

# D BHANU PRAKASH

[dbhanuprakash233.github.io](https://github.com/dbhanuprakash233)

🏠 Machilipatnam, India. ✉ [dbhanuprakash233@gmail.com](mailto:dbhanuprakash233@gmail.com) ✉ [db.maths@vignan.ac.in](mailto:db.maths@vignan.ac.in) [in dbhanuprakash233](https://www.linkedin.com/in/dbhanuprakash233)  
 🌐 D Bhanu Prakash 🌐 dbhanuprakash233 📞 631979 📞 57224978069 📞 0003-0240-2962 📞 NFS-4907-2025

## PROFILE —

I am an Assistant Professor in Mathematics at Vignan's Foundation for Science, Technology & Research (Deemed to be University), India, with a Ph.D. thesis in Mathematics submitted in May 2025 at Sri Sathya Sai Institute of Higher Learning. My research focuses on Dynamical Systems and Optimal Control Theory, particularly in Mathematical Biology. I bring a strong foundation in both theoretical and applied mathematics, strengthened by three years as a Research Fellow on a DAE-NBHM funded project. This journey has sharpened my analytical skills and deepened my commitment to teaching and mentoring.

## AREAS OF EXPERTISE

• Mathematical Modeling • Dynamical Systems • Optimal Control Theory • Data Analysis • Mathematical Ecology • Mathematical Epidemiology • Ordinary Differential Equations • Stochastic Differential Equations • Bayesian Statistics

## EXPERIENCE

### Assistant Professor

June 2025 – Ongoing

*Department of Mathematics and Statistics, School of Applied Science & Humanities, Vignan's Foundation for Science, Technology & Research (Deemed to be University), Vadlamudi, Guntur - 522 213, Andhra Pradesh, India.*

- As part of my teaching responsibilities, I am offering a course on [Fundamentals of Engineering Mathematics](#) (FEM) this semester.

### Senior Research Fellow (SRF) - NBHM Research Project

Oct 2023 – 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 an 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 an international conference (ICDECP23) organised by IIT Mandi.

## TEACHING EXPERIENCE

<b>Assistant Professor</b>	<b>July 2025 – Present</b>
<i>Department of Mathematics and Statistics, Vignan's Foundation for Science, Technology &amp; Research (Deemed to be University), Vadlamudi, Guntur - 522 213, India.</i>	
<ul style="list-style-type: none"> <li>Fundamentals of Engineering Mathematics</li> </ul>	Pre Semester, 2025-2026
<b>Teaching Assistant</b>	<b>Dec 2021 – Apr 2025</b>
<i>Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning (SSSIHL) Prasanthi Nilayam - 515 134, India.</i>	
<ul style="list-style-type: none"> <li>Probability and Statistics</li> </ul>	Semester II, 2021-2022
<ul style="list-style-type: none"> <li>Mathematical Modeling</li> </ul>	Semester II, 2022-2023
<ul style="list-style-type: none"> <li>Calculus of Variations and Optimal Control Theory</li> </ul>	Semester I, 2023-2024
<ul style="list-style-type: none"> <li>Real Analysis</li> </ul>	Semester II, 2023-2024
<ul style="list-style-type: none"> <li>Linear Algebra</li> </ul>	Semester I, 2024-2025
<ul style="list-style-type: none"> <li>Methods of Differential Equations</li> </ul>	Semester II, 2024-2025

## EDUCATION

<b>PhD., Mathematics</b>	<b>Mar 2021 – Ongoing (Thesis Submitted, May 2025)</b>
<i>Sri Sathya Sai Institute of Higher Learning (SSSIHL)</i>	<i>Prasanthi Nilayam - 515 134, India.</i>
<ul style="list-style-type: none"> <li>Thesis Title: "Dynamics and Control of Additional Food Provided Prey-Predator Systems: A Deterministic and Stochastic Study with reference to Holling Type-III/IV Responses Incorporating Mutual Interference and Intraspecific Competition".</li> <li>Research Supervisor: <a href="#">Dr. Krishna Kiran Vamsi Dasu</a></li> <li>Current Status: Three journal papers are published and three papers are communicated. Delivered talks in two international and one national conferences.</li> </ul>	
<b>M.Sc. Mathematics specialization in Computer Science</b>	<b>2018–2020</b>
<i>Sri Sathya Sai Institute of Higher Learning (SSSIHL); GPA: 8.3/10 Prasanthi Nilayam - 515 134, India.</i>	
<b>B.Sc. Mathematics (Hons.) specialization in Computer Science</b>	<b>2015–2018</b>
<i>Sri Sathya Sai Institute of Higher Learning (SSSIHL); GPA: 7.5/10 Prasanthi Nilayam - 515 134, India.</i>	
<b>Intermediate</b>	<b>2013–2015</b>
<i>Sri Chaitanya Junior College; Score: 975/1000</i>	<i>Machilipatnam - 521 001, India.</i>
<b>S.S.C</b>	<b>2012–2013</b>
<i>Sree Balajee Vidyalayam; GPA: 9.7/10</i>	<i>Machilipatnam - 521 001, India.</i>

## CERTIFICATIONS

Bayesian Statistics by Duke University offered through Coursera ( <a href="#">Certificate</a> )	Mar 2025
Stochastic Processes by HSE University and offered through Coursera ( <a href="#">Certificate</a> )	Oct 2024

## PUBLICATIONS

### Preprints

- D. B. Prakash** and D. K. K. Vamsi, "Deterministic and stochastic studies on additional food provided prey-predator systems with group defence among prey and mutual interference among predators," *arXiv preprint arXiv:2504.21114*, 2025. [Online]. Available: <https://www.arxiv.org/abs/2504.21114>. Manuscript submitted for review to *Acta Applicandae Mathematicae*, Springer Nature.

- **D. B. Prakash** and D. K. K. Vamsi, “Dynamics and control of additional food provided prey-predator systems exhibiting holling type-iii functional response and intra-specific competition among predators,” *arXiv preprint arXiv:2504.18035*, 2025. [Online]. Available: <https://arxiv.org/abs/2504.18035>. Manuscript submitted for review to *Qualitative Theory of Dynamical Systems*, Springer.
- **D. B. Prakash** and D. K. K. Vamsi, “Role of intra-specific competition and additional food on prey-predator systems exhibiting holling type-iv functional response,” *arXiv preprint arXiv:2504.09078*, 2025. [Online]. Available: <https://arxiv.org/abs/2504.09078> - Manuscript submitted for review to *Journal of Biological Dynamics*, Taylor & Francis.

### Journal Articles

- **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,” *Discov Appl Sci* 7, 874, 2025. [Online]. Available: <https://doi.org/10.1007/s42452-025-07255-z>
- **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. 1122107, 2023. [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. 20220144, 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>

## WORKSHOP AND SPEAKING ENGAGEMENTS

- **Resource Person**, FDP on “*Statistical Process Design using R & Python*”, Mangalore Institute of Technology & Engineering (MITE), Karnataka - May 8-10, 2025. Conducted a 4-hour lecture and hands-on session on **Stochastic Processes and Multivariate Analysis**.
- **Resource Person**, FDP on “*Advances in Mathematical Modeling Techniques, AI/ML & Bioinformatics*”, Sri Sathya Sai Institute of Higher Learning (SSSIHL) and Indian Society for Mathematical Modeling and Computer Simulation (ISMMACS) - April 12-13, 2025. Conducted a 2-hour hands-on session on **A Python primer on Optimal Control Problems**.
- **Resource Person**, Online workshop on “*Mathematical Modelling of Infectious Diseases*”, MedPro, Tamilnadu - February 20, 2025. Organized a two hour hands-on session on the topic: **Mathematical Modeling of Infectious Diseases using Python**.
- **Resource Person**, A 6-day In-person “*National Winter School for Women in AI and Computational Biology - 2024*”, Centre for Excellence in Mathematical Biology (CEMB-SSSIHL) - December 2-7, 2024. Organized a hands-on session for four hours on the topic: **Introduction to Programming and Disease Modeling using Python**. ([Report](#))
- **Resource Person**, FDP on “*Dynamical Systems & Optimal Control Theory, AI/ML, and Bioinformatics with Applications to Healthcare*”, Centre for Excellence in Mathematical Biology (CEMB-SSSIHL) - July 8-15, 2024. Organised a hands-on session for six hours on the topic: **Dynamical Systems and Optimal Control Theory with Python**.
- **Guest Lecture**, A 2-day In-person workshop on “*Infectious Disease Modeling*”, ICMR-National Institute for Research in Tuberculosis (ICMR-NIRT), Department of Health, Chennai, Government of India - March 14-15, 2024. Organised a 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.

## PROJECTS

### Risk Assessment of Cyberattacks Using Bayesian Networks

[Link](#) - Jan 2025

- Designed and implemented a Bayesian Network model to assess the probabilistic risk of successful cyberattacks on network assets using real-world cybersecurity data.
- Analyzed pre-processed datasets to identify relationships between vulnerabilities, threat actors, attack vectors, and asset exploitation probabilities.
- Computed risk levels for various assets and developed a ranked list with actionable mitigation insights.
- Delivered data-driven strategies for prioritizing cybersecurity defenses.



## Numerical Simulation of a Two-Stage Rocket

[Link](#) - Dec 2024

- This project simulates the vertical flight of a two-stage rocket by solving a **system of ordinary differential equations (ODEs)** numerically using `scipy.integrate.solve_ivp` with the RK45 method. The simulation accounts for quadratic air drag and gravitational forces but does not include parachute deployment during descent.

## WORKSHOPS/CONFERENCES PARTICIPATION

### Workshop Participation

- **International Online Workshop on the Ethical AI toolkit for Researchers** in *online mode* by the Department of Applied Chemistry, Amity University, Madhya Pradesh, India on August 6, 2025.
- **14-day Faculty Development Program (FDP) on Foundations and Applications of Quantum Computing** in *online mode* by the Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning (SSSIHL), Andhra Pradesh, India during March 18- April 3, 2024.
- **Certificate Program in Infectious Disease Modeling** in *online mode* by Center for Excellence in Mathematical Biology, Sri Sathya Sai Institute of Higher Learning, India during March - November 2024.
- **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

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

## HONORS AND AWARDS

- APSET 2021 - **Qualified** in Mathematics
- AP EAMCET 2015 - **Rank 1939**
- TS EAMCET 2015 - **Rank 2048**

- IIT JEE Main 2015 - Rank 17003

## TECHNICAL SKILLS

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

## LEADERSHIP AND EXTRACURRICULAR ACTIVITIES

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- 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

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

## REFERENCES

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- [Dr. Krishna Kiran Vamsi Dasu](#) (Ph.D. Supervisor), Assistant Professor (Academic Level 12), Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning, Prasanthi Nilayam, ✉ [dkkvamsi@sssihl.edu.in](mailto:dkkvamsi@sssihl.edu.in)
- [Dr. N Uday Kiran](#), Associate Professor & Head of the Department, Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning, Prasanthi Nilayam, ✉ [nudaykiran@sssihl.edu.in](mailto:nudaykiran@sssihl.edu.in)