

D BHANU PRAKASH

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PROFILE — As a fourth-year PhD student in Mathematics, my research revolves around dynamical systems and optimal control theory, with a focus on applications in mathematical ecology.

AREAS OF EXPERTISE

- Dynamical Systems • Optimal Control Theory • Mathematical Ecology • Mathematical Epidemiology
- Ordinary Differential Equations • Stochastic Differential Equations

EXPERIENCE

Senior Research Fellow (SRF) - NBHM Research Project **Oct 2023 – Present (Till Sep 2024)**

Project funded by Department of Atomic Energy-National Board of Higher Mathematics (DAE-NBHM), GoI

- Project Title: "Time Optimal Control Studies and Bifurcation Analysis of Coupled Nonlinear Dynamical Systems with Applications to Pest Management"
- Esteemed stipendiary Research Fellowship, granted for one year upon successful attainment of objectives during the initial two years.
- Two Journal papers are communicated and one paper is under preparation. Delivered a talk in international conference (RAAM-2024) organised by IIT BHU.

Junior Research Fellow (JRF) - NBHM Research Project

Oct 2021 – Sep 2023

Project funded by Department of Atomic Energy-National Board of Higher Mathematics (DAE-NBHM), GoI

- Project Title: "Time Optimal Control Studies and Bifurcation Analysis of Coupled Nonlinear Dynamical Systems with Applications to Pest Management"
- Prestigious stipendiary Research Fellowship for two years, awarded on the basis of outstanding track record and research plans.
- Two Journal papers are published and one paper is communicated. Delivered a talk in international conference (ICDECP23) organised by IIT Mandi.

EDUCATION

PhD., Mathematics

Mar 2021 – Ongoing (Est Graduation, Nov 2024)

Sri Sathya Sai Institute of Higher Learning (SSSIHL)

Prasanthi Nilayam - 515 134, India.

- Thesis Title: "Deterministic and Stochastic Time Optimal Control Studies and Bifurcation Analysis of Coupled Nonlinear Dynamical Systems with Applications to Pest Management".
- Research Supervisor: [Dr. Krishna Kiran Vamsi Dasu](#)
- Current Status: Two journal papers are published and three papers are communicated. Delivered talks in two international and one national conferences.

M.Sc. Mathematics specialization in Computer Science

2018–2020

Sri Sathya Sai Institute of Higher Learning (SSSIHL); GPA: 8.3/10 Prasanthi Nilayam - 515 134, India.

B.Sc. Mathematics (Hons.) specialization in Computer Science

2015–2018

Sri Sathya Sai Institute of Higher Learning (SSSIHL); GPA: 7.5/10 Prasanthi Nilayam - 515 134, India.

Intermediate

2013–2015

Sri Chaitanya Junior College; Score: 975/1000

Machilipatnam - 521 001, India.

S.S.C

2012–2013

Sree Balajee Vidyalayam; GPA: 9.7/10

Machilipatnam - 521 001, India.

Certifications

- **Stochastic Processes** by HSE University and offered through **Coursera**

HONORS AND AWARDS

- APSET 2021 - **Qualified** in Mathematics
- AP EAMCET 2015 - **Rank 1939**
- TS EAMCET 2015 - **Rank 2048**
- IIT JEE Main 2015 - **Rank 17003**

PUBLICATIONS

Preprints

- **D. B. Prakash** and D. K. K. Vamsi, “Global Dynamics and Time-Optimal Control Studies for Additional Food provided Holling Type-III Mutually Interfering Prey-Predator Systems with Applications to Pest Management,” arXiv preprint arXiv:5632232, 2024.
- **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

- **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>
- **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>
- 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>
- 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>
- 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>
- **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>
- 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](#)
- 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>
- **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>

WORKSHOPS/CONFERENCES

Resource Persons

- Faculty Development Program (FDP) on **Dynamical Systems & Optimal Control Theory, AI/ML, and Bioinformatics with Applications to Healthcare** organised by the Centre for Excellence in Mathematical Biology (CEMB), Sri Sathya Sai Institute of Higher Learning (SSSIHL) during July 8-15, 2024. Organised Hands-on session for six hours on the topic: **Dynamical Systems and Optimal Control Theory with Python.**
- **Lectures on Infectious Disease Modeling** organized by ICMR-National Institute for Research in Tuberculosis (ICMR-NIRT), Department of Health, Chennai, Government of India during March 14-15, 2024. Organised Hands-on session for four hours on the topic: **Introduction to Python programming and exploring basic disease models in Python.**

Conference Talks

- *Deterministic and Stochastic Time Optimal Control Studies of Coupled Nonlinear Dynamical Systems with Applications to Pest Management. 2nd International Conference on Recent Advances in Applied Mathematics* (RAAM 2024) organized by Indian Institute of Technology IIT BHU, Varanasi during July 2024.
- *Deterministic and Stochastic Studies on Additional Food Provided Prey-Predator System involving Holling Type-III and Holling Type-IV Functional Responses. 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 2023.
- *Stochastic Time-Optimal Control Studies for Additional Food Provided Prey-Predator System involving Holling Type-IV Functional Response and Mutually Interfering Predators. 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 2023.

Workshop Participation

- **5-day International Faculty Development Program (FDP) on Advances in Non-linear Dynamics: Methods and Applications** (ANDMA 2024) in **online mode** by the Department of Mathematics, School of Advanced Sciences, VIT-AP University, Andhra Pradesh, India during June 11-15, 2024.
- **International Workshop on Recent advances on control theory of PDE systems in online mode** by the International Centre for Theoretical Sciences (ICTS), Bangalore during February 12-23, 2024.
- **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.
- **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.
- **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.

Conference Participation

- *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.
- *National Workshop on Stochastic Differential Equations & Applications* conducted by Department

of Mathematics, Periyar University, Salem during March 10-13, 2021.

- *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.

MEMBERSHIP

- Life Member - Indian Academy of Mathematical Modeling and Simulation ([IAMMS](#))
- Life Member - Forum for Industrial and Applied Mathematics ([FIAM](#))

TECHNICAL SKILLS

Programming Python, MATLAB, C, C++
Softwares LaTeX, MS Office
OS Ubuntu, macOS, Windows

LEADERSHIP AND EXTRACURRICULAR ACTIVITIES

- Lead the team of Audio Control group at the University and Hostel during 2016-2018.
- Lead the team of the Hostel General Stores during 2019-2023.
- Participated in Sri Sathya Sai Village Service Program - Grama Seva, providing food and clothing to over 180 villages in Andhra Pradesh, India.
- An active volunteer in Service programs of Sri Sathya Sai Seva Organisations, India.

PERSONAL DATA

- Date of Birth: 23 March, 1998
- Nationality: Indian
- Sex: Male
- Marital Status: Single
- Languages: English, Telugu, Hindi

REFERENCES

- [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
- [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