

**Report**  
**International Colloquium on Recent Trends in Mathematical Sciences**  
**(ICRTMS-2021)**  
**15-16 November, 2021**

The Department of Mathematics in collaboration with Internal Quality Assurance Cell, Mata Sundri College for Women (University of Delhi), organized a two day online “International Colloquium on Recent Trends in Mathematical Sciences” on November 15-16, 2021 via Zoom. The aim of the colloquium was to provide a knowledge exchange platform to researchers and academicians from across the globe for discussing ideas and recent developments in the various branches of Mathematical Sciences. The colloquium featured keynote address, plenary sessions and invited talks by distinguished speakers.

The colloquium commenced on November 15, 2021 at 4:30pm with the college prayer. Ms. Sonia Aneja, the program coordinator, brought to light the impact of mathematical sciences on improving societal welfare by providing solutions to problems faced by industries while also inculcating the habits of rational thought, promoting scientific temper and nurturing mathematical talent amongst young scholars. She invited Prof. Harpreet Kaur, Principal, Mata Sundri College for Women, to present the welcome address. Prof. Kaur welcomed the distinguished speakers and participants from India and abroad. She asserted that mathematics has been an integral part of Indian heritage and discussed its applications in the construction of ancient temples and town planning. She highlighted that the purpose of the colloquium is to bring forth the vitality of the discipline and its contribution to scientific and technological progress. Ms. Mandeep Walia, the teacher-in-charge, Department of Mathematics, thanked the principal and welcomed the speakers and the participants. The inaugural ceremony came to an end with the address by Dr. Lokesh Kumar Gupta, Convener, IQAC, who emphasized on the importance of organization of such academic events.

The keynote address was delivered by Prof. Sat Gupta, Professor and Head, Department of Mathematics and Statistics, University of North Carolina-Greensboro, USA. Prof. Gupta gave a talk on the topic “Statistical Consulting in the Real World” and discussed the tools that are required for it. He illustrated the opportunities offered by Statistical Consulting and highlighted some legal and ethical challenges when representing a client in a court case or in front of a regulatory agency with the real case studies such as the FDA’s protocol for milk testing and a lawsuit for age discrimination. Dr. Jagdish Chand Bansal, Associate Professor, South Asian University, New Delhi delivered the plenary talk entitled “Computational Intelligence” which is one of the most sought after research field currently. He introduced the basic concepts of computational intelligence and briefly explained Spider Monkey Optimization which is a fission fusion social structure based optimization algorithm. Several useful techniques such as particle swarm intelligence, artificial bee colony, swarm intelligence and nature inspired optimization techniques were also discussed. The invited talk was presented by Prof. Manish K. Gupta, Dhirubhai Ambani Institute of Information and Communication Technology, Gandhinagar, Gujarat on the topic “How to Store Elephants?”. Prof Gupta introduced the concept of a new emerging field of DNA based data storage. He explained the procedure of Synthetic Data Storage for storing big data. Several interesting applications such as DNA computing, DNA encoding, DNA decoding and Biomolecular Computing were also discussed.

The Day 2, November 16, 2021 of the International Colloquium began with the plenary talk by Prof. Andrey Vesnin, Department of Mathematics and Mechanics, Novosibirsk State University, Russia. In his talk entitled “Knotted Objects in 3-Dimensional Space: From Mathematical Theory to Applications” Prof. Vesnin introduced different categories of knots and presented various famous results as well as some open problems on the topic. Using intuitive and elementary approach, he discussed virtual knots and knotted graphs as generalizations of classical knots. Further, some modern applications related to knotting in proteins were also presented. The second plenary talk of the day was delivered by Dr. Prapanpong Pongsriiam, Department of Mathematics, Faculty of Science, Silpakorn University, Thailand on the topic “Some problems on Arithmetic Progressions and Palindromes”. Dr. Prapanpong briefly reviewed arithmetic progressions of primes and discussed about arithmetic progressions of reduced residues and of palindromes. Some unsolved problems in number theory were also presented.

The first invited talk on Day 2 focussed on the topic “Big Data, IOT and Cloud Computing Application in Real Life” and was delivered by Dr. Mansaf Alam, Associate Professor, Jamia Millia Islamia, New Delhi. Dr. Alam discussed the importance of Artificial Intelligence (AI) in helping the devices/machines to take decisions and the requirement of cloud computing due to the increase in the number of IOT devices and its users and a proportionate increase in the amount of data generated, transmitted and processed through these devices. He also talked briefly about machine learning and deep learning in relation to AI. The second invited talk was delivered by Dr. Stefano Innamorati, Associate Professor, University of L’quila, Italy on the topic “Combinatorial Characterization of Some Finite Algebraic Varieties”. Dr. Innamorati discussed the notion of finite geometries, linear codes with few weights, sets with finite intersections, projective spaces and combinatorial characterization etc. He discussed the work of Beniamino Segre in 1955, who provided a combinatorial characterizations of objects classically defined in algebraic way. He concluded his talk by briefing about his recent research as well as some open problems in the concerned field. The third invited talk entitled “Singular Perturbation Problems: An Overview” was delivered by Dr. Pratima Rai, Assistant Professor, Department of Mathematics, University of Delhi. She discussed Singular Perturbation Problems (SPPs) that arise in several branches of mathematics and engineering while modelling various physical phenomena. She further considered the difficulties in using standard numerical methods for SPPs and the techniques to sort the difficulties along with turning and non turning point problems. The colloquium concluded with the vote of thanks by the Convener, Dr. Rashmi Verma.

Spanning over two days, the colloquium provided an exposure to interesting applications of Mathematical Sciences. More than 150 participants attended the colloquium from India and abroad. The keynote address, plenary sessions and invited talks by distinguished speakers from across the globe on different emerging trends in various areas of Mathematical Sciences were very informative providing deeper insights of research topics and open problems and would definitely help in inculcating research interest among young minds. The colloquium concluded successfully .