Dr B S R V Prasad

Associate Professor (Grade I)
Department of Mathematics
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Biography

I am a Mathematician working in the areas of Mathematical Biology and Ecology. My research interests include Theoretical Biological Control, Mathematical Bio-economics and Bio-geochemical modelling of lagoon ecosystems. My research in Theoretical Biological Control involves developing mathematical models to study the predator-pest interactions in the presence of additional/alternative food to predators and controllability aspects with applications to biological pest control. My research on Bio-geochemical modelling of lagoon ecosystem focuses on developing mathematical models to study the bio-geochemical events that are responsible for the changes occurring in the oxygen, nitrogen and carbon cycles of Lake ecosystems with particular reference to Chilka Lake, India.

Current Appointment

Associate Professor (Grade I), Department of Mathematics, School of Advanced Sciences, Vellore Institute of Technology, Vellore.

Areas of Specialization

Mathematical Biology, Mathematical Ecology, Optimal Control Theory, Dynamical Systems, Differential Equations, Biogeochemical Modelling of Lagoon Ecosystems.

Education

2011 — PhD in Mathematics, Andhra University

Thesis Title: *"Dynamics of additional food provided predator-prey system with applications to biological control"*

Thesis Advisor: Prof. P.D.N. Srinivasu, Department of Mathematics, Andhra University, Visakhapatnam, India.

2001 — MSc in Mathematics, Nagarjuna University (69.4%).

1999	BSc in Mathematics, Nagarjuna University (76.05%).
1996	Intermediate in Mathematics, Physics and Chemistry, Board of Intermediate Education (73.7%).
1994	SSC, Board of Secondary Education (80.33%).

Teaching/Research Experience

July, 2022-	Associate Professor (Grade I), Department of Mathematics, School of Advanced Sciences, Vellore Institute of Technology (Deemed to be Univerity), Vellore, Tamilnadu, India.
July, 2017-July, 2022	Assistant Professor Senior (Grade II), Department of Mathematics, School of Advanced Sciences, Vellore Institute of Technology (Deemed to be University), Vellore, Tamilnadu, India.
Jun, 2012-July, 2017	Assistant Professor, Department of Mathematics, School of Advanced Sciences, Vellore Institute of Technology (Deemed to be University), Vellore, Tamilnadu, India.
Nov, 2011-May, 2012	UGC-DS Kothari Postdoctoral Fellow, Ecological Modelling Laboratory, Department of Zoology, Visva-Bharati University, Santhiniketan.
Aug, 2008-Nov, 2011	SRF, Chilka Lake Ecosystem Modelling (Phase - II), Department of Mathematics, Andhra University, Visakhapatnam.
Dec, 2007-Aug, 2008	Project Assistant, Chilka Lake Ecosystem Modelling (Phase - I), Department of Mathematics, Andhra University, Visakhapatnam.
Jun, 2002-Dec, 2005	Lecturer, PG Department of Mathematics, Andhra Loyola College, Vijayawada, India.

Work Experience

Apr, 2001–May, 2002	Faculty-cum-programmer in APTECH Computer Educations, Vijayawada, India.

Funded Projects - Completed

June, 2014–June, 2017	Principal Investigator – “Bio-economics of additional food provided predator-prey system with applications to agricultural pest control” funded by DST-SERB, India under Fast Track Scheme for Young Scientist in Mathematics (with a grant of Rs. 10.5 Lakhs).

Honors and Awards

2008	Young Scientist Award from Dr. K.V. Rao Scientific Society, Hyderabad
2011	UGC-DS Kothari Postdoctoral Award from UGC, India.

Courses Taught

Undergraduate	Applied Numerical Methods, Differential and Difference Equations, Calculus for Engineers, Discrete Mathematics and Graph Thoery.
Postgraduate	Advanced Mathematical Methods, Discrete Mathematics, Lattice Theory, Numerical Analysis, Coding Theory, Programming in C & FORTRAN, Graph Theory, Applied Numerical Analysis (with C Programming), Programming for Data Analysis, Computational Thinking for Data Analytics, Design and Analysis of Algorithms.

Administrative Positions

Aug, 2015–Aug, 2017	Coordinator (for Mathematics Department) Sponsored Research and Industrial Consultancy Cell (SPoRIC), VIT University.
Jun, 2018 - Dec, 2021	Coordinator IQAC/NAAC, Department of Mathematics, SAS, VIT University.

Research Guidance

M.Phil.

Awarded	Ms. M.S. Bhuvaneswari (March, 2017) *Dissertation Title*: Dynamics of competitive species in presence of additional food with applications to biological pest control

P.hD.

Awarded	Mr. K. Durga Prasad (June, 2019) *Topic*: Predatory Interactions Influenced by Supplementary Food with Applications to Agricultural Pest Control: Modelling and Analysis
Ongoing	Ms. M.S. Bhuvaneswari *Topic*: Dynamics of Intraguild Predation with Optimal Foraging Strategies in the Presence of Additional/Alternative Food Sources with Applications to Biological Control

Participation in Workshops/Conferences

Abroad

Advanced School in High Performance Computing Tools for e-Science, held at the Abdus Salam International Center for Theoretical Physics, Trieste, Italy during March 5-17, 2007.

MBI Workshop for Young Researchers in Mathematical Biology (WYRMB), held at the Mathematical Biosciences Institute, The Ohio State University, Columbus,

Ohio, USA during August 26-29, 2013.

ECSA 53 - Estuaries and coastal areas in times of intense change, held at Shanghai, China during October 13-17, 2013.

International Conference on Applications of Mathematics to Nonlinear Sciences (AMNS - 2016), held at Khatmandu, Nepal during May 26-29, 2016.

Workshop on Evolutionary Models of Structure Populations - Integrating Methods, held at Max Planck Institute for Evolutionary Biology, Plön, Germany during September 05-07, 2018.

Winter School on Quantitative Systems Biology: Quantitative Approaches in Ecosystem Ecology, ICTP, Italy, 30 November - 17 December, 2020 (Virtual-Online Mode).

Convex Integration and Nonlinear Partial Differential Equations, International Centre for Mathematical Sciences, Edinburgh, 8-13 November, 2021 (Online Mode).

India

Refresher Course in Mathematics - Cryptology, held at Department of Mathematics, Cochin University of Science and Technology, Cochin during May 2-14, 2005.

Short-term Training Programme on Theory of Computer Science, held at Department of Mathematics, Bapatla Engineering College, Bapatla during November 22-27, 2004.

Workshop on Quantitative Finance, held at Department of Mathematics, Indian Institute of Sciences, Bangalore during November 20-28, 2006.

Winter School on Modeling, Computing and Simulation in Engineering, held at Department of Mathematics, Indian Institute of Technology Madras during December 11, 2006 - January 05, 2007.

National Conference on Recent Developments in Mathematics and Applications, conducted by Department of Mathematics, Andhra University during November 27-29, 2007.

95th Indian Science Congress Association, held at Andhra University, Visakhapatnam during January 03-07, 2008.

National Workshop on Topological Dynamics, Differential Equations and Applications, organised by CRR Advanced Institute of Mathematics, Statistics & Computer Science, University of Hyderabad, Hyderabad during March 11-15, 2008.

Instructional School on Existence and Global Attractivity of Periodic Solutions of Functional Differential Equations with Applications to Population Dynamics, held at Department of Applied Mathematics, Birla Institute of Technology, Ranchi during June 9-23, 2008.

Professor P.N. Ganapati Centennial Symposium "Landmark Researchers in Marine Biology: The Indian Context", held at Andhra University, Visakhapatnam during October 09-10, 2010.

Science Workshop on Methodology for Ecosystem Modelling, held at ICMAM-

PD, NIOT, Chennai during October 20-21, 2010.

Workshop on Mathematical Ecology, held at IISER-K, Mohanpur, Kolkata during December 07-11, 2010.

Symposium on Mathematical Ecology, held at IISER-K, Mohanpur, Kolkata during December 13-14, 2010.

International Conference on Mathematical Biology, held at Indian Institute of Science, Bangalore during July 4-7, 2011.

Indo-Swiss Workshop on Ecology & Conservation of Chilika Lake, Odisha, India, held at Chilika Development Authority, Chilika during November 25-26, 2011.

International Conference on Game Theory, Operations Research and Applications, held at Indian Statistical Institute, Chennai during January 03-07, 2012.

Faculty Development Programme, held at VIT University, Vellore during June 29-30, 2012.

Summer School on Networks in Biology, Social Science and Engineering, held at Indian Institute of Science, Bangalore during July 2-11, 2012.

Innovators' Conclave on Affordable Medical Technologies, organised by The International Consortium on Affordable Medical Technologies (CAMTech) at VIT University, Vellore, during March 15-17, 2013.

National Seminar on Advances in Fluid Dynamics, held at Sri Venkateswara University, Tirupathi during May 30, 2013.

Advanced Workshop on Mathematical Epidemiology & Differential Equations, held at IIT Patna, Patna during July 8-13, 2013.

International Conference on Environmental Biology and Ecological Modelling, held at Visva-Bharati University, Santiniketan during February 24-26, 2014.

Young Investigators Meeting in Biology - 2017 (in the capacity of Young Investigator), held at Goa during March 6-10, 2017.

Two-day UGC Sponsored National Conference on "Modern Trends in Pure Mathematics", held at Andhra Loyola College, Vijayawada during July 14-15, 2017.

IMS Conference - 2019, held at IIT Kharagpur during November 22-55, 2019.

Five Days International e-Seminar on Recent Research in Mathematics (ISRRM-2020), held at GITAM University, Bengaluru during September 11-15, 2020.

5th International Conference on Applications of Fluid Dynamics (An Online Conference), held at VIT-AP University, Amaravathi during December 13-15, 2020.

Papers/Posters Presented in Workshops/Conferences

Presented a paper titled *An algorithm to capture dynamics associated with morphometry of a Lagoon: a step towards ecosystem modelling* in the Professor P.N. Ganapati Centennial Symposium "Landmark Researches in Marine Biology:

The Indian Context", held at Andhra University, Visakhapatnam during October 09-10, 2010.

Presented a paper titled *Biological control through provision of additional food to predators: a theoretical study* in the Symposium on Mathematical Ecology, held at IISER-K, Mohanpur, Kolkata during December 13-14, 2010.

Presented a poster titled *Time optimal control of an additional food provided predator-prey system with applications to pest management and biological conservation* in the International Conference on Mathematical Biology, held at Indian Institute of Science, Bangalore during July 4-7, 2011.

Delivered a talk on *Ecosystem Modelling of Chilka Lagoon, India* in Advanced Workshop on Mathematical Epidemiology & Differential Equations, held at IIT Patna, Patna during July 8-13, 2013.

Presented a paper titled *Non-darcian unsteady flow of a micropolar fluid over a porus stretching sheet with thermal radiation and chemical reaction* in the National Seminar on Advances in Fluid Dynamics, held at Sri Venkateswara University, Tirupathi during May 30, 2013.

Presented a poster titled *Dynamics of cannibalistic predator-prey system in presence of additional food to predators* in the Young Investigator Meeting - 2017, held at Goa during March 6-10, 2017.

Invited Talks/Guest Lectures Delivered

Delivered an invited talk on *Dynamics of additional food provided predator-prey system with mutually interfering predators* in MBI Workshop for Young Researchers in Mathematical Biology (WYRMB), held at Mathematical Biosciences Institute, The Ohio State University, Columbus, Ohio, USA during August 26-29, 2013.

Delivered a talk on *Net Ecosystem Metabolism of Chilka Lagoon, India* in the international conference ECSA - 53: Estuaries and costal areas in times of intense change held at Shanghai, China during October 13-17, 2013.

Delivered a talk on *Dissolved oxygen dynamics in relation to saturation and health of an aquatic body: A case for Chilka lagoon, India* in the International Conference on Environmental Biology and Ecological Modelling, held at Visva-Bharati University, Santiniketan during February 24-26, 2014.

Delivered an invited talk on *MATLAB for Engineering Mathematics* in the National Level Workshop on Recent Advances in Mathematics and Computational tools for Engineering Applications (RAMCEA-2014), held at GMR Institute of Technology, Rajam during December 5-6, 2014.

Delivered an invited talk on *Sage: An Open Source Mathematics Software, Introduction* in the National Level Workshop on Recent Advances in Mathematics and Computational tools for Engineering Applications (RAMCEA-2014), held at GMR Institute of Technology, Rajam during December 5-6, 2014.

As resource person, delivered an invited lecture on *Difference Equations and*

It's Applications in one day workshop Mathematics - Engineering Applications at K.S. Rangasamy College of Technology, Tiruchengode, Tamilnadu on February 26, 2016.

Delivered a talk on *Dynamics of cannibalistic predator-prey system in presence of additional food to predators* in invited session of International Conference on Applications of Mathematics to Nonlinear Sciences (AMNS - 2016), held at Khatmandu, Nepal during May 26-29, 2016.

Delivered an invited talk on *Modern Trends in Differential Equations and Mathematical Modelling* in two-day UGC-Sponsored National Conference on Modern Trends in Pure Mathematics, organised by Department of Mathematics, Andhra Loyola College, Vijayawada on July 14-15, 2017.

Delivered an invited talk on *Introduction to Sage Programming* in International Seminar on Emerging Trends in Mathematics (ISTEM), VIT, Vellore during March 29-31, 2018.

Delivered a talk on *Biological pest control using cannibalistic predators and with provision of additional food: A theoretical study* in Workshop on Evolutionary Models of Structured Populations - Integrating Methods, held at Max Planck Institute for Evolutionary Biology, Plön, Germany during 05-07, 2018.

Delivered an invited talk on *Beamer Presentation* in the Workshop on LaTeXfor Technical writing, held at VIT, Vellore during September 24-25, 2018.

Delivered an invited talk on *Role of Supplementary Food Resources on Enhancing Bio-Control Efficiency of Natural Enemies: Theoretical Perspectives* in the Symposium on Theoretical and Computational Biology, Annual Conference of the Indian Mathematical Society, IMS-2019, November 22-25, 2019.

Delivered an invited talk on *Beamer Presentation* in Five Days e-Workshop on LaTeX, organised by Department of Mathematics, GITAM University, during July 05-09, 2021.

Delivered an invited talk on *Mathematical Modelling of Biological and Ecological Systems* in Faculty Development Program October 2021, organised by Department of Mathematics and Statistics, MIT World Peace University, during October 22-23, 2021.

Delivered an invited talk on *Introduction to Python with Applications to Scientific Computing* in Advances in Applied Mathematics and Computational Methods (AAMCM), organised by Department of Mathematics, VIT-AP University during January 07-09, 2022.

Delivered an invited lecture on *Programming Skilss and Software Tools for Research* in Five day's wokshop on Development of Research Skills in Mathematical Aspects, organised by Department of Mathemtatics, VIT, Vellore during April 25-29, 2022.

Organiser/Committee Member for Workshops and Conferences

Organising committee member, VIT Mathematical Meet - 2013 to 2018 organised

by Department of Mathematics, School of Advanced Sciences, VIT University, Vellore.

Organising committee member, 27th National Science Day Celebration, SciGATHER 2013 held at VIT University, Vellore on 28th February, 2013.

Chair person for session on *Mathematical Modelling* in "National Conference on Pure and Applied Mathematics - 2016" held at Department of Mathematics, School of Advanced Sciences, VIT University, Vellore

Organising Secretary, International Seminar on Emerging Trends in Mathematics (ISETM), March 29-31, 2018 held at Department of Mathematics, School of Advanced Sciences, VIT, Vellore.

Organising Secretary, ICAFD, 2018 held at Department of Mathematics, School of Advanced Sciences, VIT, Vellore.

Co-Organising Secretary, Anuual Conference of IMS-2020 held at Department of Mathematics, School of Advanced Sciences, VIT, Vellore.

Co-Organising Secretary, ICMS-2022 held at Department of Mathematics, School of Advanced Sciences, VIT, Vellore.

Publications

Journal Articles

2007 P.D.N. Srinivasu, **B.S.R.V. Prasad** and M.Venkatesulu, 2007, Biological control through provision of additional food to predators : A theoretical study. Theoretical Population Biology, Vol. 72, pp. 111-120. doi:10.1016/j.tpb.2007.03.011.

2010a P.D.N. Srinivasu, **B.S.R.V. Prasad**, 2010, Time optimal control of an additional food provided predator-prey system with applications to pest management and biological conservation. Journal of Mathematical Biology, Vol. 60, pp. 591-613. doi:10.1007/s00285-009-0279-2.

2010b P.D.N. Srinivasu, **B.S.R.V. Prasad**, 2010, Erratum to: Time optimal control of an additional food provided predator-prey system with applications to pest management and biological conservation. Journal of Mathematical Biology, Vol. 61, pp. 319-321. doi:10.1007/s00285-009-0301-8.

2011 P.D.N. Srinivasu, **B.S.R.V. Prasad**, 2011, Role of quantity of additional food to predators as a control in predator-prey systems with relevance to pest management and biological conservation. Bulletin of Mathematical Biology, Vol. 73, pp. 2249-2276. doi:10.1007/s11538-010-9601-9.

2013 **B.S.R.V. Prasad**, Malay Banerjee, P.D.N. Srinivasu, 2013, Dynamics of additional food provided predator-prey system with mutually interfering predators. Mathematical BioSciences, Vol. 246, pp. 176-190. doi:10.1016/j.mbs.2013.08.013

2014a **B.S.R.V. Prasad**, P. D. N. Srinivasu, P. Sarada Varma, A. V. Raman, and Santanu Ray, 2014, Dynamics of Dissolved Oxygen in Relation to Saturation and Health

of an Aquatic Body: A Case for Chilka Lagoon, India. Journal of Ecosystems, Vol. 2014, Article ID 526245, 17 pages. doi:10.1155/2014/526245

2014b S. Srinivas, P.B.A. Reddy, **B.S.R.V. Prasad**, 2014, Effects of Chemical Reaction and Thermal Radiation on MHD Flow over an Inclined Permeable Stretching Surface with Non-uniform Heat Source/Sink: An Application to the Dynamics of Blood Flow. Journal of Mechanics in Medicine and Biology, Vol. 14(5) doi:10.1142/S0219519414500675

2015 S. Srinivas, P.B.A. Reddy, **B.S.R.V. Prasad**, 2015, Non-Darcian unsteady flow of a micropolar fluid over a porous stretching sheet with thermal radiation and chemical reaction. Heat Transfer-Asian Research, Vol. 44(2), pp. 172-187. doi:10.1002/htj.21090

2016 M.S. Bhuvaneswari, **B.S.R.V. Prasad**, 2016, Biological pest control by using a competitive species and with provision of additional food. International Journal of Pure and Applied Mathematics, Vol. 109(2), pp. 295-309. doi:10.12732/ijpam.v109i2.10

2018 K. Durga Prasad, **B.S.R.V. Prasad**, 2018. Biological pest control using cannibalistic predators and with provision of additional food: A theoretical study. Theoretical Ecology, Vol. 11(2), pp. 191-211. doi:10.1007/s12080-017-0358-8

2019a K. Durga Prasad, **B.S.R.V. Prasad**, 2019. Qualitative analysis of additional food provided predator–prey system with anti-predator behaviour in prey. Nonlinear Dynamics, Vol. 96(3), pp. 1765-1793. doi: 10.1007/s11071-019-04883-0

2019b Seshadev Padhi, **B.S.R.V. Prasad**, Satyam Narayan Srivastava, Shasanka Dev Bhuyan, 2019. Monotone Iterative Method for Solutions of Fractional Differential Equations. Memoirs on Differential Equations and Mathematical Physics, Vol. 77, pp. 59-69.

2020a Seshadev Padhi, **B.S.R.V. Prasad**, 2020. Monotone Iterative Method for Solutions of a Cantilever Beam Equation with One Free End. Advances in Nonlinear Variational Inequalities, Vol. 23(2), pp. 15-22.

2020b M.S. Bhuvaneswari, **B.S.R.V. Prasad**, 2020. Dynamics of Generalist Predator-Prey System with Double Allee Effect and its Implications to Biological Control: A Theoretical Perspective. PanAmerican Mathematical Journal, Vol. 30(4), pp. 27-52.

2021a Seshadev Padhi, **B.S.R.V. Prasad**, Divya Mahendru, 2021. System of Riemann-Liouville fractional differential equations with nonlocal boundary conditions: Existence, uniqueness, and multiplicity of solutions. Mathematical Methods in the Applied Sciences, Vol. 44(10), pp. 8125-8149. doi: 10.1002/mma.5812

2021b Seshadev Padhi, **B.S.R.V. Prasad**, Divya Mahendru, 2021. Systems of Riemann-Liouville fractional differential equations with nonlocal boundary conditions—Existence, nonexistence, and multiplicity of solutions: Method of fixed point index. Mathematical Methods in the Applied Sciences, Vol. 44(10), pp. 8266-8285. doi: 10.1002/mma.5931

2022a M.S. Bhuvaneswari, **B.S.R.V. Prasad**, 2022. Additional food induced nonlinear interspecific competitive interactions between pests and its outcome on the biological control programs. Functional Differential Equations, Vol. 29(1-2), pp.

7-22. doi:10.26351/FDE/29/1-2/1

2022b K. Durga Prasad, **B.S.R.V. Prasad**, 2022. Dynamics of additional food provided predator–prey system with habitat fragmentation. International Journal of Biomathematics (Online Read). doi:10.1142/S1793524522500942

Book Chapters

2018 **B.S.R.V. Prasad**, P.D.N. Srinivasu, A.V. Raman, C. Kalavati, M. Rakesh, P. Sarada Varma, 2018. Integrated approach for modelling coastal lagoons: A case for Chilka Lake, India. Handbook of Statistics, Eds. Arni S.R. Srinivasa Rao, C.R. Rao, Vol. 39, pp. 343-402. doi:10.1016/bs.host.2018.06.005

Books Edited

B. Rushi Kumar, R. Sivaraj, **B.S.R.V. Prasad**, M. Nalliah, A. Subramanyam Reddy (Editors), 2019. Applied Mathematics and Scientific Computing: International Conference on Advances in Mathematics Sciences, Vellore, India, December 2107, Vol. II. Trends in Mathematics Series. Birkhäuser, Springer Nature, Switzerland. doi:10.1007/978-3-030–1123-9

Computing Skills

Programming Languages

C, C++, Basic Java, MATLAB, Octave, GNUPLOT, Sage, R, Julia, Python

Applications

LaTeX, LyX, Common Windows database, Spreadsheet, and Presentation Software

Operating Systems

Unix/Linux, Windows

Membership

Member **Society for Mathematical Biology** https://www.smb.org
Member **Society for Industrial and Applied Mathematics** https://siam.org
Member **European Society for Mathematical and Theoretical Biology** https://www.esmtb.org
Member **Ecological Society of America** https://www.esa.org
Life Member **Indian Society Of Theoretical and Applied Mechanics** https://istam.iitkgp.ac.in

Personal Data

Date of Birth	August 31, 1979
Nationality	Indian
Sex	Male
Marital Status	Un-Married

Permanent Residential Address

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References

Thesis Advisor

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