Curriculum Vitae

AMIT CHAKRABORTY

Department of Mathematics
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1. Personal information

First Name	AMIT	Last Name	CHAKRABORTY
Nationality	India	Date of Birth	Jan. 06, 1975
Highest Education	Jan. 2006, Ph.D., Mathematical Biology, University of Calcutta, India		
Other educational degrees	1998. M.Sc. Pure Mathematics, University of Calcutta, India. 1996. B.Sc (Honors), Mathematics, University of Calcutta, India.		
Phone no. and Email	+91-9784811895; amitc.envsc@yahoo.com ; amitc.maths@gmail.com		
Private address	White Meadows, B-12/6C, 1529, Dwarir Rd, Dakshin Jagaddal, Rajpur, Kolkata, West Bengal 700149, INDIA		
Professional address	Department of Mathematics, Sikkim University (A Central University of Govt. of India) 5th Mile,Tadong, Gangtok, Sikkim, 737102, INDIA.		
Language skills	Bengali (native language), Hindi, English.		
Data	URL		
Present Employer website	*https://cus.ac.in*		
Personal lab website	*http://amitc.webnode.com*		
Google Scholar	*https://scholar.google.com/citations?user=K1Ej9CEAAAAJ&hl=en&authuser=2*		
Research Gate	*https://www.researchgate.net/profile/Amit_Chakraborty5*		

2. Scientific experience (Keywords: Biocomplexity; Systems Ecology; Systems Biology)

***Present:** Professor and Head, Department of Mathematics, Sikkim University (A Central University of Govt. of India) Research Area: Systems Biology and Systems Ecology. Research theme: Chemical kinetics, reaction networks and structural analysis of nitrogen assimilation and metabolism.
***2011-2020:** Assistant Professor, Central University of Rajasthan, India.Research Area: Systems Biology and Systems Ecology. Research theme: Chemical kinetics, reaction networks and structural analysis of nitrogen assimilation and metabolism.
***Feb. 2011-Aug.2011:** Postdoctoral Fellow, Institute for Evolution and Biodiversity (IEB), University of Muenster, Germany; Research area: Stoichiogenomics and Stoichiometagenomics; Research theme: Nitrogen composition in genome and soil metagenome in connection with bioavailability of soil nitrogen in different forms.
***2009-2011:** Postdoctoral Fellow, Department of Botany and Plant Sciences, University of California, Riverside, USA; Research area: Ecological complexity and modeling; Research theme: Biodiversity maintenance mechanisms, disease transmission process, gene co-expression network related to plant defense mechanisms.
***2006-2011:** Postdoctoral Fellow, Center for Conservation Biology (CCB), University of California, Riverside, USA; Research area: Population and community ecology; Research theme: Quantification and modeling of exotic species invasions and biodiversity maintenance mechanism.
***1999-2006:** Ph.D, University of Calcutta, India; Research area: Mathematical ecology; Research theme: Biochemical kinetic modeling of soil emitted methane through functionally different microbial communities.

3. Career

Year	Position	Organization
May 2023-Present	Professor and Head	Department of Mathematics, School of Physical Sciences, Sikkim University (A Central University), Gangtok, India
Oct.2020-May 2023	Associate Professor and Head	Department of Mathematics, School of Physical Sciences, Sikkim University (A Central University), Gangtok, India
June 2019	Visiting Professor	School of Energy and Environment, Southeast University, Nanjing, China.
Aug.2011-Oct.2020	Assistant Professor	School of Mathematics, Statistics and Computational Sciences, Central University of Rajasthan, Ajmer, Rajasthan, India.
Feb.2011-Aug.2011	Postdoctoral research scholar	Evolutionary Functional Genomics Group, Institute for Evolution and Biodiversity (IEB), University of Muenster, Germany.
Feb.2009-Feb.2011	Postdoctoral research scholar	Department of Botany and Plant Sciences, University of California, Riverside, USA.
Feb.2006-Feb.2009	Postdoctoral research scholar	Center for Conservation Biology (CCB), University of California, Riverside, USA.
2005-2006	Assistant Professor	Department of Mathematics, National Institute of Technology, Silchar (NITS), Assam, India.
2003-2005	Assistant Professor	Department of Mathematics, Bengal College of Engineering and Technology (BCET), Durgapur, West Bengal, India.
2000-2003	Senior Project Scientist	Institute of Environmental Studies and Wetland Management, Department of Environment, Government of West Bengal, India.
2000	Junior Project Scientist	Institute of Environmental Studies and Wetland Management, Department of Environment, Government of West Bengal, India.
1999-2000	Junior Research Fellow (JRF)	Space Applications Centre, Indian Space Research Organization (ISRO), Ahmedabad, India.

4. Scientific Highlights (three important recent publications)

a. Rashid M, Bera S , Banerjee M, Medvinsky A, Sun GQ, Li B-L, Slijoka A, Chakraborty A*(2020) Feedforward regulation of plant nitrate transporter NRT1.1 biphasic adaptive activity. *Biophysical Journal* (cell press) 118: 898-908. https://doi.org/10.1016/j.bpj.2019.10.018

How do the protein quaternary structures assemble? What is their functional relevance in disease and other conditions? These are the basic questions that remain unclear. This study shows that assemblage/deassemblage of protein quaternary structure and its modulation depending on fluctuating extracellular conditions control molecular adaptation in a plant nutrient signaling system. In this paper, we first time illustrate adaptive responses and regulation of NRT1.1, a transporter cum sensor, mediated nitrate signaling in a wide range of extracellular nitrate concentrations. The results show that the homodimeric structure of NRT1.1 and its dimeric switch play an important role in eliciting specific cytosolic calcium waves sensed by the calcineurin-B-like calcium sensor CBL9, which activates the kinase CIPK23, in low nitrate concentration that is, however, impeded in high nitrate concentration. Nitrate binding at the high-affinity unit initiates NRT1.1 dimer decoupling and priming of the Thr101 site for phosphorylation by CIPK23. This phosphorylation stabilizes the NRT1.1 monomeric state, acting as a high-affinity nitrate transceptor. However, nitrate binding in both monomers, retaining the unmodified NRT1.1 state through dimerization, attenuates CIPK23 activity and thereby maintains the low-affinity mode of nitrate signaling and transport. This phosphorylation-led modulation of NRT1.1 activity shows bistable behavior controlled by an incoherent feedforward loop, which integrates nitrate-induced positive and negative regulatory effects on CIPK23. These results, therefore, advance our molecular understanding of adaptation in fluctuating nutrient availability and are a way forward for improving plant nitrogen use efficiency.

b. Lamba S., Bera S., Medvinsky A., Acquiati C, Li B-L, Chakraborty A*(2017) Organization of microbial nitrogen pathways with switch-like adjustment in fluctuating soil redox conditions. *Royal Society of Open Science* 4: 160768 (http://dx.doi.org/10.1098/rsos.160768)

Nitrogen is cycled throughout ecosystems by a suite of biogeochemical processes. The high complexity of the nitrogen cycle resides in an intricate interplay between reversible biochemical pathways alternatively and specifically activated in response to diverse environmental cues. Despite aggressive research, how the fundamental nitrogen biochemical processes are assembled and maintained in fluctuating soil redox conditions, remains elusive. Here, we address this question using a kinetic modeling approach coupled with dynamical systems theory and microbial genomics. We show that alternative biochemical pathways play a key role in keeping nitrogen conversion and conservation properties invariant in fluctuating environments. Our results indicate that the biochemical network holds inherent adaptive capacity to stabilize ammonium and nitrate availability, and that the bistability in the formation of ammonium is linked to the transient upregulation of the *amo-hao* mediated nitrification pathway. It is further shown how elevated anthropogenic pressure has the potential to break down the stability of the system, altering substantially ammonium and nitrate availability in the soil, with dramatic effects on biodiversity.

c. Bera S , Lamba S, Rashid M, Sharma A, Medvinsky A, Acquiati C, Li B-L, Chakraborty A* (2016) Robust regulation of hepatic pericentral amination by glutamate dehydrogenase kinetics. *Royal Society Integrative Biology* 8: 1126-1132.

Impaired glutamate dehydrogenase (GDH) sensitivity to its inhibitors causes excessive insulin secretion by pancreatic beta-cells and defective ammonia metabolism in the liver. These are commonly associated with the hyperinsulinism/hyperammonemia syndrome (HI/HA), causing recurrent hypoglycaemia in early infancy. Hepatic localization of GDH amination and deamination activities linked with the urea cycle is known to be involved in ammonia metabolism and detoxification. Although deamination activities of hepatic GDH in the periportal zones of liver lobules and its connection to urea cycle have exhaustively been investigated, physiological roles of GDH amination activity observed at pericentral zones has often been overlooked. Using biochemical modeling approaches, here we report a new role of hepatic GDH amination kinetics for maintaining ammonia homeostasis under excess intrahepatocyte input of ammonium. We have shown that α-ketoglutarate substrate inhibition kinetics of GDH robustly control the ratio between glutamate and ammonium under a wide range of intracellular substrate variation. Dysregulation of this activity under pericentral nitrogen insufficiency contributes to breaking down of ammonia homeostasis and thereby can significantly affect HI/HA syndrome.

5. Research Activities

(i) Principal investigator; project title: Mathematical and computational modeling of below ground nitrogen microbial pathways using systems biology approaches; Funding agency: SERB (Science and Education Research Board, http://www.serb.gov.in) independent research grant. Amount: Rs.21,14,000/-

(ii) **International Consultancy** for the research project: Organochlorine Pesticides in East China Sea and South China Sea. Funding Agency: School of Energy and Environment, Southeast University, China. Amount 5,000 RMB/year.

(ii) Member of Biophysical Society (US) (https://www.biophysics.org).

(iii) PhD supervision: Number of PhD students: 06; PhD degree awarded: 03; PhD continuing:03
*Name: Sanjay Lamba;
Awarded thesis title: Mathematical and computational modeling of nitrogen metabolic pathways;
Current position: Research Scientist, Tata Institute for Genetics and Society (TIGS), Bengaluru.
*Name: Soumen Bera
Awarded thesis title: Quantitative study of Glutamate dehydrogenase systems of nitrogen metabolism.
Current position: Postdoc, St. Jude Children's Research Hospital, USA.
*Name: Mubasher Rashid
Awarded thesis title: Mathematical and Computational Modeling of Biochemical Switches in Plant Nutrient Uptake.
Current position: DST Inspire Faculty, IIT Kanpur.

(iv) Number of master's student project supervised: 26

(v) Computational skills: Programming languages: Python, Perl, C, Matlab; Mathematical Software: Mathematica, Matlab, PyMOL, Chimera, FIRST, Jmol, CellAnalyzer, Discovery studio, Autodock, Autovina; Operating systems: Linux and MS-Windows

(vi) Reviewers of the journal:
Ecological Complexity; Ecological Modelling; International Journal of Biodiversity and Conservation; Physica A: Statistical Mechanics and its Applications; Environmental Pollution; Chemosphere; Science of the total environment; Mathematical Modelling and Analysis; International Journal of Agricultural Sciences; Stochastic Environmental Research and Risk Assessment; Ecological Engineering; PLOS Neglected Tropical Diseases; Annals of Botany; Nature Scientific Reports; PLoS One; Frontiers in Physiology, Environment International; Biogeochemistry; Frontiers Plant Sciences, ACS Omega, Journal of Physics: Complexity.

(vii) Academic and administrative responsibilities

- **M**ember of University Academic Council, Central University of Rajasthan.
- Member of the Board of Studies (BoS), School of Mathematics, Statistics and Computational Sciences, Central University of Rajasthan.
- Program Director of the 6th Internaltional Conference on "Complex Dynamical Systems and Applications", 21-23 February, 2020, Central University of Rajasthan.
- Member of the Board of Studies (BoS), Department of Computer Sciences, Central University of Rajasthan.
- Member of the Board of Studies, Department of Atmospheric Sciences, Central University of Rajasthan
- Member of the Syllabus Committee, Department of Mathematics, Central University of Rajasthan.
- Member of the Admission committee, Department of Mathematics, Central University of Rajasthan.
- Member of the Committee for establishment of Bioengineering Department, Central University of Rajasthan.
- Member of the Doctoral Research Committee (DRC), Department of Physics, Central University of Rajasthan.
- Member of the Doctoral Research Committee (DRC), Department of Statistics, Central University of Rajasthan.
- Member of the Doctoral Research Committee (DRC), Department of Environmental Sciences, Central University of Rajasthan.
- Member of the SPARSH cell, Central Univ. of Rajasthan, Central University of Rajasthan.
- Coordinator of integrated M.Sc.B.Ed. program in Mathematics, Central University of Rajasthan.
- Coordinator of Univ. Transport policy and recommendation committee, Central University of Rajasthan.
- Head, Department of Mathematics, Sikkim University.
- Member of the University library committee, Sikkim University.
- Chair of the Board of Studies, Department of Mathematics, Sikkim University
- Member of the Academic Council of the Sikkim University.
- Convener, NEP2020 Ability Enhancement Courses, Sikkim University. Nov.2021.
- Member, Library Management Committee, Sikkim University. March 2021-Present.
- Chair, Departmental Purchase Committee, Sikkim University, March 2021-Present.
- Member, Sikkim University Academic Council, Feb 2021-Present.
- Chair, Mathematics Question Moderation Committee, Sikkim University, Feb.2021-Present
- Member, Lien policy recommendation committee, Sikkim University, June 2022
- Member, State Curriculum Development, State Council of Educational Research and Training, Govt. of Sikkim. March 2022.
- Member, Book Selection Committee, School of Physical Sciences, Sikkim University, April 2021-Present
- Member, ICT facility management services, Sikkim University, Oct.2022.
- Special Invitee, HPC procurement committee, Sikkim University, Dec. 2022
- External Examiner, Assam Science and Technology University, Guwahati. Jan.2023.
- Member of the Governing body of Kendriya Vidyalaya, Gangtok.

(vii) Research reported in newspapers/magazines

a. Dainik Baskar, Ajmer, Rajasthan dated 26/10/2016.
b. Rajasthan Patrika dated 26/01/2016.
c. The Wire dated 23/03/2017 (https://thewire.in/agriculture/fertiliser-nitrogen-cycle-rajasthan)
d. ITEB Russian news dated 19/01/2017.
e. News-Medical Net dated Jan 31, 2022 (https://www.news-medical.net/news/20220131/Binding-and-conformational-properties-of-the-SARS-CoV-spike-protein-and-hACE2-complex.aspx)
f. Reported at www.malariaworld.org
g. Reported at Sikkim News

(viii) Foreign University research collaboration in last five years

(a) Research problem: Risk assessment of antibiotic resistance
Research collaborator: Southeast University, China
Research outcome: publication in Chemosphere (2020)

(b) **Research problem**: Ecological regulation-Long Term Ecological Research (LTER) Monitoring Stations
Research collaborators: *Belarusian State University and Russian Academy of Sciences*
Outcome: two research papers (2015 and 2017) with primary ecological dataset, one published in a reputed journal *Ecological Complexity* and one is in *Ecological indicator*.

(c) **Research problem:** Engineering Nitrogen Cycling and Microbial Metabolic Pathways
Research collaborators: *Institute for Evolution and Biodiversity, WWU Muenster, Germany.*
Outcome: publication in *Royal Society Open Science (2017)*

(d) Research problem: Nitrate Sensing and Signaling by plant root transmembrane proteins
Research collaborators: *University of California, Riverside, USA*
Outcome: Publication in *iScience (CellPress)* (2018)

(e) **Research problem:** Biochemical regulation of HIV-1 integration
Research collaborator: *Children's Hospital of Los Angeles, University of Southern California (USC).*
Outcome: publication in *FEBS letters* (2013)

(f) **Research problem:** Hyperinsulinism/hyperammonemia syndrome (HI/HA) and GDH activities in hepatic cell
Research collaborator: *RIKEN, Japan*
Outcome: publication in *Royal Society Integrative Biology* (2016).

6. Academic Awards

2004. Certificate of National Eligibility Test (NET) for Universities/Colleges' Lectureship in India.

2008-2009. The Marquis Who's Who in Science and Engineering.

March, 2011-Present. Honorary Research Associate Position at the Agricultural experiment station, Department of Botany and Plant Sciences, University of California, Riverside, USA.

Life member of the New York Academy of Sciences.

Guest Editor for a special issue of the journal Discrete Dynamics in Nature and Society published by Hindawi publisher.

June 2019. Visiting professor, School of Energy and Environment, Southeast University, Nanjing, China.

March 2019. Recognized as external reviewer (ecology section) for Austrian Science Fund, Austria.

Invited visit at The Three Gorges Environment Institute, Chinese Academy of Sciences, Chongqing on June 15, 2019.

7. Professional Training and Teaching Experience

UGC-sponsored Refresher Course, M.D.S. University, Ajmer, Nov. 2015-Dec.,2015.

UGC-sponsored orientation program sponsored by Jai Narayan Vyas University, Dec, 2013-Jan. 2014.

Summer School of Bioinformatics, Advanced Techniques in Genomic Analysis, Adam Mickiewicz University, Poznan, Poland, 2011.

Ecology: Teaching assistance for a course (BPSC-240) on biodiversity for graduate students in the Department of Botany and Plant Sciences, University of California, Riverside in 2006, 2008; Statistical Ecology (STAT 288), UCR, 2008, 2009.

Mathematics: Lecturer, 2005-2006. National Institute of Technology, Silchar, Assam, India.

Teaching Techniques, July, 2005 provided by the "National Institute of Technical Teachers' Training and Research", Kolkata, Govt. of India on the campus of Bengal College of Engineering and Technology, Durgapur, West Bengal, India.

Mathematics: Lecturer, 2002-2005. Bengal College of Engineering and Technology, Durgapur, West Bengal, India.

8. List of publications

a. **Papers in refereed journals (On Molecular Systems Biology AND System Ecology)**

1. Wang C, Thakuri B, Roy AK, Mondal N, Qi Y, **Chakraborty A*** (2023) Changes in the associations between malaria incidence and climatic factors across malaria endemic countries in Africa and Asia-Pacific region. *Journal of Environmental Management* 331: 117264 (doi: 10.1016/j.jenvman.2023.117264). (*Corresponding author)

2. Wang C, Feng L, Thakuri B, **Chakraborty A*** (2022) Ecological risk assessment of organochlorine pesticide mixture in South China Sea and East China Sea under the effects of seasonal changes and phase-partitioning. *Marine Pollution Bulletin* 185: 114329. (*Corresponding author)

3. Wang C, Thakuri B, Roy AK, Mondal N, **Chakraborty A*** (2022) Phase partitioning effects on seasonal compositions and distributions of terrigenous Polycyclic Aromatic Hydrocarbons along the South China Sea and East China Sea. *Science of The Total Environment* 828: 154430 (*Corresponding author)

4. Kumawat N, Tucs A, Bera S, Chuev GN, Valiev M, Fedotova MV, Kruchinin SE, Tsuda K, Sljoka A, **Chakraborty A***(2022) Site Density Functional Theory and Structural Bioinformatics Analysis of the SARS-CoV Spike Protein and hACE2 Complex. *Molecules* 27: 799 (doi: 10.3390/molecules27030799) (*Corresponding author)

5. Das JK, Thakuri B, Kuman KM, Roy S, Sljoka A, Sun GQ, **Chakraborty A*** (2021) Mutation-Induced Long-Range Allosteric Interactions in the Spike Protein Determine the Infectivity of SARS-CoV-2 Emerging Variants. *ACS Omega* 6: 31305-31320. (doi: 10.1021/acsomega.1c05155) (*Corresponding author)

6. Bhuyan S, Das D, **Chakraborty A**, Mandal S, Dhanabal K, Roy B.G. (2021) A Carbohydrate-based Synthetic Approach to Diverse Structurally and Stereochemically Complex Chiral Polyheterocycles. *Chem Asian J* 16: 4108-4121 (doi: 10.1002/asia.202101123)

7. Bera S , Rashid M, Medvinsky AB, Sun GQ, Li BL, Acquisti C, Slijoka A, **Chakraborty A***(2020) Allosteric regulation of Glutamate dehydrogenase deamination activity. *Scientific Reports* 10: 16523
(*Corresponding author and primary supervisor of first author PhD student)

8. Li T, Ce Wang CE, Xu Z, **Chakraborty A*** (2020) A coupled method of on-line solid phase extraction with the UHPLC-MS-MS for detection of sulfonamides antibiotics residues in aquaculture. *Chemospehere* 254:126765 https://doi.org/10.1016/j.chemosphere.2020.126765 (*corresponding author)

9. Rashid M, Bera S, Banerjee M, Medvinsky A, Sun GQ, Li B-L, Slijoka A, **Chakraborty A***(2019) Feedforward regulation of plant nitrate transporter NRT1.1 biphasic adaptive activity. *Biophysical Journal* (cell press) 118: 898-908. https://doi.org/10.1016/j.bpj.2019.10.018
(*Corresponding author and primary supervisor of first author PhD student)

10. Rashid M, Bera S , Medvinsky A, Sun GQ, Li B-L, **Chakraborty A*** (2018) Adaptive Regulation of Nitrate Transceptor NRT1.1 in Fluctuating Soil Nitrate Conditions. *iScience* (Cell Press) 2: 41-50.
(*Corresponding author and Primary supervisor of first author PhD student)

11. Lamba S, Bera S, Medvinsky A, Sun GQ, Acquiati C, Li B-L, **Chakraborty A*** (2017) Organization of microbial nitrogen pathways with switch-like adjustment to fluctuating soil redox conditions. *Royal Society Open Science* **4**: 160768 (http://dx.doi.org/10.1098/rsos.160768).
(*Corresponding author and Primary supervisor of first author PhD student)

12. Bera S , Lamba S, Rashid M, Sharma A, Medvinsky A, Acquiati C, Li B-L, **Chakraborty A*** (2016) Robust regulation of hepatic pericentral amination by glutamate dehydrogenase kinetics. *Royal Society Integrative Biology* 8: 1126-1132. (*Corresponding author and primary supervisor of first author PhD student)

13. Chakraborty A*, Sun GQ, Mustavich L, Huang SH, Li BL (2013) Biochemical interactions between HIV-1 integrase and reverse transcriptase. *FEBS Letters* 587: 425-429. (***eleven US patents cite this article**).
(*Corresponding author)

<u>On Ecology/Systems Ecology</u>

14. Adamovich B, Medvinsky AB, Nikitina LV, Radchikova NP, Mikheyeva TM, Kavalevskaya RZ, Veras YK, **Chakraborty A**, Rusakov AV, Nurieva NI, Zhukova TV (2019) Relations between variations in the lake bacterioplankton abundance and the lake trophic state: evidence from the 20-year monitoring. *Ecological Indicators* 97: 120-129.

15. Medvinsky AB, Adamovich BV, Aliev RR, **Chakraborty A,** Lukyanova EV, Mikheyeya TM, Nikitina LV, Nurieva N, Rusakov A, Zhukova T (2017) Temperature as a factor affecting fluctuations and predictability of the abundance of lake. *Ecological Complexity* 32: 90-98.

16. Medvinsky A, Adamovich BV, **Chakraborty A**, Lukyanova EV, Mikheyeva TM, Nurieva NI, Radchikova NP, Rusakov AV, Zhukova TV (2015) Chaos far away from the edge of chaos: A recurrence quantification analysis of plankton time series. *Ecological Complexity* 23:61-67.

17. Shi PJ, Ishikawa T, Sandhu HS, Hui C, **Chakraborty A***, Xian SJ, Katsunori T, Li BL (2014) On the 3/4 – exponent von Bertalanffy equation for ontogenetic growth. *Ecological Modelling* 276: 23-28. (*corresponding author)

18. Sun GQ, **Chakraborty A**, Liu QX, Jin Z, Anderson KE, Li BL (2014) Influence of time delay and nonlinear diffusion on herbivore outbreak. *Communications in nonlinear science and numerical simulations* 19: 1507-1518.

19. Shi PJ, Men XY, Sandhu HS, **Chakraborty A***, Li BL, Yang F, Sun Y, Ge F (2013) The "general" ontogenetic growth model is inapplicable to crop growth. *Ecological Modelling* 266: 1-9. (*corresponding author)

20. Chakraborty A, Shi PJ, Liu QX, Yang QP, Li BL (2013) A commensal consumer-induced mediation effects on resource-consumer interactions. *Proc. Natl.Acad. Sci. India, Sect.B Biol.Sci.* 83:385-404.

21. Sun G, Jin Z, Song LP, **Chakraborty A**, Li BL (2011) Phase transition in spatial epidemics using cellular automata with noise. *Ecological Research* 26: 333-340.

22. Chakraborty A, Li BL (2011) Contribution of biodiversity to ecosystem functioning: a non-equilibrium thermodynamic perspective. *Journal of Arid Land* 3: 71-74.

23. Chakraborty A, Li BL (2010) Departure from naturalized to invasive stage: A disturbance-induced mechanism and associated interacting factors. *Journal of Plant Ecology* 3: 231-242. **(* selected in editor choice category**)

24. Chakraborty A, Li BL (2010) The role of fluctuating resource supply in a habitat maintained by the competition-colonization trade-off. *Annals of the New York Academy of Sciences* 1195: 27-39.

25. Sun GQ, Jin Z, **Chakraborty A**, Li BL (2010) Influence of infection rate and migration on extinction of disease in spatial epidemics. *Journal of Theoretical Biology* 264: 95-103.
(*cited in Science paper (DOI: 10.1126/science.abc5096**) on COVID-19**)

26. Chakraborty A, Sun GQ, Li BL (2010) Spatial organization of multiple plant species in arid ecosystems: linking patterns and processes. *Journal of Arid Land* 2: 9-13.

27. Wu H, **Chakraborty A***, Li BL, Kenerley CM (2009) Formulating variable carrying capacity by exploring a resource dynamics-based feedback mechanism underlying the population growth models. *Ecological Complexity* 6: 403-412. (*corresponding author)

28. Chakraborty A, Li BL (2009) Plant-to-Plant direct competition for belowground resource in an overlapping depletion zone. *Journal of Arid Land* 1: 9-15.

29. Chakraborty A, Li BL (2009) Post-fire ecological succession: A theoretical modeling framework. *Acta Ecologica Sinica* 29: 7-12.

30. Medvinsky AB, Rusakov AV, **Chakraborty A**, Li BL, Marchenko AI, Sokolov MS (2009) Mathematical modeling the spatial distribution of the pollen produced by genetically modified crops. *Biophysics* 54: 941-945.

31. Chakraborty A, Bhattacharaya DK (2007) A process-based model on methane emission with its oxidation process from rice fields and corresponding control indices. *Environmental Modeling and Assessment* 12: 185-199.

32. Chakraborty A, Bhattacharaya DK (2006) A process-based mathematical model on methane production with emission indices for control. *Bulletin of Mathematical Biology* 68: 1293-1314.

33. Chakraborty A, Bhattacharya DK, Li BL (2006) Spatiotemporal dynamics of methane emission from rice fields at global scale. *Ecological Complexity* 3: 231-240.

b. Papers in conference proceedings

Kundu N, **Chakraborty A**, Pal M (2002). Advantages of estimation of Kharif crop using RadarSat ScanSar data.http://airsar.jpl.nasa.gov/documents/worshop2002/papers/L2.pdf.

c. Digital data Repository

#Lamba S, Bera S, Rashid M, Medvinsky AB, Sun G, Acquisti C, **Chakraborty A***, Li B (2017) Data from: Organization of biogeochemical nitrogen pathways with switch-like adjustment in fluctuating soil redox conditions. Dryad Digital Repository. http://dx.doi.org/10.5061/dryad.n04g0 (*Corresponding author)

d. Papers presented in conferences but not published

Invited Lecture

1. Department of Mathematics, Nar Bahadur Bhandari Government College Tadong, National Mathematics Day, commemorating the birth anniversary of renowned Mathematician Srinivasa Ramanujan on 22nd December 2021. Title of the talk: Mathematics and its applications in biology and medicine.

2. Department of Mathematics, Kalyani Mahavidyalaya, W.B., International Webinar on "Mathematics in Data Analysis and Internet Security during COVID-19 pandemic", Sept 09-10, 2020. Title of the talk: Mathematical and computational examinations of successful entry of SARS-CoV-2 into human host cells.
(youtube link: https://www.youtube.com/watch?v=Gl8StgRuz-A&feature=emb_err_woyt)

3. Department of Mathematics, Sripat Singh College, Murshidabad, W.B., National Seminar on Environmental perturbation: root causes and remedies, February 02, 2020. Title of the talk:" N-cycle and its anthropogenic perturbation: causes and consequences".

4. Invited visit at The Three Gorges Environment Institute, Chinese Academy of Sciences, Chongqing on June 15, 2019.

5. Department of Mathematics, Shanxi University, China, June 17, 2019. Title of the lecture "Organization of nitrogen biogeochemical pathways underground".

6. School of Energy and Environment, Southeast University, China, 4 lectures from June 10-14, 2019. Title of the lecture "Limiting Resource-Diversity-Functioning of the Systems (R-D-FS) framework and ecological regulation".

7. Institute of Mathematical Sciences (IMSc), Chennai, September 25, 2019. Title of the talk: Biocomplexity: Limiting resource-diversity-the functioning of systems (R-D-FS) framework.

8. 5-days workshop on "Celestial Mechanics and Dynamical Astronomy (CMDA)" 07-11 January 2019.Central University of Rajasthan. Title of the talk: On stability theory.

9. Birla Institute of Technology and Science, Pilani, International conference on life science research and its interface with engineering and allied sciences (LSRIEAS-2019), Nov 1-3, 2018. Title of the talk: "Allosteric regulation of glutamate dehydrogenase molecule-a key molecule in Hyperinsulinism and Hyperammonemia syndrome (HI/HA)".

10. Department of Mathematics, NIT Patna, National conference on mathematical biology July 7-8, 2018. Title of the talk "The deterministic models in biology: from molecules to ecosystems".

11. Department of Mathematics, Kalyani Mahavidyalaya, City Centre Complex, W.B., UGC sponsored national seminar on "Recent developments in Mathematics and its applications in other branches of science", Dec.15,2016. Title of the talk: "21st century mathematics: trends and emergence".

12. Department of Mathematics, Sripat Singh College, W.B., UGC sponsored national seminar on "Emerging advances in Mathematics and its applications in natural sciences", Dec.17,2016. Title of the talk: "Chaos far away from the edge of chaos".

13. Central University of Rajasthan, Department of Mathematics, 5-days workshop on "Mathematical modeling and simulation" March 14-18, 2016. Title of the talk " Graph-based approaches in Dynamical Systems".

14. Manipal University, Jaipur, India on Dec. 18, 2015. Title of the talk:" Regulation of bio available nitrogen forms through microbial biochemical pathways".

15. Malaviya National Institute of Technology (MNIT), Jaipur, India on Jan. 20, 2015. Title of the talk: "Mathematical Modeling, MATLAB Programming and their Applications in Engineering and Sciences".

16. The Department of Physics, Central University of Rajasthan, Dynamics Day Rajasthan: Interdisciplinary Symposium on Complex Systems' on Nov. 29, 2014. Title of the talk: Biocompexity across the levels of biological organizations.

17. Indian Statistical Institute (ISI), Kolkata on August 27, 2013. The title of the talk: linking biodiversity to ecosystem functions.

18. Indian Institute of Technology (IIT), Rajasthan on May 7, 2012. The title of the talk: The role of limiting resource from ecosystems to genes: Complex System approaches.

19. Department of Applied Mathematics, IT-BHU on October 19,2011. Title of the talk: From ecosystem to genes: resource-based approaches and modeling.

20. Department of Mathematics, University of Burdwan, W.B. on Jan.10, 2006. Title of the talk: Spatio-temporal analysis and its applications.

21. Department of Mathematics, The IIS University, April 9, 2014. Title of the talk: "Mathematical modeling and various techniques.

Presentations

International

1. Int. Conference on Optimization, Computing and Business Analysis for Sustainable Development organized by the Dept. of Mathematics, Central University of Rajasthan, January 30-31, 2015. Title of the talk: "On the ¾-exponent von Bertanlantfy equation for ontogenetic growth".

2. International Conference on Advances in Dynamical Systems organized by Dept. of Mathematics, Central University of Rajasthan on 10-13 March. 2014. Title of the talk: "Feedback and feedforward regulation of dynamical systems".

3. International Workshops on Climate Change Impacts and Societal Adaptation organized by Central University of Rajasthan and Swedish Meteorological and Hydrological Institute (Sweden) on 7-8 Nov. 2013. Title of the talk: "Regulation of ecosystem productivity through alteration of microbial nitrogen pathways".

4. Winter Seminar Series-2011, Jan.19, 2011, Department of Botany and Plant Sciences, University of California, Riverside. Title of the talk: Modeling species interactions in variable environments: linking patterns and processes of plant species invasions.

5. Biocomplexity seminar, Sept, 2009. Center for Conservation Biology, University of California, Riverside. Title of the talk: Landscape modeling efforts for N-biocomplexity program.

6. 93rd ESA Annual Meeting, Aug. 3-8, 2008. The Midwest Airlines Center, Milwaukee, Wisconsin. Title of the talk: The role of fluctuating resource supply in a habitat maintained by the competition-colonization trade-off.

7. ESA/SER Joint meeting, Aug.5-10, 2007, San Jose McEnery Convention Center, California. Title of the talk: Plant competitive interactions in an overlapping depletion zone.

8. 7th Conference of the International Academy Of Physical Sciences (CONIAPS-VII), Dec. 21 – 23, 2004, University of Allahabad, Allahabad. Title of the talk: A process based mathematical model on methane emission and corresponding emission indices for its control.

9. The First International Symposium on Nonlinear Analysis and Applications (ISNAA-2003), Jan 2-4, 2003, Science city, Kolkata. Title of the talk: Pattern formation of soil emitting methane.

National

1. National conference on "Emerging Trends in Mathematics and its applications in engineering" organized by the Department of Mathematics, Mewar University, Rajasthan, 8-9 January, 2016. Title of the talk: "Regulation of ecosystem productivity".

2. National Conference on "Time Series, Analytics And Recent Advances In Statistical Modelling" organized by the Dept. of Statistics, Central University of Rajasthan, 24-25 August 2015.Title of the talk: "Chaos far away from the edge of chaos: A recurrence quantification analysis of plankton time series".

3. National Conference on Recent advances in statistics and their applications in finance, actuarial sciences and other areas (RASAFAS) organized by Central University of Rajasthan on 14-15 Feb. 2014. Title of the talk: "On the 3/4 exponent von Bertalanffy equation for ontogenetic growth".

4. National conference on Omics for Biotechnology (NCOB – 2012), Central University of Rajasthan, Feb. 22-23, 2012. Title of the paper: Integrating Metagenomics and Modeling Approaches.

5. National Seminar on recent developments in Pure Mathematics (NSRDPM-2005), March 29- 30, 2005, Department of Pure Mathematics, University Of Calcutta, Kolkata – 19. Title of the talk: Spatiotemporal Variation of Soil emitting Methane.

6. National symposium on Mathematical Methods and Applications, Dec. 21, 2002, Indian Institute of Technology, Madras. Tile of the talk: A spatio-temporal mathematical model on methane emission.

7. Conference on Current trends in Mathematics, Nov. 9-10, 2002, Dept. of Mathematics, University of Allahabad, India. Title of the talk: Spatiotemporal Model on Methane emission.

e. Books/Chapters in books

Reference Books published by International Publisher

1. Mathematical modeling and analysis of methane production and oxidation by Amit Chakraborty (ISBN: 978-3-659-83070-9), LAP LAMBERT academic publishing, Saarbrucken, Germany, 2016.

2. Modeling plant community ecological interactions in variable environment by Amit Chakraborty (ISBN: 978-3-659-90100-3), LAP LAMBERT academic publishing, Saarbrucken, Germany, 2016.

Subject Books State / Central Govt. Publications

1. Action Plan For Banni Grassland Development Using Remotely Sensed Data And GIS Techniques. Space Applications Centre, Indian Space Research Organization (ISRO), Dept. of Space, Govt. of India. Document number: SAC/RESA/FLPG/FED/SN/07/2000.

2. A Combined Markov And Cellular Automata (MCA) Approach to Study Interplant Community Competition And Dynamics. Space Applications Centre, Indian Space Research Organization (ISRO), Dept. of Space, Govt. of India. Document number: SAC/RESA/FLPG/FED/SN/08/2000.

Book Chapter

Lamba S, Bera S, Rashid M, Chakraborty A. 2016.Species interactions in variable environment: competition, facilitation, and functional niches. In: Sharma D, and Sharma KC ed. Climate change and environment. New India Publishing Agency, New Delhi, pp. 87-110.

Book Review

Sun GQ, Li XZ, Wang Y, Chakraborty A*, Wang Z, Wu YP (2016) Impacts of Climate change on biological dynamics. Discrete Dynamics in nature and Society (Editorial Article). http://dx.doi.org/10.1155/2016/9046107 (* guest editor)

Chakraborty A, Li BL (2007). Individual based modeling and ecology by V. Grimm, S.F. Railsback, Princeton University Press, NJ. Ecological Complexity 4, 71.

Chakraborty A, Li BL (2010). Spatiotemporal patterns in ecology and epidemiology: Theory, models, and simulation by H. Malchow, SV Petrovskii and E Venturino. Series: Chapman & Hall/CRC Mathematical & Computational Biology, UK. Ecological Complexity 7, 506-507.