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List of Publications

The following works included in this thesis as a chapter have been published/communicated in the following journals.

- **Shruti** and Rakhee Kulshrestha (2020), *Channel Allocation and Ultra-Reliable Communication in CRNs with Heterogeneous Traffic and Retrials: A Dependability Theory-Based Analysis.* Computer Communications, Elsevier, 158, 51–63, doi:10.1016/j.comcom.2020.04.055.

- Srinivas R. Chakravarthy, **Shruti** and Rakhee Kulshreshtha (2020), *A queueing model with server breakdowns, repairs, vacations, and backup server.* Operations Research Perspectives, Elsevier, 7, 100131, 1–13, doi:10.1016/j.orp.2019.100131.

- Rakhee Kulshrestha, Madhu Jain and **Shruti** (2020), *Performance Analysis of Fractional Guard Channel Scheme with Buffer for Cellular Mobile Networks.* Proceedings of the National Academy of Sciences, India Section A: Physical Sciences, Springer, 90, 739-747, doi:10.1007/s40010-019-00635-2.

- Rakhee Kulshrestha and **Shruti**, *Performance Evaluation of Call Admission Control Based on Signal Quality in Cellular Mobile Networks.* International Journal of Mathematics in Operational Research, Inderscience. (Accepted)

- **Shruti** and Rakhee Kulshrestha, *Analysis of Spectrum Sensing and Spectrum Access in Cognitive Radio Networks with Heterogeneous Traffic and p-Retry Buffering.* IEEE Transactions on Mobile Computing, IEEE. (Revision Submitted)

- **Shruti** and Rakhee Kulshrestha, *Dependability-Based Analysis for Ultra-Reliable Communication in Heterogeneous Traffic Cognitive Radio Networks with Spectrum Reservation.* Personal and Ubiquitous Computing, Springer. (Communicated)

In addition, other research works carried out by the author of this thesis have been communicated/published in the following journals/proceedings:

- Srinivas R. Chakravarthy, **Shruti** and Alexander Rumyantsev (2020), *Analysis of a Queueing Model with Batch Markovian Arrival Process and General Distribution for Group Clearance.* Methodology and Computing in Applied Probability, Springer, doi:10.1007/s11009-020-09828-4.

- Rakhee Kulshrestha and **Shruti** (2020), *Discrete-Time Analysis of Communication Networks with Second Optional Service and Negative User Arrivals.* In: Lecture Notes in Networks and Systems, Springer, during ICCIS 2019 at SKIT, Jaipur, India.

- Rakhee Kulshrestha, Achal Agarwal and **Shruti** (2019), *An Adaptive Fractional Guard Channel based CAC scheme for Heterogeneous Traffic in Wireless Cellular Networks.* In: Proceedings of IEEE 6th International Conference on Computing for Sustainable Global Development (INDIACom), Delhi, India, pp. 1260–1264, IEEE Xplore.

- Srinivas R. Chakravarthy, Serife Ozkar and **Shruti**, *Analysis of $M/M/c$ Retrial Queue with Thresholds, PH Distribution of Retrial Times and Unreliable Servers.* Journal of Applied Mathematics and Informatics, KSCAM. (Revision Submitted)

- **Shruti** and Rakhee Kulshrestha, *Queueing Based Spectrum Management in Cognitive Radio Networks with Retrial and Heterogeneous Service Classes.* Journal of Ambient Intelligence and Humanized Computing, Springer. (Communicated)

Participated in Conferences/ Workshops

- Participated in online short-term course on **"Optimization Theory, Methods and Applications"**, during August 18 -20, 2020, organized by Department of Mathematics, IIT Roorkee, Uttarakhand.

- Presented paper entitled "Dependability-based Availability and Reliability Analysis in CRNs with Heterogeneous Secondary Users and Retrials" in **International Conference and 22nd Annual Convention of VPI on Advances in Operations Research, Statistics, and Mathematics (AOSM)**, during December 28-30, 2019, organized by Department of Mathematics, BITS Pilani, Rajasthan.

- Participated in international workshop on **"Stochastic Simulation and Its Applications"**, during December 24-27, 2019, organized by Department of Mathematics, BITS Pilani, Rajasthan.

- Presented paper entitled "Queueing Based Analysis with p-Retry Policy in Heterogeneous Traffic Cognitive Radio Networks Under Imperfect Spectrum Sensing" in **International Conference and 52nd Annual Convention of ORSI**, during December 15-18, 2019, held at IIM, Ahmedabad.

- Presented paper entitled "Performance Analysis of Queueing Scheme with p-Retry Policy for Heterogeneous Traffic Cognitive Radio Networks" in **21st Annual Conference of Vijnana Parishad of India on MOCTSD-2019**, during April 26-28, 2019, organized by Department of Mathematics, SRMIST, Delhi NCR Campus, Ghaziabad.

- Participated in workshop on **"Academic Writing"**, during April 5-11, 2019, organized by Department of Humanities and Social Sciences, BITS Pilani, Rajasthan.

- Presented paper entitled "An Adaptive Fractional Guard Channel based CAC scheme for Heterogeneous Traffic in Wireless Cellular Networks" in **International Conference on Computing for Sustainable Global Development**, during March 13-15, 2019, organized by BVICAM, New Delhi.

- Participated in short term course on **"Matrix-Analytic Methods in Queueing Models"**, during January 15-25, 2018, held at Central University of Kerala, Kasaragod, Kerala.

- Presented paper entitled "Performance Prediction of Fractional Guard Channel Scheme with Buffer for Cellular Mobile Networks" in **International Conference on Advancing Frontiers in Operational Research: Towards a Sustainable World**, during December 21-23, 2017, organized by Operational Research Society of India, at Heritage Institute of Technology, Kolkata, India.

- Participated in international workshop on **"Convex Analysis and Optimization"** during November 14-19, 2017 at Aligarh Muslim University, Aligarh, Uttar Pradesh.

- Conducted events and participated in **"National Conference on Mathematics"** at Birla Balika Vidyapeeth, Pilani, Rajasthan, held from April 15-16, 2017.

- Participated in national workshop on **"MATLAB and LaTeX"** during August 24-30, 2016 at Indira Gandhi University, Meerpur, Rewari, Haryana.

Brief Biography of the Supervisor

Prof. Rakhee is Associate Professor in the Department of Mathematics, Birla Institute of Technology and Science, Pilani, Pilani Campus. She has completed her Ph.D. from Centre for Information and Decision Sciences, Dr. B.R. Ambedkar University, Agra in 2003. She worked as visiting faculty at Institute of Engineering and Technology, Dr. B.R. Ambedkar University, Khandari Campus from August 2003 till June 2004. In July 2004 she joined Banasthali University, Banasthali Rajashan. After that, she joined as an Assistant Professor in the Department of Mathematics at Birla Institute of Technology and Science Pilani, Pilani Campus, Rajasthan in November 2008. Her research interests include the areas of applied probability, performance analysis of communication networks, inventory and supply chain management. There are 37 research publications in refereed International/National journals/proceedings and a monograph to her credit.

Dr. Rakhee got DST-DFG Bilateral Co-operation Fellowship, awarded by DFG, Germany to work with Prof. Raik Stolletz, University of Mannheim, Germany during 01.12.2015-15.01.2016. She also has one patent (with Dr. Savita Kumari and Prof. Seema Verma, Banasthali Univeristy). She has participated over 40 International and National Conferences in India and Abroad and visited many reputed Universities/Institutes in Germany, Turkey and Singapore. She has co-supervised a student Dr. Savita Kumari when she was in Banasthali University. Currently, she is guiding two Ph.D. students (Ms. Shruti and Mrs. Sarita). Dr. Rakhee is member of many International and National bodies like FIM, ORSI, ISPS, ISMS etc. also, executive council member of Vijnana Parishad of India.

Brief Biography of the Candidate

Ms. Shruti received her B.Sc. Mathematics degree with 1st class honors, in 2013 and M.Sc. degree with 1st class in Mathematics, in 2015 from University of Delhi. Currently, she is working towards a Ph.D. degree from Birla Institute of Technology and Science, Pilani. Her research interests lie primarily in the area of mobile and wireless communications, including spectrum management, reliability analysis, simulation, optimization, and modeling and performance evaluation of communication networks, particularly cognitive radio networks. She has 7 research publications in peer-reviewed journals and conference proceedings to her credit. She received the Young Scientist Award from Vijñana Parishad of India (VPI) in a conference Advances in Operations Research, Statistics, and Mathematics (AOSM) 2019 held at BITS Pilani. She is a member of the Operational Research Society of India (ORSI). She has also participated and presented her work in several national and international conferences/workshops of high repute.