NATIONAL CONFERENCE REPORT

RECENT TRENDS IN MATHEMATICAL BIOLOGY THEORY, METHODS & APPLICATIONS

PARTIALLY SUPPORTED BY DST SERB, INDIA

20-22 JULY 2023

Department of Mathematics and Computer Science (DMACS),
Sri Sathya Sai Institute of Higher Learning (SSSIHL)

REPORT

Purpose

The Sri Sathya Sai Institute of Higher Learning (SSSIHL) witnessed a **National Conference on recent trends in mathematical biology theory, methods and applications (partially supported by DST SERB, India).** The purpose of the conference was a dynamic platform for scientists, researchers, academicians, and students from diverse disciplines to converge and exchange cutting-edge insights, advancements, and applications in the rapidly evolving field of mathematical biology. This conference aims to foster collaboration, disseminate innovative theoretical frameworks and methodological approaches, and show case ground-breaking applications, thereby promoting the integration of mathematical modeling and biological sciences to address contemporary challenges in healthcare, environmental sustainability, and biological systems understanding.

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Day 1 – 20 July 2023

The three-day **National Conference on recent trends in mathematical biology theory, methods and applications (partially supported by DST SERB, India)** commenced on 20th July 2023, with an Invocatory Vedam rendition by the student members of Sri Sathya Sai Institute of Higher Learning. It was followed by the lighting of the ceremonial lamp by Prof B Raghavendra Prasad (Vice Chancellor, Sri Sathya Sai Institute of Higher Learning), Prof B Sai Giridhar (Registrar, Sri Sathya Sai Institute of Higher Learning), Mr Sanjay Sahni (Controller of Examinations, Sri Sathya Sai Institute of Higher Learning), Dr Pallav Kumar Baruah (Dean of Sciences, Sri Sathya Sai Institute of Higher Learning), Dr Raghunatha Sarma (Director, Prashanti Nilayam campus, Sri Sathya Sai Institute of Higher Learning), Dr Ms Lakshmi Naidu (HOD, Department of Mathematics and Computer Science (DMACS), Sri Sathya Sai Institute of Higher Learning), Dr. D. K. K. Vamsi (Convenor of the Conference) and various other dignitaries who attended the conference physically.

Dr. D K K Vamsi, Associate Professor, DMACS, SSSIHL, presented the introductory remarks in which he emphasized on the purpose of research and the view that the founder chancellor Bhagawan Sri Sathya Sai Baba had about research – research must be of practical use and must promote well-being. He spoke about the words of founder chancellor that focus is on research of energy environment and health and stated that scientific knowledge acquired should be used for benefit of the society. He also salient features of SSSIHL such as the student teacher ratio, works of the accomplished alumni etc. Areas of work in the fields include DL, ML, micro local analysis and mathematical biology in DMACS. His talk also highlighted the series of workshops and history of conferences in Mathematical Biology in SSSIHL, which included number of publications in areas of ecology and epidemiology. He also covered some interesting places in Prashanti Nilayam, various institution buildings and features of SSSIHL along with sightseeing tourist places in and around the institution premises.

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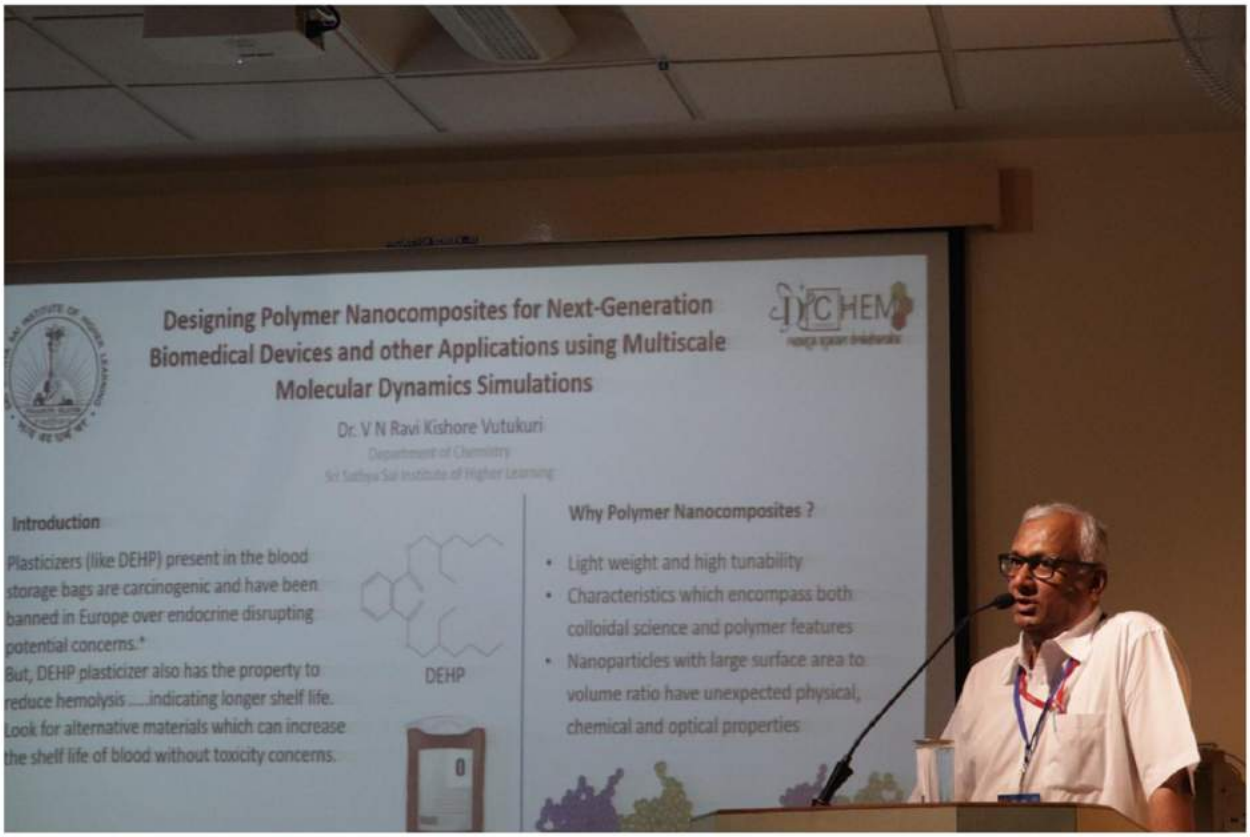

Prof. Pallav Kumar Baruah, Dean of Sciences, SSSIHL gave the welcome address. He started with achievements in departments of chemistry, Biosciences, physics that included disease biology of Huntington, glaucoma, anti microbial biology - resistance of bacteria, waste water treatment, bio remediation, structural biology, molecular dynamics simulation in biomedical devices - working on doubling the life of blood in blood banks. In the Food and Nutrition sciences department, areas of work included, food product development, food safety assessment, Fluorescence Imaging - TB disease, Micronutrients, Nuclear medicine imaging - importance of Gamma camera, Biomaterial, to name a few. He also elaborated on the importance of Holistic personality in the system of education offered in SSSIHL through the system of Modern Gurukula as well as scientific exploits in various departments across the institution. His talk also covered the aspects of Sri Sathya Sai values based integral education model wherein character development is through self-reliance departments, sports activities and how both academics and extra-curricular activities are integral pillars that benefit the society.

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Prof. B Raghavendra Prasad, Honourable Vice Chancellor, Sri Sathya Sai Institute of Higher Learning, in his inaugural address facilitated his insights on the varied areas of research in the field of Mathematical Biology and stressed on its importance for doctors and medical workforce across the nation. He shared insights on the Indian contribution to Mathematics by quoting the famous Vedanga jyotish. He also exclaimed through the words of Galileo, who said "The book of nature is written in mathematics", that mathematics is the greatest gift to the humanity. He also spoke about integration of mathematics and biology, which is the centrality of our existence. He also highlighted some salient features of SSSIHL such as youngest faculty that work towards centre for excellence for inter disciplinary research. He concluded with an emphasis on having a course based on Mathematical Biology in the curriculum of UG and PG students.

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Prof. Arni S R Srinivasa Rao, a Professor and Director of Laboratory for Theory and Mathematical Modelling, Medical College of Georgia, USA gave a Plenary talk titled **Mathematical Modelling as a National Health Planning Tool in India** in which he mentioned that mathematical modelling has been an invaluable tool in health and disease planning and policy formulations. During the talk, he summarized various works done interspersed with personal anecdotes from his life wherein he was actively involved in building models that collaborated with policy, experts, doctors of international repute and public health experts in India and off shores as well. His talk also highlighted how the professionals whom he was associated had assisted in National Healthcare planning.

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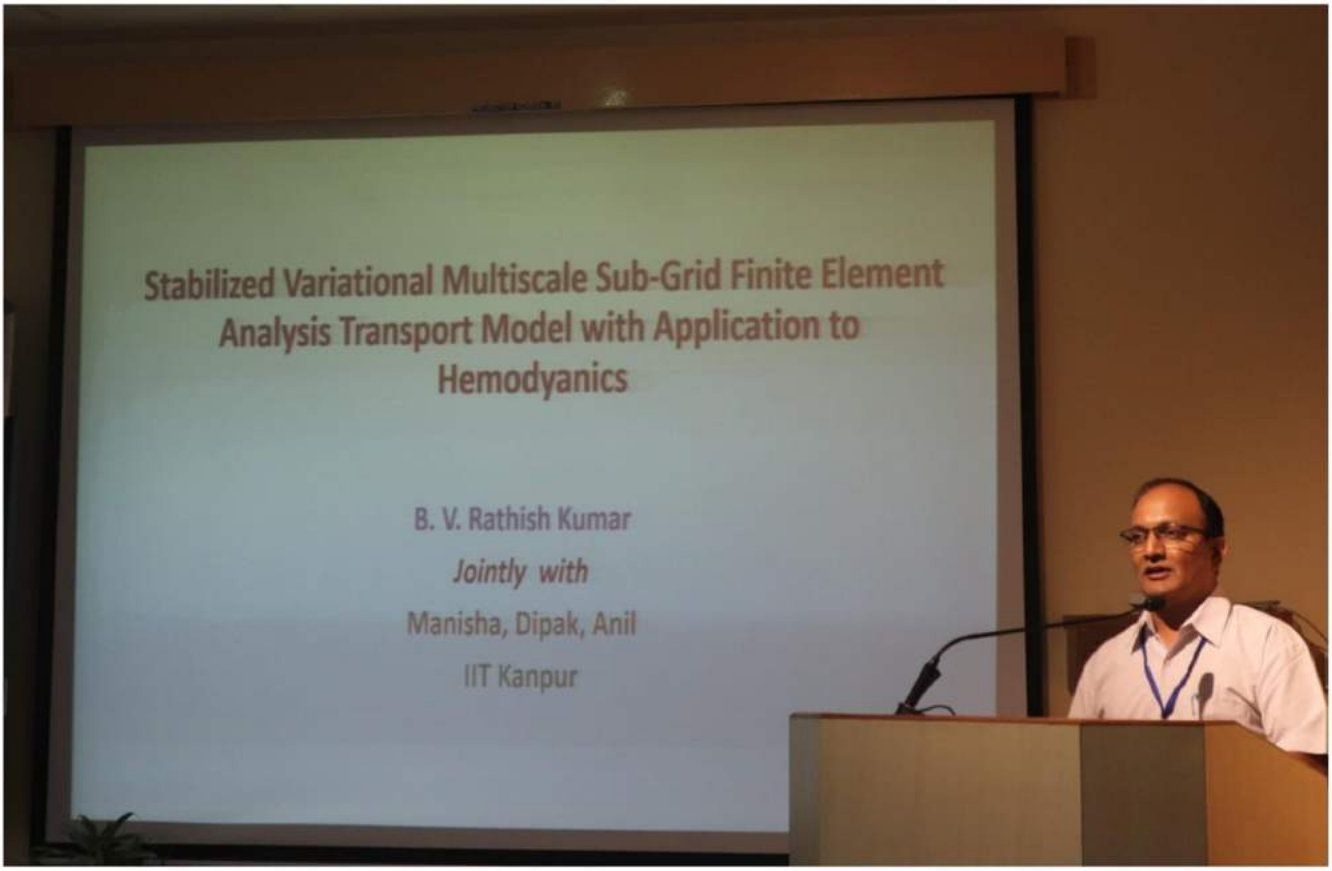

Following the plenary address was, the keynote address given by **Prof.B V Ratish Kumar**, Department of Mathematics and Statistics, IIT Kanpur, on the topic **Stabilized Variational Multiscale Sub-Grid Finite Element Analysis Transport Model with Application in Hemodynamics**. During the commencement of the talk, he introduced the various concepts of variational multi-scale sub-grid finite element analysis for fluid-flows problem. He also introduced the notion of apriori and aposteriori error analysis for finite element method in the context of transport models. Following which he carried forward these concepts to the Darcy-Stokes Model and then to the notion of stabilized variational multi-scale sub-grid finite element method for transport equations, which was especially helpful to handle convection dominated fluid flows and extended the same to the unified Brinkman-Stokes/Transport Model. Results from the numerical test cases were also mentioned. Application of the method for computing blood flow in complex arterial geometries was presented.

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Dr. Prashant Kumar Srivastava, an Associate Professor and Head at present in the Department of Mathematics, IIT Patna and he spoke on the topic "**Bifurcation Analysis of a Predator-prey Model with Allee Effect and Fear Effect in Prey and Hunting Cooperation in Predator**". He conducted a study in which the investigated predator-prey model with fear and Allee effects in prey, as well as hunting cooperation in predators. He established the well posedness of the system and analyzed the existence and stability of equilibrium points under weak and strong Allee effects. Various bifurcations were observed, including saddle-nod, transactional, and HOPF bifurcations. Numerical simulations highlighted the crucial role of predator conversion rate in stability switching. Fear had both stabilizing and destabilizing effects depending on hunting cooperation and predator efficiency. The system exhibited persistence or bi-stability with the weak Allee effect and bi-stability and tri-stability with the strong Allee effect. Increasing hunting cooperation led to a decrease in prey destiny, while excessive cooperation could drive species to extinction. However, under the weak Allee effect, high hunting cooperation was sustainable if predator conversion exceeded mortality rate. Findings provide valuable insights for estimating species behavior and population management.

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Dr Ritesh Kumar Dubey, Department of Mathematics, SRMIST, Chennai, and spoke on the topic: **Entropy stable non-oscillatory fluxes: An optimized wedding of entropy conservative flux with non-oscillatory flux**. His work frames the problem of constructing non-oscillatory entropy stable fluxes as a least square optimization problem. A Flux Sign stability condition defined for a pair of entropy conservative flux and a non-oscillatory flux. This novel approach paves a way to construct non-oscillatory entropy stable flux as a simple combination of the entropy conservative flux and a non-oscillatory flux, which inherently optimizes the numerical diffusion in the entropy stable flux. This robust approach is agnostic to the choice of flux pair, does not require the computation of costly dissipation operator and high order reconstruction of scaled entropy variable TOC construct the diffusion term. Various non-oscillatory entropy stable fluxes was constructed, and exhaustive computational results for t-standard test problems were given, which show that these entropy stable schemes completely remove spurious oscillations in approximating the discontinuities compared to the non-oscillatory schemes using the underlying fluxes only. Moreover, these entropy stable schemes maintain the formal order of accuracy of the lower order flux in the pair.

REPORT

Dr. S R V Prasad Bhuvanagiri, Department of Mathematics, School of advanced sciences, VIT Vellore, spoke on the topic: **Benefits and Drawbacks of Polyphagy in Natural Enemies and Pests in the Context of Biological Control: A Theoretical**. Biological control is an eco-friendly strategy that uses natural enemies to suppress pests or weeds reducing the need for chemical products. Generalist predators, chosen for their broad diet, play a key role in controlling pest populations. However, their feeding behaviour includes consuming non-prey sources like pollen and plant tissue. Supplementary food can enhance the number and effectiveness of natural enemies, but its success depends on the quality and quantity provided. Factors such as competition, cannibalism, and anti-predator behaviour also influence biological control outcomes. In his presentation, the speaker reviewed theoretical and mathematical modelling of interactions between natural enemies and pests, considering the impact of supplementary food and other factors. The potential of mathematical modelling to improve biological control tactics for polyphagous pests would be explored.

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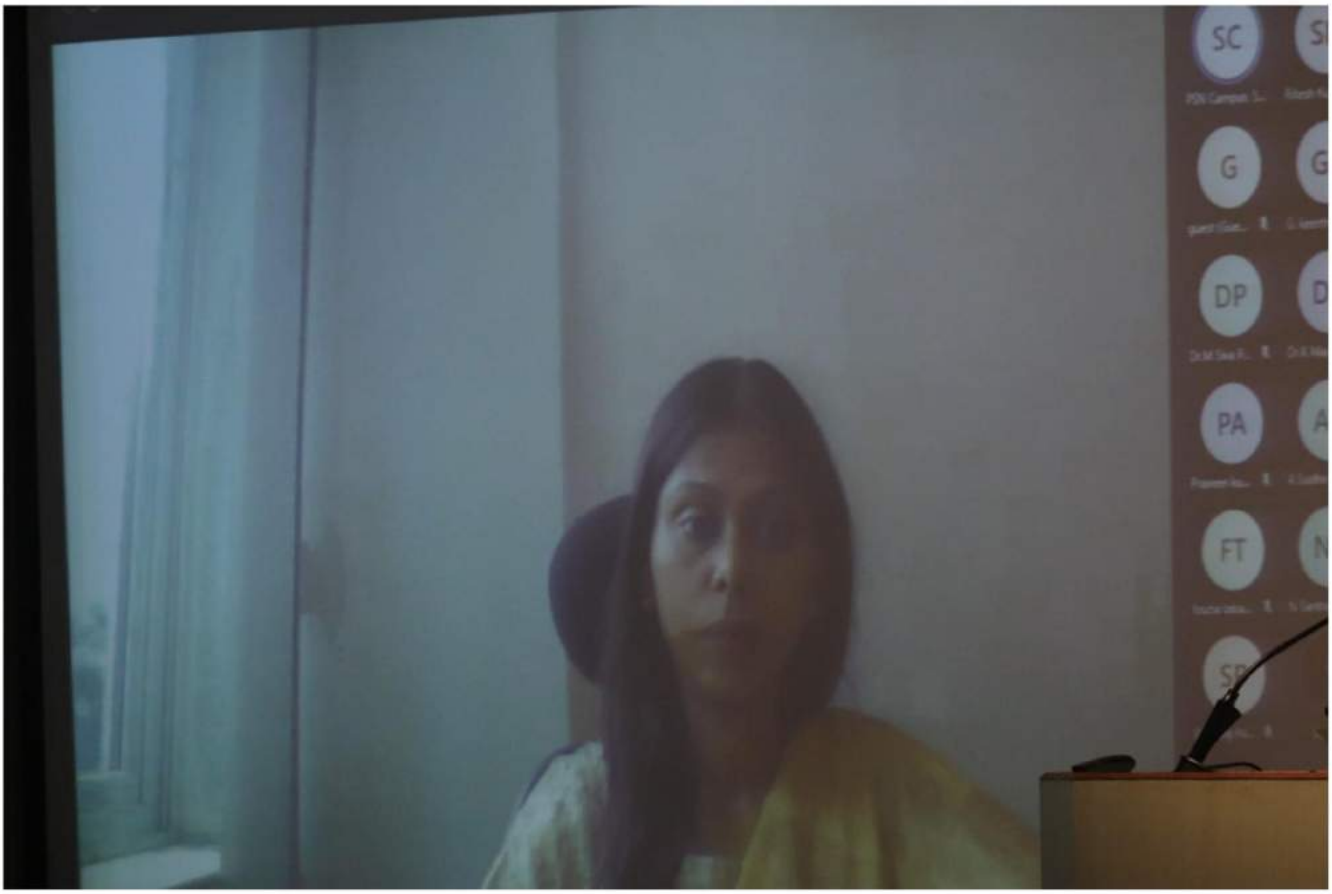

Dr. Nitu Kumari, an Associate Professor of Applied Mathematics at the Indian Institute of Technology Mandi in Himachal Pradesh, India. Dr. Nitu spoke on the topic '**Understanding Dynamics of COVID-19 in India using Data Driven Model**'. The talk was about effectively controlling the COVID-19 pandemic, understanding its spatial-temporal patterns of disease spread. In their study, utilization of CwDMD and DMD techniques on India's COVID-19 data was done to model these patterns. By decomposing the data into spatial-temporal modes, they extracted key insights into the complex dynamics driven by regional, demographic, and environmental factors. Their analysis revealed seasonal fluctuations, demographic trends, and localized outbreaks, providing valuable information for public health organizations to devise targeted strategies. The successful application of CwDMD and DMD methods in India opened up possibilities for their implementation in other countries, enabling the identification of unique drivers and the development of effective control strategies tailored to each region's needs.

Following which was a paper presentation session held for the participants who were willing to show case the work undertaken in their respective fields of expertise, which included the following presentations:

Presenter	Title of the topic
Ms. Debismita Nayak **BITS Pilani, Hyderabad Campus**	On Building Machine Learning Models for Medical Data Set with Correlated Features.
Mr. A. V. Paparao **JNTU-GV**	Prey-Predator Model Dynamics with Harvesting of Prey
Mr. S. Hariharan, **NIT Goa**	Optimal control and dynamic behaviour of SIQVR epidemic model
Mallanagoud Mulimani, **Bangalore University**	Numerical solution of time-fractional telegraph equations using wavelet transform
Sivajothi Ramalingam,	An Expert System with Neural

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Day 2 – 21 July 2023

The second day's proceedings resumed with an invited talk by **Dr. Jai Prakash Tripathi**, Department of Mathematics Central University of Rajasthan spoke on the topic: Population Interactive Models and Bio control. The work explored the dynamics of a cannibalistic predator-prey model using the theory of dynamical systems. The study focused on the impact of additional food resources and different harvesting schemes on pest control. Results indicated that providing additional food and implementing linear harvesting schemes were effective in reducing pest population density and achieving eradication. The research suggested threshold values for harvesting and optimal choices of additional food for successful biological control programs.

The second day proceedings then moved forward with an enlightening **Research Musings Session: Applicability of Mathematical Biology – the Road Less Traversed a Journey from Theory to Applicability** by **Dr. Krishna Kiran Vamsi Dasu**, Asst. Professor, and **Mr Bhanu Prakash**, Doctoral Research Scholar, Dept. of Mathematics and Computer Science, SSSIHL.

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Dr. Vamsi spoke on the topic: **Quantitative correlations between crucial biomarkers and the optimal drug regimen of Type-I Lepra reaction**. He presented an introduction on the Hansen's disease - Leprosy with the terminologies and the Pathogenesis of Leprosy. He then moved on to the mathematical modelling that included the crucial biomarkers and Multi Drug control interventions. He later presented the validation of model through disease characteristics using 2D heat plots followed by optimal control studies WRT multi Drug Therapy and crucial biomarkers. He also spoke about the numerical simulations for susceptible cells, infected cells, bacterial load and crucial biomarkers during lepra reactions. He concluded his talk with these findings and mentioned the possible future works in the field.

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Mr. Bhanu Prakash D, Doctoral Research Scholars, DMACS, SSSIHL gave a talk on **Deterministic and Stochastic Studies on Additional Food provided Prey-Predator Models involving Holling type III and Holling type IV Functional Responses.** The provision of additional food supplements for the purpose of biological conservation has been widely researched both theoretically and experimentally. The study of these bio systems usually using predator-prey models was done. He explained two additional food-provided predator-prey systems exhibiting Holling type-III and Holling type-IV functional responses, respectively. These models were analysed in the control parameter space using the control parameters, quality, and quantity of additional food. The findings suggested that with the appropriate choice of additional food for predators, the bio system could be controlled and steered to a desirable state. It was also possible to eliminate either of the interacting species. He also modified these models by perturbing a couple of parameters with noise. These stochastic models were also analysed in the control parameter space using both control parameters. The vital role of the quality and quantity of the additional food in the system dynamics cautioned the eco-manager on the choice of the additional food for realizing the goal in the biological conservation program.

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The next talk was by **Dr. N Uday Kiran**, Associate Professor in the Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning. **The talk aimed to acquaint the participants with the Department of Mathematics and Computer Science (DMACS).** During the talk, Dr Uday Kiran gave an overview of diverse research interests of the department, which include AI, ML, DL, disease modelling, high-performance computing, computer vision, information security, risk management. He then spoke about the genesis of the department and how the founder chancellor Bhagawan Sri Sathya Sai Baba took a special interest in the department. He then covered various aspects of the department including teaching methodology, extension activities in the villages, the achievements of the faculty and alumni, various collaborators, adjunct professors and MoU's signed by the department with various organisations such as Grey Scientific Labs, CodeTantra, Yousee.com, Maestro, to drive the research goals.

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Dr. Bapan Ghosh is an Assistant professor at IIT Indore. He spoke and presented on the topic, "**Bifurcations, triple and quadruple attractors and organized periodic structures in a discrete-time predator -prey system**". The presented paper investigates a discrete-time system derived from the continuous-time Rosenzweig-MacArthur (RM) model and revealed complex phenomena like periodicity, period doubling, period bubbling and chaos by varying carrying capacity and harvesting efforts. The analysis showed that the prey species carrying capacity could stabilize or destabilize the system through flip and Neimark-Sacker bifurcations, in contrast to the continuous -time RM model. In the paper, multi-stabilities were observed which included bi-stable, tri-stable and quadruple attractors. Ecological implications of prey species enrichments on predator abundance were explored. Bi-parameter space analysis of prey and predator harvesting efforts uncovered organized periodic structures with period-adding, frequency locking, Arnold tongues and shrimp like structures. At the end, discussions on ecological interpretations of predator harvesting, such as mean densities and paradoxical hydra effect etc, were done.

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The post lunch session of Day-2 started off with invited talk by **Dr. P. Muthu,** Department of Mathematics NIT Warangal, titled: **Stability of a within-host model of dengue virus transmission**. In this talk, the presenter discussed the stability of a within-host model of dengue virus transmission. The basic reproduction number (BRN) had been introduced using the next generation matrix method. The two equilibrium states, namely, the virus-free equilibrium state and the endemic equilibrium state, were analysed in terms of their local stability using the method of linearization. The Lyapunov's direct method was used to check the global stability of the equilibrium states of the system. To illustrate the behaviour of the system, numerical simulations were performed, and graphs were explained. Furthermore, to see the effect of various parameters on the system, the sensitivity analysis was done. It was found that the virus-free equilibrium was globally asymptotically stable if BRN $\leq$ 1, and the endemic equilibrium was globally asymptotically stable if BRN > 1.

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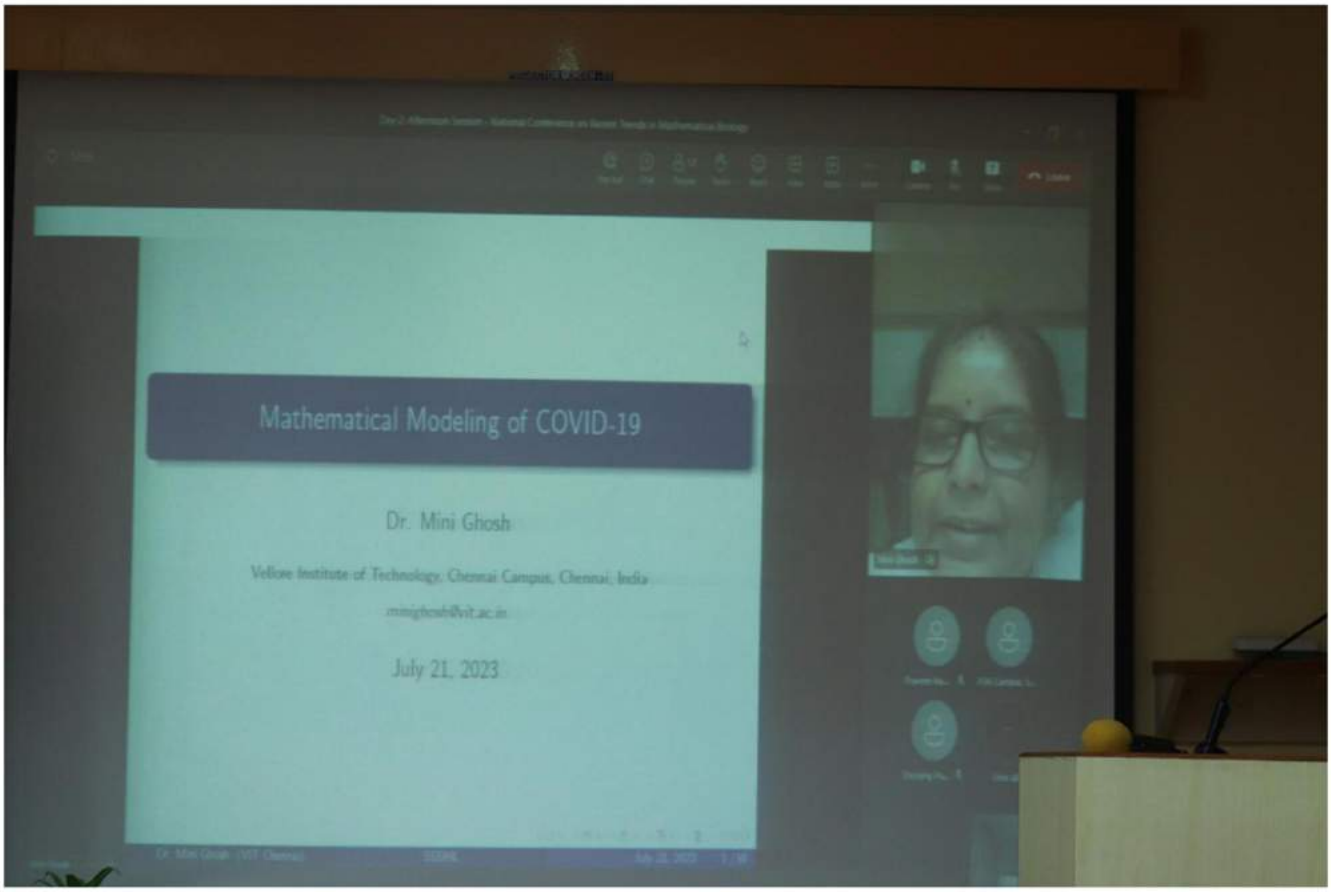

Prof. Mini Ghosh, Department of Mathematics, Professor at the School of Advanced Sciences at the Vellore Institute of Technology, Chennai Campus, India spoke on the topic – **Mathematical Modeling of COVID-19**. She started by briefly introducing the mathematical modeling of infectious diseases and then presented some of the important and critical issues in modeling and analysis. Then, she reported some of the recent research results in the area of mathematical modeling of COVID-19. She concluded her talk by focusing on the emerging and current trends in modeling the transmission dynamics of COVID-19 in the world.

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Prof. Sandip Banerjee, Department of Mathematics, IIT Roorke, spoke to us on the topic: **Mathematical modelling of Hepatitis C**. In this talk, after introducing the virus and its effects on the human body, he also spoke about the treatments namely Interferon alpha and Ribavirin. He also talked about how the immune system fights with the Hepatitis virus. He elaborated on the mathematical modelling of mechanism of how immune system fights with the virus. His talk included Linear Stability Analysis, Critical Drug Efficacy, Interferon Mono-therapy, Interferon in conjunction with Ribavirin, phases of Viral kinetics after therapy cessation, Triphasic decline in viral load etc. He concluded with the results that included dynamics of Hepatitis C virus in patients, shoulder phases, triphasic responses and various significant metrics.

Next, there was paper presentation session that was conducted,

Presenter	Title of the topic
Mr. Tamizhazhagan S **NIT, Tiruchirappalli**	Mathematical Modelling of Intracellular transport process with a finite pool
Mr. Kumbinarasaiah S **Bangalore University**	Numerical Approximation of Fractional SEIR Epidemic model of measles and smoking model by using Fibonacci wavelets operational matrix approach
Ms. Priyanka N C **NIT, Tiruchirappalli**	Mathematical Modelling of three lane\ transport systems through the exclusion process
Mr. Viney Kumar, **Shiv Nadar Institution of Eminence**	Multiplex Network Modelling of the Nonlinear Impact of Public Opinion on Vaccine choice during a Pandemic
Mr. Manohara G	Numerical Approximation of the Pine Wilt Disease

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Bangalore University	model via Taylor Wavelet collocation method
Mr. KondalaRao. K VidyaJyothi Institute of Technology, Hyderabad	Local Stability of Syn-Ecological Model with Ammensal and Neural relationship of Species of 1st,2nd and 3rd kind
Mr. Gadde Sambasiva Rao Koneru Lakshmaiah Education Foundation, Vaddeswaram, AP	Application of Soft Set in Boolean Near Rings

Day 3 – 22 July, 2023

Dr. Mohit Kumar Jolly, from Centre for Bio Systems Science and Engineering(BSSE), IISc Bangalore spoke on the topic: **Mathematical modelling to understand cancer cell adaption during metastasis and therapy resistance**. Focus of the talk was around Cancer metastasis - the spread of cancer cells from one organ to another and its therapy resistance. The talk had discussed about how mathematical models, in close integration with experimental and clinical data, can be used to better understand the dynamics of phenotypic plasticity, and suggested novel therapeutic interventions to possibly overcome the clinical challenges.

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The next speaker, **Mr. Sathya Sai Mudigonda**, an integral member of DMACS, SSSIHL gave a talk on the topic - **"The Science of Aging: Actuarial Perspectives on Longevity and Health"**. His talk's abstract examined how actuarial science is applied to the study of aging. It focussed on the use of mathematical models to predict lifespan, health outcomes and factors that influence the aging process. The talk showed how actuaries, with their expertise in assessing risk and uncertainty, play a significant role in this field by quantifying the probability of health events and providing insights for decision-making regarding aging and longevity. The abstract discussed important concepts such as morality tables, survival curves and life expectancy calculations, which are used to evaluate lifestyle choices, genetic factors and promote healthy aging. The talk also demonstrated how actuarial models also assess interventions aimed at promoting healthy aging. The result was that the interdisciplinary collaboration among actuarial scientists, biologists and epidemiologists enriched our understanding of aging, leading to evidence-based decision-making for improved health and longer lives.

Before the conclusion of the National Conference, the Best Research Paper awards were given. The jury for this awards consisted of **Dr. P Muthu (NIT Warangal), Dr. B S R V Prasad (VIT Vellore) and Dr. BVK Bhardwaj** (SSSIHL). The selection was based on the problem relevance in the current world scenario, delivery efficiency of the person, clarity of thoughts on their topic, presentation skills and overall audience appeal. The following were the winners of this competition:

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Participant Name	Place awarded	Institute
Mr Ritwik Chandra Pandey	1st place	Sri Sathya Sai Institute of Higher Learning
Mr Viney Kumar	2nd place	Shiv Nadar Institution of Eminence
Ms. Priyanka N C	3rd place	NIT, Tiruchirappalli

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The three-day conference ended with valedictory and vote of thanks following which was a feedback session.

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Other data

Many eminent scholars across various states in **India** attended the 3-day long National Conference on "*Recent Trends in Mathematical Biology - Theory, Methods and Applications*"

The conference witnessed participants from the following institutions:

ALAGAPPA UNIVERSITY
ALIGARH MUSLIM UNIVERSITY
AMET UNIVERSITY(DEEMED TO BE UNIVERSITY)
AMITY UNIVERSITY MADHYA PRADESH, GWALIOR, M.P., INDIA
ANURAG UNIVERSITY
ARNI UNIVERSITY
ARYAN INSTITUTE OF ENGINEERING AND TECHNOLOGY, BHUBANESWAR
AVINASHILINGAM UNIVERSITY
BABA MASTNATH UNIVERSITY, ASTHAL BOHAR,ROHTAK
BAJAJ COLLEGE OF SCIENCE WARDHA
BANARAS HINDU UNIVERSITY VARANASI
BANGALORE UNIVERSITY
BANKI AUTONOMOUS COLLEGE, CUTTACK, ODISHA, INDIA
BITS-PILANI HYDERABAD CAMPUS
CBLU
CCSHAU, HISAR
CENTRAL UNIVERSITY OF RAJASTHAN
CENTRAL UNIVERSITY OF RAJASTHAN
CHAUDHARI CHARAN SINGH HARYANA AGRICULTURAL UNIVERSITY
CHAUDHARY BANSI LAL UNIVERSITY, BHIWANI
CHAUDHARY CHARAN SINGH HARYANA AGRICULTURAL UNIVERSITY HISAR HISAR
CHAUDHARY CHARAN SINGH HARYANA AGRICULTURAL UNIVERSITY, HISAR, HARYANA
CHRIST UNIVERSITY
CLEMSON UNIVERSITY
CMR UNIVERSITY
DEEN DAYAL UPADHYAY GORAKHPUR UNIVERSITY
DEFENCE INSTITUTE OF ADVANCED TECHNOLOGY(DEEMED TO BE UNIVERSITY)
DELHI UNIVERSITY (SRI GURU TEGH BHADUR KHALSA COLLEGE)
DEPARTMENT OF MATHEMATICS, MILLAT COLLEGE, A CONSTITUENT UNIT OF L. N. MITHILA UNIVERSITY, DARBHANGA, BIHAR
DEPARTMENT OF MATHEMATICS, PSG COLLEGE OF ARTS & SCIENCE, COIMBATORE-641014.
DHANAURI P.G. COLLEGE, DHANAURI, HARIDWAR, UTTARAKHAND, INDIA
DOTE/MUTHAYAMMAL POLYTECHNIC INSTITUTION
ELIZADE UNIVERSITY, ONDO STATE, NIGERIA
FACULTY OF EDUCATION, BANARAS HINDU UNIVERSITY, VARANASI
GAUHATI UNIVERSITY
GITAM DEEMED TO BE UNIVERSITY BANGALORE
GNDU/ PCM S. D. COLLEGE FOR WOMEN.
GOVERNMENT HOLKAR (MODEL,AUTONOMOUS) SCIENCE COLLEGE, INDORE, MADHYAPRADESH
GOVT NEHRU PG COLLEGE DEORI SAGAR MP
GULBARGA UNIVERSITY KALABURAGI
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IIT INDORE
IIT MADRAS
IIT ROORKEE
INDIAN INSTITUTE OF INFORMATION TECHNOLOGY DHARWAD
INDIAN INSTITUTE OF SCIENCE
INDIAN INSTITUTE OF TECHNOLOGY (BHU), VARANASI
INDIAN INSTITUTE OF TECHNOLOGY ROPAR
J.N.T.U. HYDERABAD
JAWAHARLAL NEHRU UNIVERSITY, NEW DELHI
JNTUGV COLLEGE OF ENGINEERING VIZIANAGARAM
JNTUH UNIVERSITY COLLEGE OF ENGINEERING MANTHANI
K R T ARTS, B H COMMERCE AND A M SCIENCE COLLEGE NASHIK
KALYANI MAHAVIDYALAYA
KARNATAKA STATE OPEN UNIVERSITY, MYSURU
KG COLLEGE OF ARTS AND SCIENCES
KINGSTON EDUCATIONAL INSTITUTION
KONERU LAKSHMAIAH EDUCATION FOUNDATION
LOVELY PROFESSIONAL UNIVERSITY
M.E.S MAMPAD COLLEGE
MADRAS UNIVERSITY/ ST. JOSEPH'S COLLEGE (ARTS & SCIENCE)
MAGADH UNIVERSITY BODH GAYA BIHAR
MAHARANI'S SCIENCE COLLEGE, UNIVERSITY OF MYSORE
MALANKARA CATHOLIC COLLEGE, MARIAGIRI, KALIAKKAVILAI
MALAVIYA NATIONAL INSTITUTE OF TECHNOLOGY JAIPUR
MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY
MAULANA MUKHTAR AHMAD NADVI TECHNICAL CAMPUS, MANSOORA CAMPUS, MALEGAON-423203, DISTRICT NASHIK, MAHARASHTRA (INDIA)
MOUNT CARMEL COLLEGE
MUTHAYAMMAL COLLEGE OF ARTS AND SCIENCE(AUTONOMOUS)
NATIONAL INSTITUTE OF TECHNOLOGY GOA
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI
NATIONAL INSTITUTE OF TECHONOLOGY, RAIPUR
NIT ROURKELA, ODISHA
NIT WARANGAL
NIT, TRICHY
ODISHA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY
OSMANIA
PANJAB UNIVERSITY, UIET (PUSSGRC) HOSHIARPUR
PATRICIAN COLLEGE OF ARTS AND SCIENCE
PERIYAR MANIYAMMAI INSTITUTE OF SCIENCE AND TECHNOLOGY DEEMED TO UNIVERSITY THANJAVUR
PRESIDENCY UNIVERSITY BANGALORE
PRIYADARSHINI COLLEGE OF ENGINEERING AND TECHNOLOGY, NELLORE
PT. RAVISHANAKAR SHUKLA UNIVERSITY, RAIPUR, CHHATTISGARH, INDIA

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R L INSTITUTE OF MANAGEMENT STUDIES, (A UNIT OF SLCS) MADURAI, TAMIL NADU
RABINDRANATH TAGORE UNIVERSITY, RAISEN, BHOPAL, MADHYA PRADESH
RAGHU ENGINEERING COLLEGE
RAJIV GANDHI NATIONAL INSTITUTE OF YOUTH DEVELOPMENT, SRIPERUMBUDUR , TAMIL NADU
RAJKIYA ENGINEERING COLLEGE SONBHADRA
RAMAKRISHNA MISSION VIVEKANANDA CENTENARY COLLEGE, RAHARA
RAMANAND ARYA DAV COLLEGE, UNIVERSITY OF MUMBAI
RAMJAS COLLEGE, UNIVERSITY OF DELHI
RGUKT NUZVID
S A ENGINEERING COLLEGE
SAM GLOBAL UNIVERSITY, BHOPAL (M.P)
SANDA COLLEGE, DHENKANAL, ODISHA
SANSKRITHI SCHOOL OF ENGINEERING
SAVEETHA ENGINEERING COLLEGE
SHIV NADAR INSTITUTION OF EMINENCE
SILVER OAK UNIVERSITY
SKCG AUTONOMOUS COLLEGE, PARALAKHEMUNDI
SOUTH ASIAN UNIVERSITY
SREE SARASWATHI THYAGARAJA COLLEGE
SRI PADMAVATI MAHILA VISHVAVIDYALAYAM
SRI PADMAVATI MAHILA VISVAVIDYALAYAM
SRI SATHYA SAI INSTITUTE OF HIGHER LEARNING
SRIMAD ANDAVAN ARTS AND SCIENCE COLLEGE(A), TIRUCHIRAPPALLI
SRM INSTITUTE OF SCIENCE AND TECHNOLOGY, TIRUCHIRAPPALLI CAMPUS
ST. JOSEPH ARTS AND SCIENCE COLLEGE
ST. JOSEPH'S COLLEGE (ARTS & SCIENCE), KOVUR, CHENNAI
ST. JOHN'S COLLEGE, ANCHAL
ST. JOSEPH'S COLLEGE (ARTS & SCIENCE)
STUDY WORLD COLLEGE OF ENGINEERING
SVB FINANCIAL GROUP
SVCET
TELANGANA TRIBAL WELFARE DEGREE COLLEGE, MAHABUBABAD
THAPAR INSTITUTE OF ENGINEERING AND TECHNOLOGY PATIALA
THE LNM INSTITUTE OF INFORMATION TECHNOLOGY
THIRUVALLUVAR UNIVERSITY
UMAKANTA ACADEMY
UNIVERSITY OF ALLAHABAD
UNIVERSITY OF DELHI
UNIVERSITY OF IBADAN, NIGERIA.
V. P. COLLEGE VAIJAPUR
VASAVI COLLEGE OF ENGINEERING
VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY, BURLA, SAMBALPUR.
VELLORE INSTITUTE OF TECHNOLOGY, VELLORE
VIDYA JYOTHI INSTITUTE OF TECHNOLOGY,HYDERABAD

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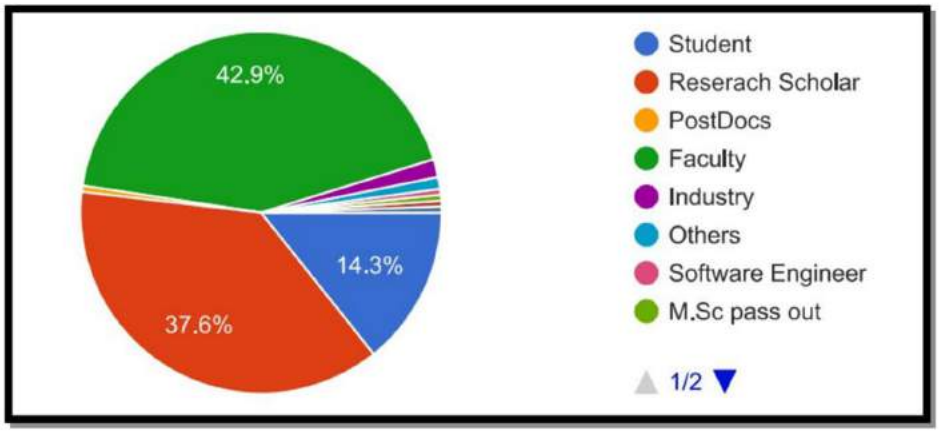
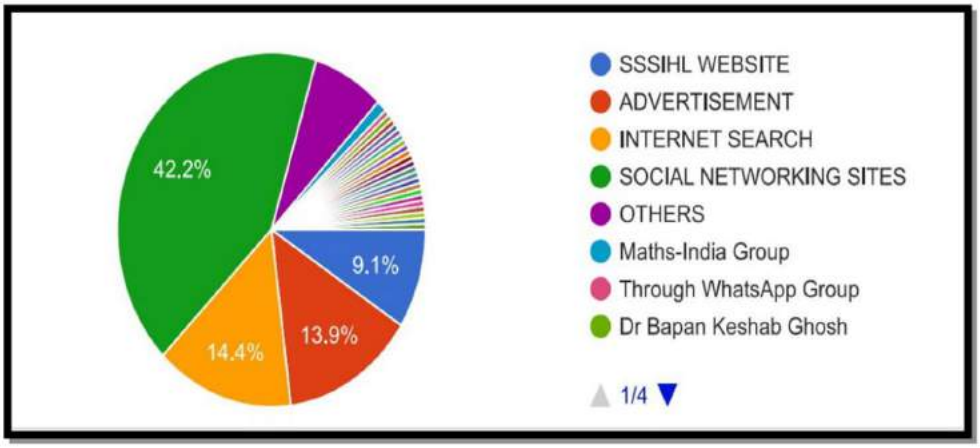
VIVEKANANDA GLOBAL UNIVERSITY JAIPUR

ZAKIR HUSAIN DELHI COLLEGE, UNIVERSITY OF DELHI



Occupation distribution of the participants



Source of information about conference to the participants

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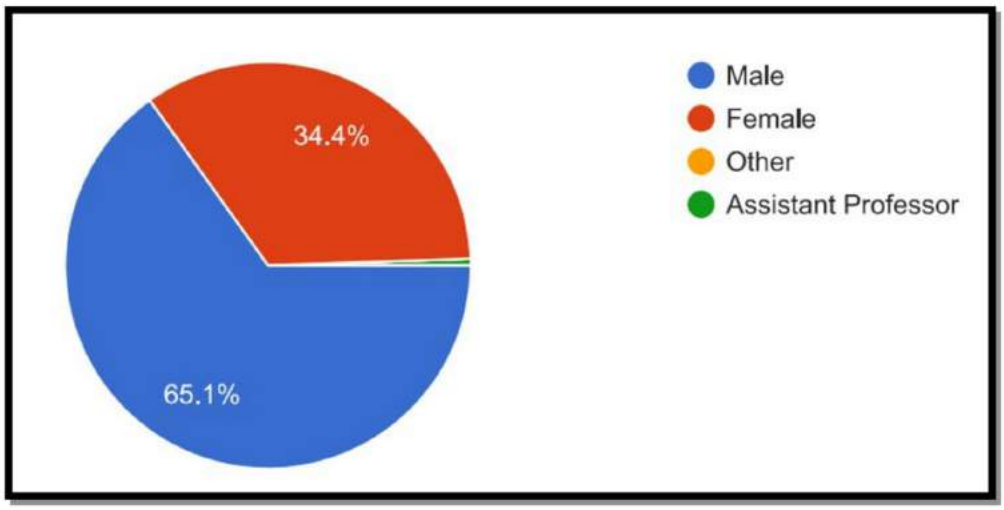

Gender distribution of participants

Feedback from the participants

1. *"Congratulations for organizing this national conference successfully with all dedication and huge efforts. Thank you so much for inviting me to deliver the talk in the Conference and to interact with different young minds and some of our dear friends. It has been wonderful experience for me especially via culture; way of living and learning that is practiced in SSSIHL. Whole the organization of the Conference was very well supportive, arranged and perfectly managed.*

   Two important points I would just suggest or rather emphasize here and maybe we can try next time in some other event.

   1. For very new researchers, we may have a sequence of 2 to 3 lectures on basic concepts that exactly help how to start research, do modeling and use dynamical systems results.

   2. At least one two sets of lectures by Industry experts and/or policy makers those use math bioresearch outcomes. However, at the same time exactly before these lectures the associated theoretical concepts in research could be covered via some lectures. Then it would be easy to catch how the theoretical outcomes get into real applications."

2. *"Aligning with motto of the Consortium, the series of events should follow. It is a small step, which may have a huge impact in the way of Math-Bio perceived in the country. After this first successful step, we need to march forward to achieve success for ourselves and for the group."*

3. *"Words will not be enough to describe the hospitality received throughout the conference, what a nice arrangement and fine accommodation too in such a peaceful holy place. Was very much interested to attend*

in person as I listened a lot about this place from my relative devotees but never visited but finally Baba's blessing did it possible. From very beginning since registration to the very end until I left room all were very cooperative. Another good thing I noticed the DMACS is full of highly talented faculties and in specific, my most liking is SSSIHL having good faculties with a world class research lab producing good scholars which is very much impressive about this institution. Thanks to students, staffs and all for organizing such an event in a nice way. Hope I will be a part of future events of DMACS."

4. *"This conference has helped me to learn so many things. I am also thankful to the speakers for the wonderful lectures. I would like to extend my sincerest appreciation for orchestrating such an extraordinary event centred on mathematical biology. As a participant, I had the invaluable chance to delve into the forefront of research and advancements within this fascinating field. Not only were the scientific sessions enlightening, but also the overall hospitality and organization were also truly commendable. Moreover, I am grateful for the opportunities provided to establish meaningful professional connections and foster potential collaborations during the conference. Such interactions have undoubtedly enriched my understanding and passion for mathematical biology. Once again, I express my heartfelt gratitude for making this event a resounding success."*

5. *"Dear Organizers,*

   I express my heartfelt gratitude for organizing such an exceptional event on mathematical biology. As an attendee, I had the opportunity to immerse myself in the latest research and developments within the field. Beyond the scientific sessions, the organization of the hospitality is also good. The conference facilitated new professional connections and collaborations. I look forward to attending future editions of this conference and continuing to contribute to the advancement of mathematical biology."

6. *"Big thanks to all the members of the organizing committee not only for all your smooth efforts at every step but also spread the knowledge among us and all research scholars. May Baba (SSS) gives their blessings to all of you to proceed further and organize such type of conference in future. It is my first visit to this and my colleague and I enjoyed a lot. It is very nice to see all the supporting staffs for their keen interest."*

7. *"Thank you for organizing such a wonderful conference on Mathematical Biology and wonderful sessions from eminent personalities and for Sri Satya Sai Baba Darshan. Also for the opportunity to participate in-person."*

8. *"I attended all the sessions in virtual mode. The uniqueness of this conference was, the speakers touch almost all the areas in Mathematical Biology. It's very useful for budding researchers."*

9. *"Thank you coordinators for organizing such a wonderful conference in mathematical biology. All the sessions were very useful for everyone. Also, appreciate the organizers for their excellent coordination. Accommodation and food was very good."*

10. *"Thank you coordinators for organizing such a wonderful event. All the sessions were excellent and very much useful especially for research scholars. Also appreciate the organizers for their excellent coordination."*

11. *"A wonderful event where each session is highly informative and we have seen a wonderful world class advanced research labs. Very nice accommodation and a great experience of Sri Satya Sai Darshan."*

12. *"Mathematical biology session was great. Just get enrolled in PhD program and wanted to work in the field of mathematical modelling in epidemiology. Had a Great experience listening these sessions"*

Summary

The National Conference on Recent Trends in Mathematical Biology: Theory, Methods, and Applications gathered scientists and researchers to share cutting-edge insights and applications in the field. The conference emphasized interdisciplinary collaboration and the integration of mathematical modeling with biological sciences to address real-world challenges in healthcare, environmental sustainability, and biological systems understanding. Attendees explored innovative theoretical frameworks and methodologies, fostering new research opportunities at the intersection of mathematics and biology.

In conclusion, the National Conference on Recent Trends in Mathematical Biology provided a valuable opportunity for attendees to expand their knowledge, network with peers, and contribute to the growth of this burgeoning field. By harnessing the power of mathematics and its applications in biology, this event has furthered our understanding of living systems and opened new horizons for addressing critical societal challenges.

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PHOTO GALLERY

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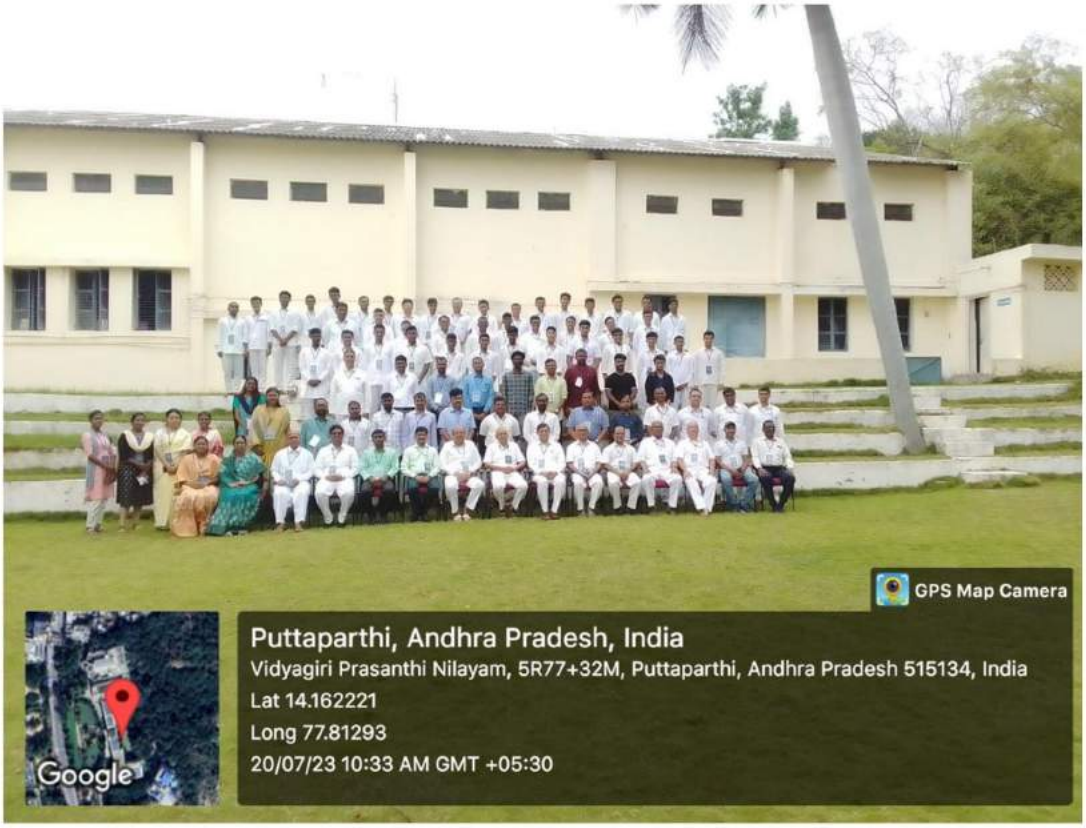
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Real life applications
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Benefits and Drawback of Polyphagy in Natural Enemies and Pests in the Context of Biological Control: A Theoretical Framework
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REPORT


Stability of a within-host model of dengue virus transmission
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REPORT


Mathematical modeling to understand cancer cell adaptation during metastasis and therapy resistance
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4. Phase-Type Aging Model (PTAM)
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