Dr. Monica Rani
Assistant Professor (Adhoc)
Department of Mathematics
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Qualification: Ph.D. (Mathematics) from IIT Roorkee, 2014

Title: Reliability Optimization of some Industrial systems using Artificial Bee Colony technique.

Supervisor: Prof. S.P. Sharma, Department of Mathematics, IIT Roorkee, Roorkee, India.

Teaching Experience

- Working as Assistant Professor in the Department of Mathematics, **Jesus & Mary College, University of Delhi**, New Delhi (July 2018- till date)
- Worked as Teaching Fellow at **Anna University CEG** Guindy Campus, **Chennai** (July 2016-August 2017).
- Worked as a Lecturer in the Department of Mathematics, **Chitkara Institute of Engineering and Technology (now Chitkara University) Punjab** (July 2009 to Dec 2009).
- Taken Tutorial classes for UG and PG students at **IIT Roorkee**, Roorkee (July 2010 – to May 2013).

Research Interest

Computational Intelligence, Mathematical Finance, Optimization techniques, fuzzy and intuitionistic fuzzy set theory and Reliability optimization.

Subjects Taught

Mathematical Finance, Computer Algebra System and Related Software, Probability and Statistics, Partial Differential Equations, Calculus, Mathematical Modelling, Engineering Mathematics, Algebra and Number Theory, Probability and Queuing Theory, Statistical Methods for Engineers, LaTeX and HTML.

Research Guidance

1. Research paper titled 'Monofractal and Multifractal Analysis of Indian Agricultural Commodity prices' has been published in Springer Nature Switzerland AG, 2021. (Neha Sam, Vidhi Vashisth, Yukti, Department of Mathematics, JMC Batch 2017-2020)

2. Research paper titled 'Analysis of Fractal Patterns in the Prices of Agro-based commodities' was presented in the 3rd International Conference on Modern Mathematical Methods and High-Performance Computing in Science & Technology held at Inderprastha Engineering College, Ghaziabad from 9-01-20 to 11-01-20. (Neha Sam, Vidhi Vashisth, Yukti, Department of Mathematics, JMC Batch 2017-2020)

Research Publication (Total Publication: 22)

Paper published/accepted in	Number of papers
International Journals	17 (**5 are in SCI Impact Factor more than 6**)
International Conferences	4
Book Chapter	1

Paper Published in International Journals

1. Bi-objective optimization of the reliability-redundancy allocation problem for series-parallel system, Journal of Manufacturing System, Elsevier, 33(3), pp. 335 - 347, 2014 **(SCI: Impact Factor: 8.633)** (With S.P Sharma and Harish Garg)
2. An approach for analyzing the reliability of industrial systems using soft-computing based technique, Experts Systems with Applications, Elsevier, 41 (2). pp. 489 - 501, 2014 **(SCI: Impact Factor: 6.954)** (With S.P Sharma and Harish Garg)
3. Intuitionistic fuzzy optimization technique for solving multi-objective reliability optimization problems in interval environment, Expert Systems with Applications, Elsevier, 41 (7), pp. 3157 - 3167, 2014 **(SCI: Impact Factor: 6.954)** (With S.P Sharma and Harish Garg)
4. Performance analysis of repairable industrial systems using artificial bee colony and fuzzy methodology, International Journal of Artificial Intelligence Tools, World-Scientific, 23 (5), 1450008 (23 pages), 2014 **(SCI: Impact Factor: 1.208)** (With S.P Sharma and Harish Garg)
5. Cost Minimization of butter-oil processing plant using artificial bee colony technique, Mathematics and Computers in Simulations, Elsevier, 97C, pp. 94 - 107, 2014, **(SCI: Impact Factor: 2.463)** (With S.P Sharma and Harish Garg)

6. "An approach for reliability analysis of industrial systems using PSO and IFS technique", ISA Transaction, Elsevier, 52(6), pp. 701 - 710, 2013. **(SCI: Impact Factor: 5.468)** (With S.P Sharma and Harish Garg)
7. Weibull fuzzy probability distribution for analyzing the behavior of pulping unit in a paper industry, International Journal of Industrial and Systems Engineering, Inderscience, 14(4), pp. 395 - 413, 2013. (With S.P Sharma and Harish Garg)
8. "Preventive maintenance scheduling of the pulping unit in a paper mill", Japan Journal of Industrial and Applied Mathematics, Springer,30(2), pp. 397 - 414, 2013, **(SCI: Impact Factor: 0.876)** (With S.P Sharma and Harish Garg)
9. 'Reliability analysis of the engineering systems using intuitionistic fuzzy set theory, International Journal of Quality and Reliability Engineering, Hindawi, Volume 2013 (2013), Article ID 943972, 10 pages (With S.P Sharma and Harish Garg)
10. A novel approach for analyzing the behavior of repairable systems by utilizing uncertain data, International Journal of Performability Engineering, RAMS Consultant, 9(2), 201-210, 2013. (With S.P Sharma and Harish Garg)
11. Predicting uncertain behavior of press unit in a paper industry using artificial bee colony and fuzzy lambda-tau methodology, Applied Soft Computing, 13(4), 1869- 1881, 2013, Elsevier **(SCI: Impact Factor: 6.725)** (With S.P Sharma and Harish Garg)
12. Stochastic behavior analysis of an Industrial system using PSOBLT technique, International Journal of Fuzziness and Knowledge-based systems, World Scientific, 20(5), 741 -761, 2012. **(SCI: Impact Factor: 1.518)** (With S.P Sharma and Harish Garg)
13. An efficient two-phase approach for solving reliability-redundancy allocation problem using artificial bee colony technique, Computers and Operations Research, Elsevier, 40 (12), pp. 2961 - 2969, 2013. **(SCI: Impact Factor: 4.008)** (With S.P Sharma and Harish Garg)
14. Behavior analysis of pulping unit in a paper mill with Weibull fuzzy distribution function using ABCBLT technique, International Journal of Applied Mathematics and Mechanics, 8(4), 86 -96, 2012. (With S.P Sharma and Harish Garg)
15. Cost minimization of washing unit in a paper mill using artificial bee colony technique, International Journal of Systems Assurance Engineering and Management, Springer, 3(4), 371- 381, 2012. (With S.P Sharma and Harish Garg)
16. Fuzzy RAM analysis of the screening unit in a paper industry by utilizing uncertain data, International Journal of Quality, Statistics and Reliability, Hindawi, Vol. 2012, Article ID 203842, 14 pages, 2012. (With S.P Sharma and Harish Garg)
17. Availability redundancy allocation of washing unit in a paper mill utilizing uncertain data, Elixir Mechanical Engineering, 39C, 4627- 4630, 2011. (With S.P Sharma and Harish Garg)

Book Chapter

1. Predicting uncertain behavior and Performance analysis of the Pulping system in a Paper Industry using PSO and fuzzy methodology", Handbook of Research on Novel Soft Computing Intelligent Algorithms: Theory and Practical Applications, IGI Global USA, (Ed.) P. Vasant, pp. 1070 - 1110, DOI: 10.4018/978-1-5225-1908-9.ch046, 2017 (With S.P Sharma and Harish Garg)

Paper published in International Conferences

1. "*Reliability Redundancy allocation problem of the pharmaceutical plant using artificial bee colony technique*", proceeding in International Conference on Advances in Modeling, Optimization and Computing (AMOC 2011) held at IIT Roorkee, Roorkee, India, December 5-7, 2011, pp 560-567. (With S.P Sharma and Harish Garg)
2. "*Reliability analysis of a Press unit in a paper mill using Weibull fuzzy distribution function",* accepted for proceeding of 16th online conference WSC-2011, December 5-16, 2011, published in "Soft Computing in Industrial Application", Springer. (With S.P Sharma and Harish Garg)
3. "*Reliability analysis of press unit using vague set",* proceeding in International Conference on Applied Mathematics And Numerical Analysis (ICAMNA) 2012, held at Paris, France, June 27-28, 2012, Issue 66, pp 649-655. (With S.P Sharma)
4. "*Behavior analysis of the Washing unit using Artificial bee colony technique and vague set theory*", proceeding in The Eighth Imacs International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and theory, held at Athens, Georgia, March 25-28, 2013. (With S.P Sharma)

Conferences/Workshops/Seminar/Webinar Attended

- Participated in Webinar on "Anti-Plagiarism Software in Higher Education: An Overview of Ouriginal (Urkund)" held on 18th June 2022 organized by IQAC, JMC.
- Participated in Webinar on "Revisiting the Vision and Mission: In Preparation for JMC @2025" held on 27th October 2021 organized by IQAC & RCC, JMC.
- Participated in Webinar on "Quality in Higher Education: Insights and Initiatives for JMC @2025" held on 22nd October 2021 organized by IQAC & RCC, JMC.
- Participated in Refresher Course in Mathematics organized by the Department of Mathematics, Ramanujan College from 31st August- 14th Sept. 2021
- Participated in FDP on the Creation and development of MOOCs while managing Online classes organized by Keshav Mahavidyalaya, University of Delhi from 24th – 31st August 2021.
- Participated in a 5-day Workshop on Creating Dynamic Dashboards organized by Skill Nation during 21st – 26th September 2021.
- Participated in FDP on Online teaching Tools Organized by JMC, University of Delhi from 24th July-2th July 2020.

- ❖ Participated in FDP on Recent trends in PDEs: Theory & Computations Organized by Department of Mathematics, School of Sciences, NIT Andhra Pradesh from 2nd October-6th October 2020
- ❖ Participated in Webinar on Understanding and Mentoring Young People held on 23rd June 2020 organized by IQAC, JMC.
- ❖ Participated in Webinar on "How to stay Cyber safe in Covid-19 Times" held on 22nd June 2020 organized by Department of Mathematics & IQAC, JMC.
- ❖ Participated in a talk on 'Reimaging Academic Leadership- Redefining the role of Teacher' and 'Academic Excellence in the Era of Disruption by Maj. Gen. G G Dwivedi held on 16th December 2019 organized by IQAC, JMC.
- ❖ Participated in FDP cum workshop on Climate across the curriculum: educational resources for teachers held at Jesus & Mary College on 28 January 2019.
- ❖ International Conference on Applied Mathematics and Numerical Analysis (ICAMNA) held at Paris, France, June 27-28, 2012.
- ❖ Attended 16th World Conference on Soft Computing in Industrial Applications (WSC16) held on the Internet from 5th to 16th December 2011.
- ❖ International Conference on Advances in Modeling, Optimization, and Computing (AMOC 2011) held at IIT Roorkee, Roorkee, India, December 5-7, 2011.
- ❖ Attended a National Workshop on Modeling and Optimization held at Maharshi Dayanand University Rohtak, Haryana, August 17-21, 2010.

Academic Qualification

- Ph.D. (Mathematics) from IIT Roorkee successfully defended on December 13, 2013, and awarded on September 20, 2014.
- Pre-PhD (Course Work) from IIT Roorkee with CGPA: 9.0/10
- M.Sc. (Mathematics) from Punjabi University, Patiala with 80.25% in 2008.
- B.Sc. (Non-Medical) from Govt. Ranbir College, Sangrur (Punjabi University) with 72.4% in 2006.

Participation in other college activities

- ❖ Delivered Lecture on Logistic Regression in a workshop on Regression Analysis using R held at Jesus & Mary College, New Delhi 2019
- ❖ Member, B.A(Prog) Committee (2019- till date)
- ❖ Member, Bridge Course Committee (2022- till date)
- ❖ Department Representative, Website Committee (2021- till date)
- ❖ Department IQAC Representative (Dec. 2021- till date)
- ❖ Golden Jubilee School Project (2019-2021)
- ❖ Member, Hindi Quiz Society (2019-2020)

- Member, Remedial Coaching Classes (2019-2022)
- Member, Green Society (2018-2019)

Other Responsibilities

NSE- NSEIT Bangalore, Content Reviewer.

Membership in Professional Bodies

- Life Member of IAENG whose membership No. is 113863.
- Life Member of IACSIT whose membership No. is 80342728.
- Associate Member of UACEE whose membership No. is SM1002960.
- Member of Bernoulli Society membership number is 15609.
- Member of Science and Engineering Institute (SCIEI) whose membership number is 20130527001.

Additional Certification & Awards

- Won 1st prize and certificate in Scopus, Science direct Quiz held at Mahatma Gandhi Central Library, IIT Roorkee.
- Qualified **CSIR – UGC – JRF** in **June 2009.**
- Qualified **CSIR – NET in Dec 2008.**
- National Mathematics Olympiad Certificate.
- **DST Travel Grant** for attending and presenting a research paper in Paris, France during June 27-28, 2012.

Other Information

- **Software Package**: MS Office, LaTeX, MS Excel
- **Programming Language**: MATLAB, C, C++, R, Mathematica

Personal Details:

Date of Birth	:	October 3, 1986
Marital Status	:	Married
Language Proficiency	:	English, Hindi, Punjabi
Nationality	:	Indian