

**DEPARTMENT OF MATHEMATICS, FACULTY OF MATHEMATICAL SCIENCES  
UNIVERSITY OF DELHI, DELHI**

**97<sup>th</sup> ANNUAL REPORT APRIL 01, 2019 -MARCH 31, 2020**

**Major Activities and Achievements**

The Department is supported by UGC-DSA I, DST-PURSE and DST-FIST grants and offers M.A./M.Sc. and M.Phil/Ph.D. programs in Mathematics. The Department is ranked 156 in Asia in the Times Higher Education Rankings 2019 and 10<sup>th</sup> in QS World University Ranking in India.

The faculty members have published around 45 research papers in journals of international repute during 2018-19. A co-edited book *Generalized Nash Equilibrium Problems, Bilevel Programming and MPEC* have also been published during this period. Department organised 33<sup>rd</sup> Annual Conference of the Rmanujan mathematical Society in June 2018. Department organised Pre Entrance Summer School in Mathematics in June 2018.

**Honours/Distinctions**

Ajay Kumar was part of selection committee at Indian Statistical Institute on June 13, 2019.

Ajay Kumar was part of selection committee in University of Kashmir on June 15, 2019.

Ajay Kumar participated as an Expert in DST INSPIRE fellowship Review meeting at the Pillai College of Engineering, Dr. K. M Vasudevan Pillai Campus, Sector -16, New Panvel, Navi Mumbai during August 2-3, 2019.

Ajay Kumar participated in SERB -Expert Committee meeting at IIT Madras.during August 9-10, 2019.

Ajay Kumar participated as an Expert in Selction Committee at Central University of Rajasthan on Dec.8,2019.

Ajay Kumar participated as an expert in selection committee as an expert at BHU on January 8, 2020.

C. S. Lalitha Chaired a panel discussion session on Challenges in Mathematics in Higher Education during a National Conference held at PGDAV College, University Delhi on November 9, 2019.

C. S. Lalitha chaired a special session on Mathematical Programming at 52<sup>nd</sup> Annual Convention of ORSI & International Conference, IIM Ahmedabad during December 15-18, 2019.

C. S Lalitha chaired the selection committee of Best Student Award at 52<sup>nd</sup> Annual Convention of ORSI & International Conference, IIM Ahmedabad during December 15-18, 2019.

C. S. Lalitha was a member of the selection committee for choosing ORSI Fellows of 2019.

C.S. Lalitha appointed as E. C. Nominee in the Managing committee of Rajiv Gandhi Hostel for P G Girls and Undergraduate Hostel for Girls in May 2019.

C. S. Lalitha attended WOS-A meeting of DST as an expert committee member in C-MET Pune during June 27-29, 2019.

C. S. Lalitha chaired the selection committee of Best student Award at 52<sup>nd</sup>Annual Convention of ORSI & International Conference, IIM Ahmedabad during December 15-18, 2019.

C.S. Lalitha served as a member of the selection committee for choosing ORSI Fellows of 2019.

Dinesh Singh attended a meeting of the Search Committee, as a nominee of the Government of Rajasthan, for selecting a panel of names for the position of Vice Chancellor of Rajasthan Technical University Kota on February 19, 2019 and April 22, 2019.

Dinesh Singh attended 45th Board of Governors meeting in IIIT-Delhi on June 6, 2019.

Dinesh Singh was Chief Guest and delivered Inaugural Lecture: at the International Conference on Gravitation Cosmology and Mathematical Physics on April 5, 2019.

Dinesh Singh attended meeting at Jaipur of the Search Committee for selection of Vice Chancellor, Rajasthan Technical University, Kota on April 22, 2019.

Dinesh Singh was Chief Guest at Inaugural Function of National Faculty Development Programme, South Campus, University of Delhi on April 30, 2019.

Dinesh Singh attended meeting of Search Committee Attended meeting at Jaipur of the Search Committee for Selection of Vice Chancellor, Rajasthan Technical University, Kota on May 4, 2019.

Dinesh Singh was the Chief Guest at Annual Convocation 2019 IILM Institute of Higher Education 3, Lodhi Road, New Delhi on May 8, 2019.

Dinesh Singh inaugurated as Chief Guest the Conference on Algebra, Analysis and Applications at Ambedkar University, Kashmiri Gate, Delhi on 10 May 2019.

Dinesh Singh was the Chief Guest and delivered Public Lecture "Meaning of Education", organised By K. R. Mangalam University, Multi Purpose Hall, India International Centre, Max Muller Marg, New Delhi on May 11, 2019.

Dinesh Singh presided as Chancellor over Academic Program Committee of K. R. Mangalam University, Gurugaoon on June 12, 2019.

Dinesh Singh chaired the Steering Board Meeting of the Indo-French Centre for Applied Mathematics at Indian Institute of Science Bengaluru on July 2, 2019.

Dinesh Singh attended meeting and lunch with former Prime Minister of Bhutan Honorable Tshering Tobgay and ambassador of Bhutan Mr. Vetsop Namgyel at Gymkhana Club on July 6, 2019.

Dinesh Singh delivered keynote lecture on "India as Knowledge Society: Lessons from the Past" at International Conference on Forms of Knowledge and Intellectual Traditions in South Asia, organized by Nehru Memorial Museum and Library on July 10, 2019.

Dinesh Singh was Chief Guest at Induction Ceremony & lecture to student's growing an eminent personality and give them life at Laxmi Bai College on July 22, 2019.

Dinesh Singh presided as Chancellor over Academic Program Committee of K.R. Mangalam University, Gurgaon, Haryana on July 27, 2019.

Dinesh Singh was Chief Guest at scholar batch ceremony at K.R. Mangalam World School, gurgaon, Haryana on July 29, 2019.

Dinesh Singh was the Chief Guest and addressed freshman students at Delhi Technological University on August 2, 2019.

Dinesh Singh presided over the Board of Governors Meeting of K.R. Mangalam University at India International Centre, New Delhi on August 3, 2019.

Dinesh Singh was the Chief Guest and delivered lecture on "On Relevance of Gandhian Philosophy in the present Context" at Vishwa Yuwak Kendra, Chanakypuri, New Delhi on August 10, 2019.

Dinesh Singh was invited by the Government of Rajasthan as Chief guest and Keynote speaker at conference on "New Education Policy in Context with Technical Education" at MNIT, Jaipur on August 13, 2019.

Dinesh Singh presided over Academic Program Committee of K.R. Mangalam University, Gurgaon, Haryana on August 17, 2019.

Dinesh Singh was Chief Guest at Aarohan, the Musical heritage, an Evening Replete with Melody Filled Memories at the Islamic Cultural Centre, Lodhi Road, New Delhi on August 18, 2019.

Dinesh Singh was keynote speaker at national seminar on "Gandhi and His Relevance Today: Society, Culture and Swaraj" at Seva Gram, Wardha organized by the Indian Council of Historical Research and Mahatma Gandhi International Hindi University, Wardha, Maharashtra on August 21, 2019.

Dinesh Singh was Chief Guest at Stage Production of DPS International "McBeth Rebooted" at DPS International, Saket, New Delhi on August 31, 2019.

Dinesh Singh was keynote speaker in Plenary Session on the theme "Perspectives on Career Guidance" at FICCI's 12 Global Skills Summit at FICCI Federation House 1, Tansen Road, New Delhi on September 20, 2019.

Dinesh Singh presided as Chancellor over Academic Program Committee of K.R. Mangalam University, Gurgaon on September 23, 2019.

Dinesh Singh was Chief Guest at National Faculty Development Programme on Multivariate Data Analysis organised jointly by Ramanujan College, Department of Commerce, University of Delhi, Department of Financial Studies, South Campus, University of Delhi, Indian Accounting Association, NCR Chapter at South Campus, New Delhi on September 30, 2019.

Dinesh Singh was Chief Guest at 150<sup>th</sup> Birthday Celebration of Mahatma Gandhi at Banaras Hindu University, Varanasi on October 1, 2019.

Dinesh Singh presided as Chancellor over Academic Program Committee of K. R. Mangalam University, Gurgaon, Haryana on October 9, 2019.

Dinesh Singh attended meeting at Raj Bhaan, Lucknow as Convener Search Committee for Vice Chancellor, Lucknow University on November 10, 2019.

Dinesh Singh was Guest of Honour for the Launch of the Book From Shanties to School, Author Dr. Manimala Roy (Konark Publisher) at India International Centre, New Delhi on November 16, 2019.

Dinesh Singh presided as Chancellor over the Convocation of K. R. Mangalam University, Chief Guest Hon'ble Sh. Pranab Mukherjee "Bharat Ratna and Former President of India" on November 23, 2019.

Dinesh Singh was Chief Guest at 112th Birth Anniversary Celebration of Freedom Fighter Baba Lal Singh at Harijan Sewak Sangh, Gandhi Ashram Kingsway Camp, Delhi on November 27, 2019.

Dinesh Singh was Chief guest on 03-01-2020 at Centre for Professional Development in Higher Education at UGC-Human Resource Development Centre, University of Delhi on January 3, 2020.

Dinesh Singh was Chief Guest and delivered Keynote Address On Theme 'Innovative Learning Ecosystem for the New Age School Leaders' at IUEF 3<sup>rd</sup> International Mega Summit National School Award(INSA-2020) at SD Public School, Pitampura, New Delhi on January 4, 2020.

Dinesh Singh was Chief Guest at Rangayan, Annual Festival of Plays of ARSD College at Sri Ram Centre, New Delhi 110021 on January 17, 2020.

Dinesh Singh delivered Presidential Address at Inter Disciplinary National Seminar on theme Mohandas Karamchand Gandhi: Society, Politics and Philosophy at ARSD College, University of Delhi on January 23, 2020.

Dinesh Singh was Chief Guest at Workshop of Health Awareness organized by SPM college at Constitution Club of India, Rafi Marg, New Delhi on January 28, 2020.

Dinesh Singh was Chief Guest Farewell & Citation Ceremony at Springdales School, Dhaura Kuan, New Delhi 110021 on February 1, 2020.

Dinesh Singh was Chief Guest and delivered Dr. V. K. Tyagi Memorial Lecture on Gandhi & Environment organized by Shyam Lal College, University of Delhi, Delhi on February 13, 2020.

Dinesh Singh presided as Chancellor over Academic Program Committee of K. R. Mangalam University, Gurgaon, Haryana on February 15, 2020.

Randheer Singh appointed as a Member of Board of Studies (BOS), Department of Mathematics, Netaji Subhas University of Technology, Dwarka, New Delhi-110078 for three years from June, 2019.

Randheer Singh attended a meeting of Board of Studies (BOS) meeting of the Dept. of Mathematics, Netaji Subhas University of Technology, Dwarka, New Delhi-110078 held on June 7, 2019.

Randheer Singh attended a meeting of Board of Studies (BOS) meeting of the Department of Mathematics, Netaji Subhas University of Technology, Dwarka, on July 16, 2019.

Ruchi Das was appointed as a member of the Special Committee of the School of Physical Sciences of Jawaharlal Nehru University, New Delhi for a period of three years w.e.f. April 3, 2017.

Sachi Srivastava is member of Executive Committee of Indian Women in Mathematics.

## **Publications**

Ambethkar, V. & Basumatary, L. R. (2019). Solution of viscous flow in a rectangular region by using the hybrid finite volume scheme. *Journal of applied mathematics and computational mechanics*, 18(3), 17-30.

Ambethkar, V. & Basumatary, L. R. (2019). Numerical solutions of steady free convective flow in a rectangular region with discrete wall heat and concentration sources. *Journal of applied mathematics and computational mechanics*, 18(4), 5-18.

- Gaur, A. & Kumar, R. (2019). Maximal Non-  $\phi$ -Chained Rings and Maximal Non Chained Rings, *Results in Mathematics*, 74(3). doi.org/10.1007/s00025-019-1043-6
- Gupta, V. P. & Jain, R. (2020). On Banach space projective tensor product of  $C^*$ -algebras. *Banach J. Math. Anal.*, 14 524-538.
- Gupta, V. P., Jain, R. & Talwar, B. (2020). On closed Lie ideals of certain tensor products of  $C^*$ -algebras II. *Math. Nachr.*, 293 (1), 101-114.
- Jain, R. (2020). Automorphisms of the Banach space projective tensor product of  $C^*$ -algebras, *Arxiv der Math.* doi.org/10.1007/s00013-020-01433-8.
- Kansal, A., Kumar, A. & Rajpal, V. (2020). Inductive Limit in the Category of TRO. *Annals of Functional Analysis*, 11, 748-760.
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- Karuna & Lalitha, C.S. (2019). External and internal stability in set optimization using gamma convergence, *Carpathian Journal of Mathematics*, 35(3), 393-406.
- Kumar, A. & Srivastava, S. (2019). Supercyclic  $C_0$ -semigroups, stability and somewhere dense orbits. *J. Math. Anal. Appl*, 476(2), 539–548.
- Kumar, R. & Gaur, A. (2020). Maximal non  $\lambda$ -subrings. *Czechoslovak Mathematical Journal*, 70(2), 323-337.
- Kumar, D. & Kumar, S. (2019). Some new periodic solitary wave solutions of (3+1)-dimensional generalized shallow water wave equation by Lie symmetry approach. *Computers & Mathematics with Applications*, 78(3), 857-877. doi.org/10.1016/j.camwa.2019.03.007
- Kumar, R. & Gaur, A. (2019).  $\lambda$ -rings,  $\phi$ - $\lambda$ -rings, and  $\phi$ - $\Delta$ -rings, *Filomat*, 33(16), 5125–513.
- Kumar, R. & Gaur, A. (2020). Three open questions on residually small rings. *Rocky Mountain Journal of Mathematics*, 50(1), 177-180.
- Kumar, S. & Kumar, A. (2019). Lie symmetry reductions and group invariant solutions of (2+1)-dimensional modified Veronese web equation. *Nonlinear Dynamics*, 98(3), 1891–1903. doi.org/0.1007/s11071-019-05294-x
- Kumar, S., Kumar, M. & Kumar, D. (2019). Computational soliton solutions to (2+1)-dimensional Pavlov equation using Lie symmetry approach. *Pramana-Journal of Physics*, 94.
- Kumar, S., Kumar, D. & Wazwaz, A. M. (2019). Group invariant solutions of (3+1)-dimensional generalized B-type Kadomtsev Petviashvili equation using optimal system of Lie subalgebra. *Physica Scripta*, 94(6), 1402-4896. doi:10.1088/1402-4896/aafc13
- Kumar, S. & Kumar, D. (2019). Solitary wave solutions of (3+1)-dimensional extended zakharov-Kuznetsov equation by Lie symmetry approach. *Published in the Computers & Mathematics with Applications*, 77(8), 2096-2113. doi:10.1016/j.camwa.2018.12.009
- Kumar, S., Wazwaz, A. M., Kumar, D. & Kumar, A. (2019). Group invariant solutions of (2+1)-dimensional rdDym equation using optimal system of Lie subalgebra, *Physica Scripta*, 94(11). doi:10.1088/1402-4896/ab2d65

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- Madaan, V., Kumar, A. & Ravichandran, V. (2019). Lemniscate convexity and other properties of generalized Bessel functions. *Studia Scientiarum Mathematicarum Hungarica*, 56(4), 404-419.
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- Madaan, V., Kumar, A. & Ravichandran, V. (2020). Lemniscate convexity and other properties of generalized Bessel functions. *Studia Scientiarum Mathematicarum Hungarica*, doi.org/10.1556/012.2019.56.4.1445
- Muskan Kapoor and C.S. Lalitha, *A strict constraint qualification in vector optimization*, Ind. J. Indust. Math. 10(1) (2019), 109-120.
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- Rai, P. & Sharma, K. K. (2020). Numerical approximation for a class of singularly perturbed delay differential equations with boundary and interior layer (s), *Numerical Algorithms*, 1-24.
- Rastogi, S. & Srivastava, S. (2019). Non-analytic growth bounds and delay semigroups. *Semigroup Forum*, 99(3), 788–813.
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- Shah, Sejal, Das, T. & Das, R. (2020). Distributional chaos on uniform spaces. *Qual. Theory Dyn. Syst.*, 19(1), 4.
- Shah, S. & Singh, R. (2019). Propagation of non-planar weak and strong shocks in a non-ideal relaxing gas. *Ricerche di Matematica*, doi.org/10.1007/s11587-019-00472-w
- Shah, S. & Singh, R. (2019). Imploding shocks in real reacting gases with dust particles. *Journal of Mathematical Physics*. doi.org/10.1063/1.5142327
- Shah, S. & Singh, R. (2019). Evolution of singular surface and interaction with a strong shock in reacting polytropic gases using Lie group theory. *International Journal of Non-Linear Mechanics*, 116, 173-180.
- Shah, S. & Singh, R. (2019). Collision of a steepened wave with a blast wave in dusty real reacting gases. *Physics of Fluids*, 31(7). doi.org/10.1063/1.5109288
- Sharma, A. & Gaur, A. (2019). Maximal Labeling of Graphs, Discrete Mathematics. *Algorithms and Applications*, 11(4), 1950044. doi.org/10.1142/S1793830919500447

Sharma, J. & Kumar, A. (2020). Continuous abstract wavelet transform on homogeneous spaces. *Georgian Mathematical Journal*. Doi:10.1515/gmj-2020-2069

Sharma, K. K., Rai, P. & Mishra, P. (2019), A Robust Numerical Scheme for Singularly Perturbed Delay Differential Equations with Turning Point. *International Journal for Computational Methods in Engineering Science and Mechanics*, 20(5), 423-433.

Thakur, R., & Das, R. (2019). Stronger forms of sensitivity on product dynamical system via Furstenberg families. *Studia Scientiarum Mathematicarum Hungarica*, 56(4), 440-453.

Thakur, R., & Das, R. (2020). Strongly Ruelle-Takens, strongly Auslander-Yorke and Poincare chaos on semiflows. *Commun. Nonlinear Sci. Numer. Simul.* 81, 105018. doi:10.1016/j.cnsns.2019.105018

Trisandhaya, P., Kumari, P. & Kumar, A. (2020). Application of Item Sum Technique for Estimating Quantitative Sensitive Mean on Successive Moves Using Auxiliary Information. *Communications in Statistics - Simulation and Computation*. doi.org/10.1080/03610918.2020.1722839

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Vasisht, R. & Das, R. (2020). Furstenberg families and transitivity in non-autonomous systems. *Asian- Eur. J. Math.* 13 (1), 2050029.

Vasisht, R. & Das, R. (2019). A note on F-sensitivity for non-autonomous systems. *J. Difference Equ. Appl.*, 25 (2019), 548-559.

Yadav, S., Rai, P. & Sharma, K. K. (2019). A higher order uniformly convergent method for singularly perturbed parabolic turning point problems, *Numerical Methods for Partial Differential Equations*, doi.org/10.1002/num.22431

### **Research Projects**

Atul Gaur was awarded DST-SERB (MATRICS Scheme), 2019-21 (Three Years), *On Some Ring Extensions*, Rs. 6,60,000/-

C.S. Lalitha was awarded DST-SERB (MATRIC scheme) project, 2018-21 (Three Years), *Scalarization Aspects in Vector and Set Optimization*, Rs. 6,60,000/-

H.K. Singh was awarded DST-SERB (MATRICS Scheme), 2018-21 (Three Years), *Finite Group Actions on Product of Spaces of Type (0,0) and Borsuk-Ulam Type Theorem for Product of Projective Spaces*, Rs 6,60,000/-

H.K. Singh awarded DST-SERB (EMR Scheme), 2018-21 (Three Years), *Index of Finitistic Spaces and Transformation Groups on Projective Space*, Rs 17,51,970/-

Sachi Srivastava was awarded DST-SERB (MATRIC scheme) project, 2020-23 (Three Years), *Quantum Dynamical Semigroups and Perturbations*, Rs. 6,60,000/-

### **Seminars and Colloquia Organised**

Department of Mathematics organizes a lecture by Prof. Oscar Blasco, University of Valencia, Spain entitled "Matricial Harmonic Analysis for matrices with operator entries" on Monday, December 9, 2019.

Department of Mathematics (South Campus) organizes a lecture by Prof. Apoorva Khare, Indian Institute of Science, Bangalore entitled "Groups with norms: A PolyMath adventure" on October 17, 2019.

Department of Mathematics (South Campus) organizes a lecture by Prof. Tirthankar Bhattacharyya, Indian Institute of Science, Bangalore entitled "What do analytic functions look like" on October 10, 2019.

Department of Mathematics (South Campus) organizes a lecture by Prof. Ali Taheri, University of Sussex entitled "Multi-dimensional calculus of variations: From Quasiconvexity to microstructures" on September 17, 2019.

Department of Mathematics organizes special lecture of two hours by Prof. S.S. Khare, Ex Faculty, Department of Mathematics, NEHU, Shillong on "The Beauty of Algebraic Topology" on March 3, 2020.

Department of Mathematics organizes Series of six lectures by Prof. S. Chandra, Ex Faculty, Department of Mathematics, IIT Delhi on "Mathematics Behind Machine Learning" on February 24, March 2, March 23, March 30, April 13 and April 20, 2020.

Department of Mathematics (South Campus) organizes monthly Colloquium lectures.

### **Conferences/Workshops Organised**

Department of Mathematics organized National Centre for Mathematics Workshop (NCMW) on "Sheaf Theory, Sheaf Cohomology and Spectral Sequences" during November 18-30, 2019 (Organizers: Prof. Satya Deo, Dr. Hemant Kumar Singh, Dr. Satya Prakash Tripathi).

### **Seminar/Conference Presentations**

Ajay Kumar delivered invited talk on *Operator Spaces and Operator systems* in National conference on Advances in Mathematical Analysis and applications held at PGDAV College on November 8, 2019.

Ajay Kumar delivered a plenary talk entitled *Tensor Products of Operator Spaces and their Inductive Limits* in the International Conference on Analysis and its Applications held at the Department of Mathematics, University of Jammu during December 16-18, 2019.

Atul Gaur resented a paper entitled *Ring extensions with certain conditions on intermediate rings* in Conference on Algebra, Analysis and Applications organized by Ambedkar University, Delhi on May 10, 2019.

Atul Gaur delivered a contributory talk on  *$\lambda$ -subrings and maximal non  $\lambda$ -subrings* in International Conference on Algebras and its related Topics with Applications held at the Department of Mathematics, Aligarh Muslim University, Aligarh during December 17- 19, 2019.

C. S. Lalitha delivered a talk on *Strict Constraint Qualification in Vector Optimization* in 52<sup>nd</sup> Annual Convention of ORSI & International Conference at IIM Ahmedabad during December 15-18, 2019.

C. S. Lalitha delivered a talk on *Essential Solution Sets in Set Optimization* in Two Day Conference at the Panjab University on February 15, 2020.

C. S. Lalitha delivered a talk on *On Essential Solution Sets in Set Optimization* in INDO-FRENCH Seminar on Optimization, Variational Analysis and Applications at the Banaras Hindu Universty on February 3, 2020.

Dinesh Singh delivered Inaugural Lecture in the Conference on Algebra, Analysis and Applications at Ambedkar University, Delhi on May 10, 2019.



Dinesh Singh delivered Keynote Lecture on *From Fourier, Lebesgue to Beurling and de Branges and Beyond A Survey of Modern Analysis from a Personal Viewpoint* in 1<sup>st</sup> International Conference on Mathematical Modelling, Computational Intelligence Techniques and Renewable Energy (MMCITRE-2020) at the Pandit Deendayal Petroleum University, Gandhinagar, Gujrat on February 21, 2020.

Pratima Rai presented the paper entitled *Numerical solution of singularly perturbed delay differential parabolic turning poin problems* in the 25th International Conference on Difference Equations and Applications held at UCL in London during June 24-28, 2019.

Ranjana Jain delivered an invited talk on *Lie Ideals of Certain Tensor Products of C\*-Algebras* in Conference on Topics in Analysis at Ashoka University, Sonapat, December 18, 2019.

Ranjana Jain was a Resource Person at MHRD Faculty Development Program on "Research Methodology in Mathematics" at Kalindi College, University of Delhi on December 21, 2019.

V Ambethkar delivered a talk on *A novel high order accurate weno scheme for solution of hyperbolic conservation laws* in 9<sup>th</sup> International Congress on Industrial and Applied Mathematics, held in Universitat de València Campus Blasco Ibáñez, Valencia (Spain) during July 15-19, 2019.

### **Other Inter-Institutional Collaboration**

Dinesh Singh Middlesex University, London by invitation for joint research with Professor Mehmet Karamagnolou on Artificial Intelligence and robotics-Exploring the possibility of embedding via AI the features of a mathematician in the Middlesex Robot Pepper during May 12-18, 2019.

Dinesh Singh visited University of Houston, US by invitation for joint research with Professor Bernhard Bodman and Prof. David Blecher during July 11-19, 2019.

Dinesh Singh visited Middlesex University, London for attending the Annual Teaching and Learning Conference on invitation and for collaboration with prof. Mehmet Karamanoglu during September 06-11, 2019.

Dinesh Singh visited people's Republic of China by Invitation to speak at the China and India Universities forum on October 21<sup>st</sup> 2019. Also visited several Universities in China as part of an official Delegate during the period October 16-22, 2019.

Dinesh Singh visited University of Houston, US by Invitation for joint research with Mathematicians at the University of Houston and Research Collaboration Meeting with senior functionaries of the M.D. Anderson, Cancer Centre University of Texas at Austin during the period January 6-16, 2020.

Sachi Srivastava is Visiting scientist at Department of Mathematics, Berkeley under the invitation of Prof. Marc Rieffel during 17<sup>th</sup> March 2019 –30<sup>th</sup> May 2019,.

Sachi Srivastava Hosted Prof. Franco Fagnola, Department of Mathematics, Politecnico di Milano, Milan, Italy, for a research visit

Sachi Srivastava collaborated with Prof. K. B. Sinha, Jawaharlal Centre for Advanced Scientific Research, Bangalore.

### **Placement Details (Number and percentage of students placed)**

Total 18 students were placed out of 66 students registered with placement cell. 11 companies invited for placement with the average annual package was 6.01 lacs per annum.

## **Extension and Outreach Activities**

Ajay Kumar delivered invited talk on "Research in higher education" at Faculty Induction Programme organized by MHRFDC, Hansraj College on June 28, 2019.

Ajay Kumar delivered invited talk on "Research in Higher Education" in Faculty Development Program on Biomathematics at Shivaji College on August 5, 2019.

Ajay Kumar attended SERB- National Post Doctoral Fellowship, Physical and Mathematical Sciences meeting as an Expert on September 27-28, 2019.

Atul Gaur attended UGC sponsored Short Term Course on MOOCs, E-Learning and ICT at CPDHE, University of Delhi, Delhi during June 15-21, 2019.

C. S. Lalitha delivered an invited talk on "Kasturba and National Movement", Harijan Sewak Sangh, New Delhi, September 20, 2019.

C. S. Lalitha attended the 87<sup>th</sup> meeting of the Central Council of the Operational Research Society of India at Commission for Scientific and Technical Terminology (CSTT), Ministry of Human Resources Development, Department of Higher Education, New Delhi on September 22, 2019.

C. S. Lalitha delivered a talk on "Mathematics in Medicine" at the Zakir Husain Delhi College, University of Delhi on April 1, 2019.

C. S. Lalitha delivered a talk on "Basics of Convex Optimization" in Faculty Development Program on Optimization Techniques and its Applications at the Jaypee Institute of Information Technology, Noida on July 2, 2019.

C. S. Lalitha was involved in framing the syllabus of certificate course on Applied Mathematics in the Department of Mathematics, University of Jammu during October 10-11, 2019

C. S. Lalitha delivered a talk on "Mathematics Behind CT Scans" at the Department of Mathematics, University of Jammu on October 11, 2019.

C. S. Lalitha delivered a talk on "Convex Optimization and Applications" in IWM Regional Workshop on Research and Opportunities, NIT Meghalaya on October 19, 2019.

C. S. Lalitha delivered a talk on "Research Methodology" in the Faculty Development Programme on Recent Trends in Research Methodology, E-Content, Mathematical and Statistical Methods in Open Education World at Kalindi College, University of Delhi on December 20, 2019.

Ranjana Jain delivered an invited talk on "Research Methodology in Mathematics" in the Faculty Development Programme, on Recent Trends in Research Methodology, E-Content, Mathematical and Statistical Methods in Open Education World at Kalindi College, University of Delhi on December 21, 2019.

Dinesh Singh delivered an invited talk on "Education for the Future" at the Global Education Interact by Techglobal; May-June edition at Hotel Lalit on June 17, 2019.

Dinesh Singh held an interaction meeting with the Director SOL, University of Delhi and his entire team for the undergraduate curriculum of Delhi University on June 21, 2019.

Dinesh Singh published cover story article for India Today magazine "Need to Rewrite A-B-C of Education" on June 21, 2019.

Dinesh Singh published guest column article entitled "Cracking the Admission Code" on June 26, 2019.

Dinesh Singh conducted a live address and interaction on "Education Beyond High School" with school leaving students and parents of India on Facebook at K. R. Magalam University, Guurgaon on June 28, 2019.

Dinesh Singh wrote an article in Outlook Magazine on July 29, 2019 on "University of the Future".

Dinesh Singh wrote an article on "Here's the real reason behind the high cut off Delhi University" Daily on July 18, 2019.

Dinesh Singh addressed live on the topic "Education Beyond School" and interacted with school leaving students and parents of India on Facebook at K.R. Mangalam University, Gurgaon, Haryana on July 9, 2019.

Dinesh Singh was a panelist in the session "Preparing Graduate for a Disruptive World" organized by Mail Today in 8<sup>th</sup> Education Summit 2019 at ITC Maurya on July 10, 2019.

Dinesh Singh was a panelist on topic Vocational skills Institutions and Industry Centres - Perspective on Challenges and Opportunities sponsored by Automotive Skills Development Council Annual Conclave 2019 at Pullman New Delhi Aerocity on July 24, 2019.

Dinesh Singh Interview, New Education Policy on August 9, 2019.

Dinesh Singh delivered keynote lecture at national seminar on "Draft New Education Policy" at Hans Raj College, University of Delhi on August 10, 2019.

Dinesh Singh wrote the article "How the draft New Education Policy could help the Economic Growth of India" in Daily O/ Mail Today on September 4, 2019.

Dinesh Singh attended first Advisory Board meeting of the Pranab Mukherjee Foundation at India International Centre, on September 13, 2019.

Dinesh Singh attended meeting of Mathematical Sciences Foundation at India International Centre, on September 16, 2019.

Dinesh Singh attended by invitation the inauguration of the celebrations of Mahatma Gandhi's 150th Birth year by President Ramnath Kovind at Harijan Sewak Sangh, Kingsway Camp on September 24, 2019.

Dinesh Singh was keynote speaker and delivered a lecture on topic "National Education Policy and its Challenges" at ARSD College, University of Delhi, New Delhi on September 26, 2019.

Dinesh Singh attended as a member a meeting of the National Advisory Committee of the KVPY at Technology Bhavan, DST, Ministry of science and technology SJS Sansanwal Marg, New Delhi on September 27, 2019.

Dinesh Singh delivered Distinguished Public Lecture on "Universities of the Future: Global Aspiration and Local Imperatives" at O. P. Global Jindal University, Sonipat, Haryana on September 27, 2019.

Dinesh Singh wrote The Print Article "Abhijit Banerjee's Nobel in the US: Is it a comment on the quality of Indian Institutions" on October 15, 2019.

Dinesh Singh wrote The Print Opinion Article “IIT mania is costing student quality time at schools. But CBSE, other bodies still sleeping” on October 17, 2019.

Dinesh Singh wrote an article on “The Relevance of Gandhi’s Ideas on Education” in Mail Today on October 19, 2019.

Dinesh Singh wrote an open article “Is our Education System Meaningful?” in New Indian Express on October 20, 2019.

Dinesh Singh wrote an article “Why Mahatma Gandhi’s views on education are important today?” in Daily O/ Mail Today on October 20, 2019.

Dinesh Singh wrote “India’s education system looks to Ivy League but regulatory bodies like UGC get in the way” in The Print Article on October 31, 2019.

Dinesh Singh attended Governing Body Meeting at Library of the Tibetan Work and Archives at Gangchen Kyishong, Dharamshala, Himachal Pradesh-176215 on October 24, 2019.

Dinesh Singh wrote The Print Opinion Column “How China makes it possible for a German to study ancient Indian math in its University” on November 18, 2019.

Dinesh Singh wrote The Print Opinion Column “JNU fee row should make us ask if public and private universities are really any different” on November 18, 2019.

Dinesh Singh wrote an Opinion Column “An agenda for Learning Reform” in Daily O/ Mail Today on November 21, 2019.

Dinesh Singh wrote an article “JNU Protest over fee hike reminds me of how St. Stephen’s student called a strike & won” in The Print on November 21, 2019.

Dinesh Singh wrote an Opinion Column “Why the students must march to their inner drumbeat in Daily O/ Mail Today on November 22, 2019.

Dinesh Singh delivered invited lecture on “Fundamental Management Principle for Field Officers” wherein he addressed IPS officers at the Sardar Vallabhai Patel National Police Academy, Ministry of Home Affairs, Government of India, Hyderabad in November 2019.

Dinesh Singh wrote an article in “JNU V-C Jagadesh Kumar: Can engineers effectively head a largely social sciences university” in Talk Point, The Print on January 10, 2020.

Dinesh Singh wrote the article on “Best years of student life stolen by the grind of coaching centres” in Daily O/ Mail Today on January 21, 2020.

Dinesh Singh wrote the article “For Free thinking JNU, lack of diversity in faculty, students, courses have been a curse” in Opinion Column, The Print: on January 22, 2020.

Dinesh Singh wrote an article on “Why we need to revamp higher education right now” in Opinion, The New Indian Express on January 23, 2020.

Dinesh Singh delivered a Lecture on “Topic Mahatma Gandhi and his contributions in the various fields of Human life” at Delhi College of Art and Commerce, New Delhi on January 30, 2020.

Dinesh Singh was Speaker on Panel Discussion on Dignity & Socio Economic REFORM Sat Pranab Mukherjee Foundation, Delhi on February 4, 2020.

Dinesh Singh delivered the V. Kumar Memorial Lecture at Springdales School, Pusa Road, New Delhi on February 7, 2020

Dinesh Singh wrote an article on “Budget 2020: Finance Minister’s push on e- learning is the need of the hour” in Daily O/ Mail Today on February 5, 2020.

Dinesh Singh wrote an article on “JNU V-C Jagadesh Kumar: Can engineers effectively head a largely social sciences university” in Talk Point, The Print on February, 10, 2020.

Dinesh Singh wrote an article on “AAP Shows education can bring political benefits. Will other states follow” in Opinion Column, The Print on February 12, 2020.

Dinesh Singh wrote an article on “Mathematics during the Vedic age” in Opnion, The New Indian Express on February 24, 2020.

Dinesh Singh was Lead Speaker in a Panel Discussion on Education at Litfest 2020, Vasant Vihar, New Delhi on February 23, 2020.

Hemant Singh was the Course Co-Convener for Refresher Course in Mathematics/ Operational Research/ Statistics and Computer Science organized by the Centre of Professional Development in Higher Education (CPDHE), UGC-HRDC, University of Delhi during May 31, 2019 to June 14, 2019.

Rati Kanta Panda was a resource person for TIMC- MH workshop on "Calculus: The Geometrical Way" organized by the Department of Mathematics, Miranda House during September 19-20, 2019.

Ruchi das delivered an invited talk entitled “Fixed point theorems in topology” in Refresher Course in Mathematics, Operational Research, Statistics and Computer Science organized by the Centre of Professional Development in Higher Education (CPDHE), UGC-HRDC, University of Delhi during May 31, 2019 to June 14, 2019.

#### **Number of M.Phil./Ph.D. Awarded**

Ph.D. :19

M.Phil. :14

**Faculty strength:** Permanent 22