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D Bhanu Prakash

PhD Student, Mathematics

I am a third year PhD student in Mathematics working on the stochastic optimal control problems for prey-predator systems and apply these results to biological conservation and pest management.

Current Appointment

October 2023– **Senior Research Fellow (SRF)**
Project title: *Time - Optimal Control Studies and Bifurcation Analysis of Coupled Non-Linear Dynamical Systems with Application to Pest Management* under the supervision of Dr. Krishna kiran Vamsi Dasu. This work is being funded by National Board of Higher Mathematics, DAE, Government of India.

Areas of Specialization

- Mathematical Ecology: Prey-Predator Dynamics
- Mathematical Epidemiology: Disease Modeling
- Optimal Control Theory - Deterministic and Stochastic
- Dynamical Systems
- Bifurcation Analysis

Education

2018–2020 **Sri Sathya Sai Institute of Higher Learning**, *M.Sc.*, Mathematics specialization in Computer Science, *GPA:8.3/10*

2015–2018 **Sri Sathya Sai Institute of Higher Learning**, *B.Sc.*, Mathematics(Hons.) specialization in Computer Science, *GPA:7.5/10*

2013–2015 **Sri Chaitanya Junior College**, *Intermediate*, Mathematics, Physics, Chemistry, *Score:975/1000*

2012–2013 **Sree Balajee Vidyalayam**, *S.S.C*, , *GPA:9.7/10*

Experience

October 2023– **Senior Research Fellow (SRF)**
Project title: *Time - Optimal Control Studies and Bifurcation Analysis of Coupled Non-Linear Dynamical Systems with Application to Pest Management* under the supervision of Dr. Krishna kiran Vamsi Dasu. This work is being funded by National Board of Higher Mathematics, DAE, Government of India.

October 2021– September 2023 **Junior Research Fellow (JRF)**
Project title: *Time - Optimal Control Studies and Bifurcation Analysis of Coupled Non-Linear Dynamical Systems with Application to Pest Management* under the supervision of Dr. Krishna kiran Vamsi Dasu. This work is being funded by National Board of Higher Mathematics, DAE, Government of India.

2020–2021 **Research Assistant**, *Sri Sathya Sai Institute of Higher Learning*, Doing Literature Review , *on Stochastic Modeling, Optimal Control Theory and Bayesian Statistics*

Publications

Preprints

2023 **D. B. Prakash** and D. K. K. Vamsi, "Time-optimal control studies for additional food provided prey-predator systems involving holling type-iii and holling type-iv functional responses," *arXiv preprint arXiv:2309.13592*, 2023. [Online]. Available: https://doi.org/10.48550/arXiv.2309.13592

Journal Articles

2023 **D. B. Prakash** and D. K. K. Vamsi, "Stochastic time-optimal control and sensitivity studies for additional food provided prey-predator systems involving holling type-iv functional response," *Frontiers in Applied Mathematics and Statistics*, vol. 9, p. 1 122 107, [Online]. Available: https://doi.org/10.3389/fams.2023.1122107

2023 **D. B. Prakash** and D. K. K. Vamsi, "Stochastic optimal and time-optimal control studies for additional food provided prey–predator systems involving holling type iii functional response," *Computational and Mathematical Biophysics*, vol. 11, no. 1, p. 20 220 144, 2023. [Online]. Available: https://doi.org/10.1515/cmb-2022-0144

2022 B. Chhetri, D. K. K. Vamsi, **D. B. Prakash**, S. Balasubramanian, and C. B. Sanjeevi, "Age structured mathematical modeling studies on covid-19 with respect to combined vaccination and medical treatment strategies," *Computational and Mathematical Biophysics*, vol. 10, no. 1, pp. 281–303, 2022. [Online]. Available: https://doi.org/10.1515/cmb-2022-0143

2022 B. Chhetri, V. M. Bhagat, D. K. K. Vamsi, V. S. Ananth, **D. B. Prakash**, S. Muthusamy, P. Deshmukh, and C. B. Sanjeevi, "Optimal drug regimen and combined drug therapy and its efficacy in the treatment of covid-19: A within-host modeling study," *Acta Biotheoretica*, vol. 70, no. 2, pp. 1–28, 2022. [Online]. Available: https://doi.org/10.1007/s10441-022-09440-8

2022 D. S. S. M. Kanumoori, **D. B. Prakash**, D. K. K. Vamsi, and C. B. Sanjeevi, "A study of within-host dynamics of dengue infection incorporating both humoral and cellular response with a time delay for production of antibodies," *Computational and Mathematical Biophysics*, vol. 9, no. 1, pp. 66–80, 2021. [Online]. Available: https://doi.org/10.1515/cmb-2020-0118

2021 **D. B. Prakash**, B. Chhetri, D. K. K. Vamsi, S. Balasubramanian, and C. B. Sanjeevi, "Low temperatures or high isolation delay increases the average covid-19 infections in india: A mathematical modeling approach," *Computational and Mathematical Biophysics*, vol. 9, no. 1, pp. 146–174, 2021. [Online]. Available: https://doi.org/10.1515/cmb-2020-0122

2021 B. Chhetri, D. K. K. Vamsi, **D. B. Prakash**, and C. B. Sanjeevi, "Combined drug interventions and its efficacy in the reduction of covid-19 burden: A within-host modeling study with reference to hcq and bcg vaccination," *Advances in Dynamical Systems and Applications (ADSA)*, vol. 16, no. 1, pp. 369–403, 2021 Link

2021 B. Chhetri, V. M. Bhagat, D. K. K. Vamsi, V. S. Ananth, **D. B. Prakash**, R. Mandale, S. Muthusamy, and C. B. Sanjeevi, "Within-host mathematical modeling on crucial inflammatory mediators and drug interventions in covid-19 identifies combination therapy to be most effective and optimal," *Alexandria Engineering Journal*, vol. 60, no. 2, pp. 2491–2512, 2021. [Online]. Available: https://doi.org/10.1016/j.aej.2020.12.011

2020 **D. B. Prakash**, D. K. K. Vamsi, D. B. Rajesh, and C. B. Sanjeevi, "Control intervention strategies for within-host, between-host and their efficacy in the treatment, spread of covid-19: A multi scale modeling approach," *Computational and Mathematical Biophysics*, vol. 8, no. 1, pp. 198–210, 2020. [Online]. Available: https://doi.org/10.1515/cmb-2020-0111

Teaching

Assisted in teaching the following courses

- Mathematical Modeling
- Optimal Control Theory
- Bayesian Statistics
- Bayesian Statistics
- Probability and Statistics

Workshops/Conferences

Conference Talks

[1] **International Conference on Differential Equations and Control Problems (ICDECP23)**, *organized by School of Mathematics and Statistical Sciences, Indian Institute of Technology Mandi (IIT Mandi)*, during June 15-17,2023. Title of the talk: **Stochastic Time-Optimal Control Studies for Additional Food Provided Prey-Predator System involving Holling Type-IV Functional Response and Mutually Interfering Predators.**

[2] **National Conference on Recent Trends in Mathematical Biology - Theory, Methods and Applications**, *organized by Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning (SSSIHL)*, during July 20-22,2023. Title of the talk: **Deterministic and Stochastic Studies on Additional Food Provided Prey-Predator System involving Holling Type-III and Holling Type-IV Functional Responses.**

Workshop Participation

[1] **SERB Sponsored High-End Workshop (KARYASHALA) on Bifurcations and Chaos: Computations and Applications**, *organized in **completely offline mode** by Department of Mathematics, Indian Institute of Technology Indore (IIT Indore)*, during July 03-09,2023.

[2] **National Center for Mathematics Workshop on Control Theory for Partial Differential Equations (NCMW-CTPDE)**, *organized in **completely offline mode** by IISER, Thiruvananthapuram*, during December 04-16,2023.

[3] **Winter School on Games in Evolutionary Dynamics**, *organized in **completely offline mode** by Department of Mathematics, Shiv Nadar Institute of Eminence (Deemed to be University), Delhi NCR*, during December 18-23,2023.

Conference Participation

[1] **International Workshop on Modeling Dynamics, Statistical Inference and Prediction of Infectious diseases (MoDSIP-2018)**, *held at Sri Sathya Sai Institute of Higher Learning (SSSIHL)*, during August 12-15,2018.

[2] **National Workshop on Stochastic Differential Equations & Applications**, *conducted by Department of Mathematics, Periyar University, Salem*, during March 10-13,2021.

[3] **Indo-US Conference-II on the Science of Mathematical Modeling and Decision Making**, *held at Sri Sathya Sai Institute of Higher Learning (SSSIHL)*, during October 28-30,2021.

[4] **Third National Conference on Control and Inverse Problems**, *jointly organized by Central University of Kerala, Central University of Tamilnadu and Periyar University*, during February 25-26,2022.

[5] **Workshop on Nonlinear Phenomena in Mathematical Biology (WoNPMB-2022)**, *held online at Department of Applied Sciences, ABV- Indian Institute of Information Technology and Management (IIITM), Gwalior*, during December 19-23,2022.

Achievements

[1] APSET 2021 - **Qualified**

[2] AP EAMCET 2015 - **Rank 1939**

[3] TS EAMCET 2015 - **Rank 2048**

[4] IIT JEE Main 2015 - **Rank 17003**

Certifications

[1] **Understanding Research Methods** by University of London and offered through **Coursera**

[2] **Stochastic Processes** by HSE University and offered through **Coursera**

[3] **Understanding Research Methods** by University of London and offered through **Coursera**

Membership

[1] Life Member - **Forum for Industrial and Applied Mathematics (FIAM)**

Skill matrix

Skill matrix Alternatively, provide a skill matrix to show off your skills

■□□□□ basic knowledge
■■□□□ intermediate knowledge with some project experience
■■■□□ extensive project experience
■■■■□ deepened expert knowledge
■■■■■ expert / specialist

	Level	Skill	Years	Comment
Coding:	■■■□□	Python	2	*I have been simulating control systems in Python.*
	■■■□□	C, C++	5	*I have been coding various programs in C, C++ from my undergraduate days.*
Applications:	■■■□□	LaTeX	4	*I typed my research papers, presentations and this CV in LaTeX*
	■■■□□	Microsoft Office	2	*I am comfortable using MS Office suite.*
OS:	■■■□□	Linux	5	*I have been using Ubuntu in Desktop.*
	■■□□□	Windows	2	*I am comfortable using a Windows OS.*
Languages:	■■■■□	Telugu	15	*Telugu is my mother tongue.*
	■■■□□	English	10	*I am efficient in vocal, written communication in English.*

Personal Data

Nationality Indian

Sex Male

Marital Status Un-Married

References

[1] Dr. Krishna Kiran Vamsi Dasu (Ph.D. Advisor) , Associate Professor - Stage I, Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning, Prasanthi Nilayam, dkkvamsi@sssihl.edu.in

[2] Prof. Pallav Kumar Baruah, Professor, Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning, Prasanthi Nilayam, pkbaruah@sssihl.edu.in

[3] Dr. N Uday Kiran, Associate Professor, Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning, Prasanthi Nilayam, nudaykiran@sssihl.edu.in