchi**, Tiwari PK, Venturino E, Misra AK, Impact of social media advertisements on the transmission dynamics of COVID-19 pandemic in India, **Journal of Applied Mathematics and Computing**, 68 (2022) 19–44. (IF: 2.196, Q2)
- **Subhas Khajanchi**, Sarkar K, Banerjee S, Modeling the dynamics of COVID-19 pandemic with implementation of intervention strategies, **The European Physical Journal Plus**, 137 (2022) 129. (IF: 3.911, Q2)
- Sardar M, **Subhas Khajanchi**, Is the Allee effect relevant to stochastic cancer model ?, **Journal of Applied Mathematics and Computing**, 68 (2022) 2293–2315. (IF: 2.196, Q2)
- **Subhas Khajanchi**, Nieto JJ, Spatiotemporal dynamics of a glioma immune interaction model, **Scientific Reports**, 11 (2021) 22385. (IF: 4.379, Q1).
- **Subhas Khajanchi**, The impact of immunotherapy on a glioma immune interaction model, **Chaos, Solitons & Fractals**, 152 (2021) 111346. (IF: 5.944, Q1).
- Tiwari PK, Rai RK, **Subhas Khajanchi**, Gupta RK, Misra AK, Dynamics of coronavirus pandemic: effects of community awareness and global information campaigns, **The European Physical Journal Plus**, 136(10) (2021) 994. (IF: 3.911, Q2)
- Sardar M, Biswas S, **Subhas Khajanchi**, The impact of distributed time delay in a tumor-immune interaction system, **Chaos, Solitons & Fractals**, 142 (2021) 110483. (IF: 5.944, Q1)
- **Subhas Khajanchi**, Bera S, Roy TK, Mathematical analysis of the global dynamics of a HTLV-I infection model, considering the role of cytotoxic T-lymphocytes, **Mathematics and Computers in Simulation**, 180 (2021) 354–378. (IF: 2.463, Q1)
- **Subhas Khajanchi**, Sarkar K, Mondal J, Nisar KS, Abdelwahab SF, Mathematical modeling of the COVID-19 pandemic with intervention strategies, **Results in Physics**, 25 (2021) 104285. (IF: 4.476, Q2)
- Sardar M, **Subhas Khajanchi**, Biswas S, Abdelwahab SF, Nisar KS, Exploring the dynamics of a tumor-immune interplay with time delay, **Alexandria Engineering Journal**, 60(5) (2021) 4875–4888. (IF: 3.732, Q1)
- Rai RK, **Subhas Khajanchi**, Tiwari PK, Venturino E, Misra AK, Impact of social media advertisements on the transmission dynamics of COVID-19 pandemic in India, **Journal of Applied Mathematics and Computing**, 66 (2021) 1–26. (IF: 1.686, Q2)
- Tiwari PK, Singh RK, **Subhas Khajanchi**, Kang Y, & Misra AK, A mathematical model to restore water quality in urban lakes using Phoslock, **Discrete and Continuous Dynamical Systems Series B**, 26(6) (2021) 3143–3175. (IF: 1.327, Q1)
- Sarkar K, **Subhas Khajanchi**, Mali PC, & Nieto JJ, Rich dynamics of a predator-prey system with different kinds of functional responses, **Complexity**, (2020) 4285294 doi.org/10.1155/2020/4285294. (IF: 2.833, Q1)
- Samui P, Mondal J, & **Subhas Khajanchi**, A mathematical model for COVID-19 transmission dynamics with a case study of India, **Chaos, Solitons & Fractals**, 140 (2020) 110173. (IF: 5.944, Q1)

- **Subhas Khajanchi**, & Sarkar K, Forecasting the daily and cumulative number of cases for the COVID-19 pandemic in India, **Chaos**, 30 (2020) 071101. (IF: 3.642, Q1)
- Sarkar K, **Subhas Khajanchi**, & Nieto JJ, Modeling and forecasting the COVID-19 pandemic in India, **Chaos, Solitons & Fractals**, 139 (2020) 110049. (IF: 5.944, Q1)
- **Subhas Khajanchi**, Sarkar K, Mondal J, Dynamics of the COVID-19 pandemic in India, **arXiv preprint arXiv:2005.06286**, (2020).
- Sarkar K, & **Subhas Khajanchi**, Impact of fear effect on the growth of prey in a predator-prey interaction model, **Ecological Complexity**, 42 (2020) 100826. (IF: 1.931, Q2)
- Misra AK, Singh RK, Tiwari PK, **Subhas Khajanchi**, & Kang Y, Dynamics of algae blooming: effects of budget allocation and time delay, **Nonlinear Dynamics**, 100 (2020): 1779–1807. (IF: 5.022, Q1)
- Das DK, **Subhas Khajanchi**, & Kar TK, Transmission dynamics of tuberculosis with multiple re-infections, **Chaos, Solitons & Fractals**, 130 (2020): 109450. (IF: 5.944, Q1)
- Das DK, **Subhas Khajanchi**, & Kar TK, The impact of media awareness and optimal strategy on the prevalence of tuberculosis, **Applied Mathematics and Computation**, 366 (2020): 124732. (IF: 4.091, Q1)
- **Subhas Khajanchi**, Chaotic dynamics of a delayed tumor-immune interaction model, **International Journal of Biomathematics**, 13(2) (2020): 2050009. (IF: 2.053, Q3)
- **Subhas Khajanchi**, Stability analysis of a mathematical model for glioma-immune interaction under optimal therapy. **International Journal of Nonlinear Sciences and Numerical Simulation**, 20(3-4) (2019): 269–285. (IF: 2.007, Q1)
- Das DK, **Subhas Khajanchi**, & Kar TK, Influence of multiple re-infections in tuberculosis transmission dynamics: A mathematical approach, **IEEE Xplore**, (2019): 1–5. (2019 8th International Conference on Modeling Simulation and Applied Optimization (ICMSAO)). (Conference Paper)
- **Subhas Khajanchi**, & Banerjee S, A strategy of optimal efficacy of T11 target structure in the treatment of brain tumor. **Journal of Biological System**, 27(2) (2019): 225–255. (IF: 1.000, Q2)
- **Subhas Khajanchi**, & Nieto Juan J, Mathematical modeling of tumor-immune competitive system, considering the role of time delay. **Applied Mathematics and Computation**, 340 (2019): 180–205. (IF: 4.091, Q1)
- **Subhas Khajanchi**, Perc M, & Ghosh D, The influence of time delay in a chaotic cancer model. **Chaos**, 28 (2018): 103101.doi:10.1063/1.5052496. (IF: 3.642, Q1)
- **Subhas Khajanchi**, Modeling the dynamics of glioma-immune surveillance. **Chaos, Solitons & Fractals**, 114 (2018): 108–118. (IF: 5.944, Q1)
- **Subhas Khajanchi**, & Banerjee S, Influence of multiple delays in brain tumor and immune system interaction with T11 target structure as a potent stimulator. **Mathematical Biosciences**, 302 (2018): 116–130. (IF: 2.144, Q1)
- **Subhas Khajanchi**, Das DK, & Kar TK, Dynamics of tuberculosis transmission with exogenous reinfections and endogenous reactivations. **Physica A**, 497 (2018): 52–71. (IF: 3.263, Q2)
- Das DK, **Subhas Khajanchi**, & Kar TK, Dynamical behaviour of tuberculosis transmission, **Biomath Communications Supplement**, (2018): 5(1). (International Conference). (Conference Paper)
- **Subhas Khajanchi** & Banerjee S, Quantifying the role of immunotherapeutic drug T11 target structure in progression of malignant gliomas: mathematical modeling and dynamical perspective. **Mathematical Biosciences**, 289 (2017): 69–77. (IF: 2.144, Q1)
- **Subhas Khajanchi**, Uniform persistence and global stability for a brain tumor and immune system interaction. **Biophysical Reviews and Letters**, 12(4) (2017): 187–208. (Q4)
- Ghosh D, **Subhas Khajanchi**, Mangiarotti S, Denis F, Dana SK, & Letellier C, How tumor growth can be influenced by delayed interactions between cancer cells and the microenvironment?. **BioSystems**, 158 (2017): 17–30. (IF: 1.973, Q2)
- **Subhas Khajanchi** & Banerjee S, Role of constant prey refuge on stage structure predator -prey model with ratio dependent functional response. **Applied Mathematics and Computation**, 314 (2017): 193–198. (IF: 4.091, Q1)

- **Subhas Khajanchi**, Modeling the dynamics of stage-structure predator-prey system with Monod - Haldane type response function. **Applied Mathematics and Computation**, 302 (2017): 122–143. **(IF: 4.091, Q1)**
- **Subhas Khajanchi**, Bifurcations and oscillatory dynamics in a tumor immune interaction model. **BIOMAT 2015: International Symposium on Mathematical and Computational Biology**, (2016): 241–259. **(Book Chapter)**
- Banerjee S, **Subhas Khajanchi**, & Chaudhuri S, A mathematical model to elucidate brain tumor abrogation by immunotherapy with T11 target structure. **PLOS ONE**, 10(5) (2015) : e0123611. doi:10.1371/journal.pone.0123611. **(IF: 3.240, Q1)**
- **Subhas Khajanchi** & Ghosh D, The combined effects of optimal control in cancer remission. **Applied Mathematics and Computation**, 271 (2015): 375–388. **(IF: 4.091, Q1)**
- **Subhas Khajanchi**, Bifurcation analysis of a delayed mathematical model for tumor growth. **Chaos, Solitons & Fractals**, 77 (2015): 264–276. **(IF: 5.944, Q1)**
- **Subhas Khajanchi** & Banerjee S, Stability and bifurcation analysis of delay induced tumor immune interaction model. **Applied Mathematics and Computation**, 248 (2014): 652–671. **(IF: 4.091, Q1)**
- **Subhas Khajanchi**, Dynamic behavior of a Beddington-DeAngelis type stage structured predator-prey model. **Applied Mathematics and Computation**, 244 (2014): 344–360. **(IF: 4.091, Q1)**
- **Subhas Khajanchi** & Banerjee S, Global stability of a tumor immune interaction model. **Mathematical Sciences International Research Journal**, 2(2) (2013): ISSN 2278–8697. **(Conference Paper)**
- Nandi S, **Subhas Khajanchi**, Chatterjee AN, & Roy PK, Insight of viral infection of Jatropha Curcas plant (Future Fuel): A control based mathematical study. **Acta Analysis Functionalis Applicata**, 13(4) (2011): 366–374. **(Conference Paper)**

Editorial Activities

- Associate Editor at the **Journal of Applied Mathematics and Computing (Springer) (SCIE-indexed)** from August 26, 2022 - Ongoing.
- Associate Editor at the Journal of **Frontiers in Applied Mathematics and Statistics** (Section: **Dynamical Systems**) from August 10, 2020 - Ongoing.
- Editorial board member at the **Journal of Applied Mathematics** (Springer) from February 15, 2022 - Ongoing.

Teaching (UG & PG)

- Techniques of Applied Mathematics,
- Ordinary and Partial Differential Equations,
- Numerical Methods,
- Calculus - I & II,
- Linear Algebra,
- PhD Course Work.

Research Projects

Title of the Project: **Mathematical Modeling of Tumor Immune Competitive Systems: Model Analysis and Validation**
Funding Agency/Institute: **Science and Engineering Research Board (SERB)**
Period: **3 years (2018 – 2021)**
Completed/Ongoing: **Completed**
Amount: **22,59,060/-**

Title of the Project: **Mathematical Modeling of hematopoiesis process in application to chronic and acute myelogenous leukemia**
Funding Agency/Institute: **INDO-FRENCH Centre for Applied Mathematics (IFCAM)**
Period: **2 years (2018 – 2020)**
Completed/Ongoing: **Completed**

Title of the Project: **Evolutionary dynamics of a predator-prey model with behavioral refuges**
Funding Agency/Institute: **Science and Engineering Research Board (SERB) International Research Experience (SIRE) at the University of Cambridge**
Period: **2 Months (Oct. 16, 2022 – Dec. 15, 2022)**
Completed/Ongoing: **Completed**
Amount: **7,06,213/-**

Awards & Fellowships

- National Board of Higher Mathematics (**NBHM**) Travel Grant to attend 9th International Congress on Industrial and Applied Mathematics (ICIAM - 2019), Universitat de Valencia, Valencia (Spain), July 15-19, 2019.
- **INSA Visiting Scientists** for two months in the year 2017-2018.
- Department of Science and Technology (DST) Travel grants to attend the “Summer School on Mathematics of Infectious Diseases” at York University, Toronto, Canada.
- Research Scholar fellowship from ‘IIT Roorkee’, from 2013 to 2015 (March 08, 2015).
- Junior Research Scholar fellowship from ‘IIT Roorkee’, from 2011 to 2013.
- Received National Merit-Cum-Scholarship in Master of Science (M. Sc.), from 2008 to 2010.
- Qualified Graduate Aptitude Test in Engineering (GATE) in the year 2011.
- Qualified National Eligibility Test (NET) for Lectureship (December 2010).

Conference, Workshop, Schools and Talks

Invited Talks

- “Mathematical modeling of glioma-immune interaction with immunotherapeutic drug”, Jahangirnagar University, Savar, Dhaka, Bangladesh, at “International Workshop on Recent Trends in Mathematical Biology – RTMB 2020”, January 14 - 15, 2020.
- “Mathematical Modeling of Brain Tumor - Immune surveillance with immunotherapeutic drug T11 Target Structure”, University of Dhaka, Bangladesh, at 20th International Mathematics Conference, December 8 - 10, 2017.
- “Dynamics of Brain Tumor and Immune System Competition with T11 Target Structure: Model Analysis and Validation”, Department of Mathematics, Bankura University, West Bengal, India, Indo-German Conference on Modeling, Simulation and Optimization in Applications, February 22 - 24, 2017.
- “A Mathematical Model to Elucidate Brain Tumor Abrogation by Immunotherapy with T11 Target Structure”, H. Lee Moffitt Cancer Center, Tampa, Florida, USA, July 18 - 22, 2016.

Contributed Talks

- Optimal treatment strategies using dendritic cell vaccination for a tumor model with parameter identifiability, 9th International Congress on Industrial and Applied Mathematics (ICIAM - 2019), Universitat de Valencia, Valencia (Spain), July 15-19, 2019.
- Bifurcations and Oscillatory Dynamics in a Tumor Immune Interaction Model, Indian Institute of Technology Roorkee, Uttarakhand, India, at BIOMAT 2015, 15th International Symposium on Mathematical and Computational Biology, November 02 - 06, 2015.
- Influence of time delay in a chaotic Tumor - immune interaction model, Indian Statistical Institute (ISI) Kolkata, India, Physics and Applied Mathematics Unit (PAMU), Physics and Applied Mathematics Researchers' Meet - 2015, March 18 - 20, 2015.

School(s)

- Summer School on Mathematics of Infectious Diseases, York University & Field Institute, Toronto, Canada, Department of Mathematics and Statistics, May 19 - 27, 2013.

Conference and Symposiums

- Mathematical Modeling of Malignant Brain Tumor with T11 Target Structure as a Potent Immune Stimulator, Calcutta University, West Bengal, India, National Seminar on "Recent Advances in Computational Mathematics", December 27 - 29, 2016.
- Bifurcation analysis of a delayed mathematical model for tumor growth, Department of Mathematics, Indian Institute of Technology Madras (IITM), India, "International Conference on Mathematical Modeling and Computer Simulation (ICMMCS)", December 8 - 10, 2014.
- The combined effects of optimal control in cancer remission, Jointly Organized by Agricultural and Ecological Research Unit & Physics and Applied Mathematics Unit, "3rd International Symposium on Complex Dynamical Systems and Applications (CDSA - 2014)", March 10 - 12, 2014.
- "National Conference on Mathematics and its Application (NCMA)", Department of Mathematics, Jadavpur University, January 13 -14 2010.

Workshops

- "Indo - Canadian Workshop on Mathematics of Infectious Diseases", Department of Mathematics, Indian Institute of Technology (IIT) Roorkee, January 20 - 22, 2014.
- "Workshop on Nonlinear Differential Equations: Dynamics of Complex Systems (NDEDCS-2013)", under the auspices of National Program on Differential Equations: Theory, Computation and applications (NPDE-TCA), Department of Applied Mathematics, University of Calcutta, September 23 - 28 2013.
- "Workshop on Nonlinear Dynamics in Biology", Department of Mathematics, Indian Institute of Science (IISc), Bangalore, July 8 - 13 2013.
- "Advance Level Workshop on Differential Equations in Ecology and Epidemiology" under the auspices of National Program on Differential Equations: Theory, Computation and applications(NPDE-TCA), Department of Mathematics, Indian Institute of Technology (IIT) Roorkee, October 10 - 14 2012.
- "Workshop on Adaptive Finite Element Method (AFEM)", Department of Mathematics, Indian Institute of Space Science and Technology (IIST), Trivundrum, India, March 16 - 25, 2011.

Computer Proficiency

- *Programming language*: MATLAB, Mathematica, FOTRAN.
- *Typesetting*: Latex, Word.

Professional References

- **Prof. Sandip Banerjee**
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 Indian Institute of Technology (IIT) Roorkee,
 Uttarakhand - 247667, India.
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- **Prof. Hien Tran**
 Department of Mathematics,
 North Carolina State University, USA.
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- **Dr. Dibakar Ghosh**
 Physics and Applied Mathematics Unit (PAMU),
 Indian Statistical Institute, Kolkata,
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- **Prof. Mostafa Adimy**
 INRIA Senior Researcher (Directeur de Recherche),
 Head of the "DRACULA" project-team,
 INRIA Antenne Lyon la Doua,
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 56, Boulevard Niels Bohr,
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