Vidyottama Jain

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Education

- **Ph.D. (Operations Research)**, Indian Institute of Technology Delhi, New Delhi, India, 2005.
- **M.Sc. (Mathematics)**, Raj Rishi College, University of Rajasthan, Alwar, Rajasthan, 1998, with 83.4%.
- **B.Sc.**, Gauri Devi College, University of Rajasthan, Alwar, Rajasthan, 1996, with 66.8%.

Work Experience

- Associate Professor, Department of Data Science and Analytics, Central University of Rajasthan, India (Jan'23-Present).
- Assistant Professor, Department of Mathematics, Central University of Rajasthan, India (June'12-Jan'23).
- Post Doctoral Fellow, **with Prof Lotfi A. Zadeh**, Berkeley Initiative in Soft Computing (BISC), Department of EECS, University of California Berkeley, Berkeley, California, USA (May'09-March'12).
- Senior Lecturer, Department of Mathematics, Amrita School of Engineering, Amrita Vishwa Vidyapeetham, Bengaluru, India (July'07-June'08).
- Visiting Scholar, **with Prof. C.R. Bector**, Department of Business Administration, Asper School of Business, University of Manitoba, Winnipeg, Canada (May'05 - June'05).
- Research Associate, **with Prof. S. Dharmaraja**, Department of Mathematics, Indian Institute of Technology Delhi, New Delhi, India (March'05 - May'05).

Teaching Experience

- Taught **Fuzzy Set Theory and its Applications, Mathematical Statistics and Probability Theory, Operations Research, Mathematical Programming, Game Theory, Numerical Analysis, Linear Algebra** and **Abstract Algebra** at post-graduate level and **Vector Calculus and Matrices, Differential and Integral Calculus** at Undergraduate level at Central University of Rajasthan, Rajasthan, India.

- Taught **Basic Mathematics** and **Probability, Statistics and Queuing Theory** courses at undergraduate level at Dept. of Mathematics, Amrita School of Engineering, Bengaluru, India.

- During Ph.D., conducted tutorial sessions for **Operations Research** and **Basic Mathematics** courses for UG students at Dept. of Mathematics, Indian Institute of Technology Delhi, India.

Research Areas

- Stochastic Modeling in Communication Systems, Fuzzy Optimization, Optimization Theory, Decision Making under Risk and Uncertainty, Perception Based Modeling.

Sponsored Projects

- Co-PI, For the development of "Queueing Theory and Modelling Lab" sponsored by Virtual Labs (An MoE Govt. of India Initiatives-Under the National Mission on Education through ICT), August 2022 - August 2024. (Status: Ongoing, Amount: 20 Lacs).

- Co-PI, For the development of "Probability and Statistics Lab" sponsored by Virtual Labs (An MoE Govt. of India Initiatives-Under the National Mission on Education through ICT), August 2022 - August 2024. (Status: Ongoing, Amount: 20 Lacs).

- Co-PI, Project entitled "Development and study of methods for reliability enhancement of tethered high-altitude unmanned telecommunication platforms (DST-RSF)" sponsored by DST, Feb. 2022 - Jan. 2025. (Status: Ongoing, Amount: Approx 98 Lacs).

- PI, Project entitled "Farmer satisfaction over crop insurance: A fuzzy cognitive map approach (UGC-BSR)" sponsored by UGC, 2014-2016. (Status: Completed, Amount: 6 Lacs).

List of Publications

A. Research Work in Progress

1. Nikita and **Vidyottama Jain**, "Analysis of Semi-Markov Model for Power Efficiency of NB-IoT Devices with RACH and Auxiliary State".

2. Nikita and **Vidyottama Jain**, "Analysis of $M^X/M/m/2m$ queueing model for bandwidth allocation in 5G networks".

3. Nikita and **Vidyottama Jain**, "Power Efficient Multi-server Semi-Markov Model for NB-IoT Devices in 5G Networks".

B. Recently Completed/ Recently Communicated Research Work

4. Nikita and **Vidyottama Jain***, "Stochastic Modeling of DRX mechansim in 5G based NB-IoT", Submitted the revised version to *Transactions on Emerging Telecommunications Technologies*.

5. Raina Raj and **Vidyottama Jain***, "Optimization of Traffic Control in MMAP[k]/PH[k]/S Queueing Model with PH Retrial Times and Preemptive Resume Priority Policy", Communicated to *Annals of Operations Research*.

6. Raina Raj and **Vidyottama Jain***, "Optimal Controllable Preemption for MMAP[c]/PH[c]/S Retrial Queueing Model in Catastrophic Scenario", Communicated to *OPSEARCH*.

7. Raina Raj and **Vidyottama Jain***, "Optimization of Traffic Control in MMAP[k]/PH[k]/S Catastrophic Queueing Model with PH Retrial Times and Preemptive Repeat Priority Policy", Communicated to *Telecommunication Systems*.

8. Raina Raj and **Vidyottama Jain***, "An Epidemiological Assessment of the Impact of Booster Vaccination on COVID-19 Transmission in India", Communicated.

9. Nikita and **Vidyottama Jain***, "Stochastic Modeling of DRX mechansim in 5G based NB-IoT", Submitted the revised version to *Transactions on Emerging Telecommunications Technologies*.

C. Recent Publications in Refereed International Journals

10. **Vidyottama Jain***, Nikita and S. Dharmaraja, "Stochastic Modelling for Bandwidth Part Switching based DRX Mechanism in 5G NR ", Telecommunication Systems, 2023 (In Press). (Springer, Impact Factor: 2.336)

11. **Vidyottama Jain***, Raina Raj and S. Dharmaraja, "Performability analysis of a MMAP[2] /PH[2]/S model with PH retrial times", Communications in Statistics: Theory and Methods, 2022 (In Press). (Taylor Francis, Impact Factor: 0.919)

12. Raina Raj and **Vidyottama Jain***, Optimization of traffic control in MMAP [2]/PH [2]/S priority queueing model with PH retrial times and preemptive repeat policy, Journal of Industrial and Management Optimization, 19(4), 2333-2353, 2023. (AIMS, Impact Factor: 1.411)

13. S. Dharmaraja, D. Khichar, P. Kalita and **Vidyottama Jain**, "Estimation of Mortality Rate of COVID-19 in India using SEIRD Model", *OPSEARCH*, 2021 (In Press). (Springer, Scopus Indexed)

14. **Vidyottama Jain***, Raina Raj and S. Dharmaraja, Numerical "Optimization of Loss System with Retrial Phenomenon in Cellular Networks", *International Journal of Operational Research*, 46(2), 210-226, 2023. (Inderscience, Scopus Indexed)

15. S. Dharmaraja, Srijan Narang and **Vidyottama Jain***, "A Mathematical Model for Supply Chain Management of Blood Banks in India", *OPSEARCH*, 57, 541–552, 2020. (https://doi.org/10.1007/s12597-019-00425-9). (Springer, Scopus Indexed)

16. Raju Srinivasan, **Vidyottama Jain** and S. Dharmaraja, "Perception Based Performance Analysis of Higher Education Institutions: A Soft Computing Approach", *Soft Computing*, 24, 513-521, 2020. (https://doi.org/10.1007/s00500-019-03931-6). (Springer, IF: 3.643)

17. S. Dharmaraja, **Vidyottama Jain**, Priyanka Anjoy and Hukum Chandra, "Empirical Analysis for Crop Yield Forecasting in India", *Agricultural Research*, 9, 132-138, 2020. (https://doi.org/10.1007/s40003-019-00413-x). (Springer, Emerging Sources Citation Index)

D. Refereed International Journal Publications

18. Ashok Deshpande and **Vidyottama Jain***, "Computing with Words on Energy Options?-Towards Decision under Risk and Uncertainty", *International Journal of Nuclear Knowledge Management*, 5(2), 219-232, 2011. (Inderscience)

19. **Vidyottama Vijay**, A. Mehra, S. Chandra and C.R. Bector, "Fuzzy Matrix Games via a Fuzzy Relation Approach", *Fuzzy Optimization and Decision Making*, 6, 299-314, 2007. (Springer, IF: 4.128)

20. **Vidyottama Vijay**, S. Chandra and C.R. Bector, "Matrix Games with Fuzzy Goals and Fuzzy Pay-offs", *Omega*, 33, 425-429, 2005. (Elsevier, IF: 7.084)

21. **Vidyottama Vijay**, S. Chandra and C.R. Bector, "Bi-matrix Games with Fuzzy Goals and Fuzzy Payoffs", *Fuzzy Optimization and Decision Making*, 3, 327-344, 2004. (Springer, IF: 4.128)

22. C. R. Bector, S. Chandra and **Vidyottama Vijay**, "Duality in Linear Programming with Fuzzy Parameters and Matrix Games with Fuzzy Payoffs", *Fuzzy Sets and Systems*, 146, 253-269, 2004. (Elsevier, IF: 3.343)

23. C. R. Bector, S. Chandra and **Vidyottama Vijay**, "Matrix Games with Fuzzy Goals and Fuzzy Linear Programming Duality", *Fuzzy Optimization and Decision Making*, 3, 263-277, 2004. (Springer, IF: 4.128)

D. Refereed Book Chapters/Papers appear in Conference Proceedings

24. **Vidyottama Jain**, Vladimir Vishnevsky, Raina Raj and S. Dharmaraja, "Power Management in Tethered High Altitude Platforms: A Quasi Birth-Death Approach", Lecture Notes in Computer Science, DCCN-2022.

25. S. Dharmaraja, **Vidyottama Jain** and Raina Raj, "Performance Analysis for Tethered HAP Systems: An Analytical Approach", Lecture Notes in Computer Science, DCCN-2022.

26. **Vidyottama Jain** and S. Dharmaraja, "Crop Insurance in India: A Mathematical Review", *Operations Research in Development Sector*, Asset Analytics, (A. Tripathy, R. Narayan, S. S. Patnaik and J. Nayak (Eds.)), Springer Singapore, 97-107, 2019.

27. **Vidyottama Jain**, D. Datta and Ashok Deshpande, "Decision Making on Energy Options: A Case Study", *Human-Centric Decision -Making Models for Social Sciences*, Studies in Computational Intelligence 502, (W. Pedrycz and P. Guo(Eds.)), Springer Verlag Berlin Heidelberg, 401-418, 2014.

28. **Vidyottama Jain** and Ashok Deshpande, "Prospect Theory on Energy Options?-Towards Decision Making under Risk", Proceedings of *IEEE International Conference on Reliability, Safety and Hazard (ICRESH-2010)*, Mumbai, 112-117, Dec. 14-16, 2010.

29. **Vidyottama Jain** and Ashok Deshpande, "Decision Making under Risk and Uncertainty: Revisited", *Computer Society of India-Communications*, Theme Article 3, 34 (8), 10-12, November 2010.

30. **Vidyottama Vijay**, "Constrained Matrix Games with Fuzzy Goals", Proceedings of the *ISFUMIP National Conference on Fuzzy Logic and its Application in Technology and Management FLATeM-2004*, IIT Kharagpur, May 20-21, 2004.

31. W. Shukla, P. Sinha and **Vidyottama Vijay**, "A Categorical Look at Duality in Fuzzy Linear Programming", Proceedings of the *Sixth International Conference APORS 2003*, New Delhi, Dec. 8-11, 93-100, 2003.

*: **Corresponding author**.

Organised/Invited Talk/Presented/Participated in Conference/Workshop/Seminar

1. Delivered an invited talk over "Semi-Markov modeling for power efficiency of NB-IoT devices in 5G networks", International Conference on Recent Trends in Applied Mathematics (ICRTAM2023), Loyola College, Chennai, India, February 25, 2023.

2. Delivered an invited talk over "Stochastic Modeling for Performance Enhancement in 5G Wireless Networks", Fifth International Conference on Applied Mathematical Models, PSG College of Technology, Coimbatore, India, January 06, 2023.

3. Delivered an invited talk over "Analysis of Power Management in a Tethered High Altitude Platform using MAP/PH[3]/1 Retrial Queueing Model", 25^{th} International Conference on Distributed Computer and Communication Networks (DCCN 2022), Peoples' Friendship University of Russia (RUDN University), Moscow, Russia, September 27, 2022.

4. Delivered a contributory talk over "Optimization of Traffic Control in Multiserver Preemptive Priority Queueing Model", International Conference of Recent Advances in Mathematical Sciences and Interdisciplinary Areas, GLA University, Mathura, June 23-25, 2022.

5. Delivered an invited talk over "Multi-Server Preemptive Priority Queueing Model with PH Retrial Times", Short Term Training Workshop Program on "Emerging Applications of Mathematics and Statistics in Engineering Science and Technology (EAMSEST-2022)", NIT Rourkela, May 10, 2022.

6. Delivered an invited talk over "Combinatorial and Stochastic Optimization", *SERB sponsored Karyashala on Statistical Modelling & Computational Intelligence*, NIT Tiruchirappalli, Dec. 12, 2021.

7. Participated in *13th International Workshop on Retrial Queues and Related Topics*, Centre for Research in Mathematics, Dept. of Mathematics, CMS College Kottayam, Kerala, Dec. 6-8, 2021.

8. Organised *International Webinar Series on Applications of Stochastic Models and Queueing Theory*, Central University of Rajasthan, Ajmer, Rajasthan, held on six days during Oct. 11-Nov. 11, 2021.

9. Delivered an invited talk over "Modelling of Retrial Queueing Model with Correlated Arrival Flows in Cellular Networks", *International Conference on Advances in Applied and Computational Mathematics (ICAACM-2021)*, Manipal University Jaipur, September 17, 2021.

10. Delivered an invited talk over "Application of Calculus in Management", Jaipuria Institute of Management, Jaipur, Aug. 9, 2021.

11. Coordinated *Ten Days Online Faculty Development Program on Teaching Learning and Assessment*, under the scheme of Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNMTT), Central University of Rajasthan, Ajmer, Rajasthan, March 15-25, 2021.

12. Delivered an invited talk over "An Introduction to Optimization Techniques", *Online Short Term Training Programme:Gyan-Ganga Programme*, Feb. 4, 2021.

13. Delivered invited talks over "Integer Linear Programming Problems", *1-week Online Short Term Course on Operations Research and its Applications*, Indian Institute of Technology Delhi, Dec. 9-10, 2020.

14. Participated in *2-week Online Refresher Course on "Artificial Intelligence"* (with Grade-A), UGC-HRDC Jawaharlal Nehru Technological University Hyderabad, Nov. 9-23, 2020.

15. Participated in *5-day Workshop on Enhancing of Teaching and Learning Skills in Statistics*, Central University of Rajasthan, March 12-16, 2019.

16. Delivered invited talks over "Linear Optimization, Non-linear Optimization and Fuzzy Optimization", *1-Week Short Course on Computational Techniques and their Applications in Engineering*, Government Engineering College, Ajmer, Sep. 11-12, 2018.

17. Presented the paper entitled "Crop Insurance: A Game Theoretic Approach", *49th Annual Convention and International Conference of Operational Research Society of India and International Conference on Analytics in Operational Research*, BIMTECH, Delhi, Dec 12-14, 2016.

18. Delivered an invited talk over "Introduction to Fuzzy Set Theory", *1-Week National Workshop on Mathematical Modelling and Simulation*, Central University of Rajasthan, March 18, 2016.

19. Presented the paper entitled "Crop Insurance in India: A Mathematical Survey", *48th Annual Convention of the Operational Research Society of India*, Bhubaneswar, Orissa, Dec 17-19, 2015.

20. Delivered an invited talk over "Introduction to Fuzzy Set Theory", *Faculty Development Programme*, Manipal University, Jaipur, July 23, 2015.

21. Delivered a series of lectures over "Latex", *Faculty Development Programme*, Manipal University, Jaipur, July 22-23, 2015.

22. Participated in the *International Symposium in the Honor of Dr. A. Ravi Ravindran*, IISc Bangalore, India, March 12-13, 2015.

23. Participated in the *QIP Sponsored Short Term Course on Applied Game Theory for Engineers and Managers*, IIT Kanpur, June 20-24, 2014.

24. Participated in the *Short Term Course on Computational Techniques in Engineering and Science*, MNIT Jaipur, April 1-5, 2013.

25. Presented the paper entitled "Perception Based Modeling on Energy Options?-Towards Decision Making under Risk", *World Conference on Soft Computing 2011*, San Francisco, USA, May 24-26, 2011.

26. Presented the paper entitled "Constrained Matrix Games with Fuzzy Goals" *Conference on Fuzzy Logic and its Applications in Technology and Management-2004*, IIT Kharagpur, India, May 20-21, 2004.

27. Presented the paper entitled "Matrix Games with Fuzzy Goals and Fuzzy Linear Programming Duality", *Conference on Fuzzy Set Theory and Its Mathematical Aspects*, BHU Varanasi, India, Dec. 25-27, 2002.

28. Presented the paper entitled "Matrix Games with Fuzzy Goals and Fuzzy Payoffs", *Sixth International Conference APORS 2003*, New Delhi, India, Dec 8-11, 2003.

29. Presented the paper entitled "Bi-Matrix Games with Fuzzy Goals and Fuzzy Payoffs", *International Conference on Operations Research with Economic and Industrial Applications*, ISI Kolkata, India, Jan. 8-10, 2004.

Achievements

1. Qualified CSIR-UGC NET for Lectureship held on July 1, 2001.

2. Qualified Graduate Aptitude Test in Engineering (GATE)-1999 in Mathematical Sciences.

3. Awarded with the "Best Student Paper I Prize" in APORS 2003-Sixth International Conference of the Association of Asia-Pacific Operational Research Societies held in New Delhi during Dec 8-11, 2003.

4. Paper entitled "Duality in linear programming with fuzzy parameters and matrix games with fuzzy pay-offs" got included in Science Direct Top 25 Hottest Articles February-2005 within the journal "Fuzzy Sets and Systems" under the subject area "Computer Science".

Ph.D. Supervision

1. Raina Raj (Sept.'17-Feb'23, Thesis Title: "A Study of Retrial Queueing Models with Optimization Problems in Cellular Networks").

2. Nikita (September 2019 onwards).

3. Komal Suwalka (Nov. 2022 onwards).

Post Graduate-Major Project Supervision

1. Deepika Soni, A study on linear regression analysis, Dec-May 2022.

2. Kalpana, A study on fuzzy linear programming problems, Jan-May 2022.

3. Naveen Yadav, A study on support vector machines, Dec-May 2022.

4. Deepesh Yadav, A study of retrial queueing model with catastrophe phenomenon, Feb.-June 2021.

5. Abhishek Lavaniya, A study over spectrum sharing in wireless cellular systems, Jan.-May 2020.

6. Praveen Joshi, Mobility prediction using hidden Markov model, Jan.-May 2020.

7. Mahendra Kumar Hinonia, A study on fractional programming problems, Jan.-May 2020.

8. Ramniwas Saharan, Methods for solving matrix games with intuitionistic fuzzy payoffs, Jan.-May 2020.

9. Noman Zaki, A study of coalition based resource allocation in wireless networks, Jan.-May 2019.

10. Mansi Shekhawat, Study Of fuzzy queues: a parametric non-linear programming approach, Jan.-May 2019.

11. Komal Joshi, A study of single server queue with retrial phenomena, Jan.-May 2019.

12. Bindu Chaudhary, Structure and applications of fuzzy cognitive map, Jan.-May 2018.

13. Deepika Dhewa, A study on fuzzy set, intuitionistic fuzzy set and hesitant fuzzy set, Jan.-May 2018.

14. Bhavesh Awasthi, Static games with complete and incomplete information, Jan.-May 2015.

15. Priyanka Jangid, Fuzzy similarity measure and its application, Jan.-May 2014.

16. Ruchita Jain, Multi-objective optimization theory, Jan.-May 2014.

Reviewer

1. IEEE Transactions on Reliability

2. Methodology and Computing in Applied Probability.

3. Telecommunication Systems

4. Simulation Modelling Practice and Theory

5. Applied Soft Computing

6. National Academy Science Letters

7. Journal of Intelligent and Fuzzy Systems

8. Transactions on Fuzzy Systems
9. Proceedings of the National academy of Sciences
10. OPSEARCH

Supervisors

- Prof. Lotfi A. Zadeh, Director, Berkeley Initiative in Soft Computing (BISC), Dept. of EECS, University of California Berkeley, Berkeley, California, USA.
- Prof. Ashok Deshpande, Founding chair, BISC-Special Interest Group (SIG)-Environment Management Systems (EMS) & Adjunct Professor, College of Engineering Pune, India.
- Prof. Suresh Chandra, Department of Mathematics, Indian Institute of Technology Delhi, New Delhi, India.

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References

- Prof. Suresh Chandra, Department of Mathematics, Indian Institute of Technology Delhi, New Delhi 110016, India.

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- Prof. A.P. Singh, Visiting Professor, Department of Mathematics, Central University of Rajasthan, Ajmer, 305817.

  E-mail: apsingh@curaj.ac.in
- Prof. S. Dharmaraja, Head, Department of Mathematics, Indian Institute of Technology Delhi, New Delhi 110016, India.

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Membership of professional and academic societies

1. Life member, Operations Society of India.
2. Life member, Indian Mathematical Society.

Personal Details

Full Name	Vidyottama Jain
Sex	Female
Nationality	Indian
Marital Status	Married