Dr. Sumit J. Darak

July 15, 2023

Contact Information

B605, New Academic Block,
Indraprastha Institute of Information Technology (IIIT),
Okhla Phase III, New Delhi, India - 110020.

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Research Interests

Intelligent and reconfigurable wireless PHY; Edge Computing; Algorithms to Architectures;

Educational Background

Doctor of Philosophy (*PhD*)(CGPA = 4.75/5) *January, 2009 - January, 2013*
School of Computer Engineering (SCE)
Nanyang Technological University (NTU), Singapore
Date of conferment of PhD: 06/12/2013
Thesis Title : "*Design of Low Complexity Variable Digital Filters and Reconfigurable Filter Banks for Multi-Standard Wireless Communication Receivers.*"
Thesis Advisers : Assoc. Prof. A. P. Vinod (NTU, Singapore)
Assoc. Prof. E. M-K. Lai (Massey University, New Zealand)

Bachelor of Engineering (*B.E.*)(*First class with distinction*) *July, 2003 - August, 2007*
School of Electronics and Telecommunications Engineering (E & TC)
Maharashtra Institute of Technology (MIT), University of Pune, India
FYP Title : "*Implementation of Image Processing Algorithms on FPGA Using VHDL and PCI Bus.*"

Employment History

Indraprastha Institute of Information Technology, Delhi, India *January, 2015 - Present*
Associate Professor at the ECE department of IIIT, Delhi. *January, 2020 - Present*
Assistant Professor at the ECE department of IIIT, Delhi. *January, 2015 - December 2019*

Apexplus Technologies, India *June, 2022 - Present*
SoC Consultant

VVDN Technologies, India *March, 2019 - Sept. 2021*
5G Consultant

Indian Institute of Technology, Bombay, India *June-July 2017, Dec. 2017, June-July 2018*
Visiting Researcher at IEOR department of IIT, Bombay.

CentraleSupélec, Rennes, France *Nov. 2015 - Dec. 2015*
Visiting Professor

CominLabs, UEB and Supélec, Rennes, France *March, 2013 - November 2014*
Postdoctoral Research Fellow

EADS Innovation Works (South Asia), Singapore *August, 2012 - January, 2013*
Research Internship

Massey University, Auckland, New Zealand *August, 2011 - December, 2011*
Visiting Research Student

Tata Consultancy Services (TCS), Pune, India *September, 2007 - December, 2008*
Assistant System Engineer

Honors and Awards

- *Qualcomm Innovation Fellowship (QIF)* winner 2023.
- *Design Contest Runner-Up* in VLSID 2023 Conference.

- *Qualcomm Innovation Fellowship (QIF)* winner 2022.
- *Design Contest Winner* in VLSID 2022 Conference.
- *COMSNETS 2022 Best Thesis and IIITD 2022 Doctoral Dissertation Awards* to PhD student, Himani Joshi.
- *Best paper award* (Application-oriented Research Track) in AIMLSystems 2021 Conference.
- IIIT-Delhi Research Excellence Awards (2021).
- *Core Research Grant* from DST-SERB, GoI, 2019.
- *Second Best Poster Award* in 11^{th} IEEE COMSNETS 2019, Bangalore, India.
- *IIIT Delhi Teaching Excellence Award* for ECE210: ELD (2018, 2020), ECE111: DC(2019) and ECE510: DHD (2019, 2020).
- *2018 NI Academic Research Grant.*
- *Second Best Paper Award* in 36^{th} IEEE/AIAA DASC 2017, Florida, USA.
- *2017 NI Academic Research Grant.*
- *Young Scientist Paper Award* and *Conference Travel Grant* from URSI-France in *XXXI General Assembly and Scientific Symposium of the URSI*, Canada, Aug. 2017.
- *Best Demo Award* in CROWNCOM 2016, France.
- *Visiting Professor Fellowship* from CentraleSupélec, Rennes, France for one month visit.
- *DST INSPIRE Faculty Award* from Government of India for young researchers under 32 years age along with 5 year research grant.
- *Young Scientist Paper Award* and *Conference Travel Grant* from URSI-France in *XXXI General Assembly and Scientific Symposium of the URSI*, Beijing, China, Aug. 2014.
- *Organizing Committee Member* of 3^{rd} International Workshop on Next Generation Green Wireless Networks (Next-GWiN), France, 2014.
- *Session Chair* of special session on Green Communication at IEEE ATC 2013, Ho Chi Minh, Vietnam, Oct. 2013.
- Awarded Graduate Scholarship for four years to pursue graduate studies at NTU, Singapore.
- *Best Paper Award* in the IET National Conference on Signal and Image Processing Applications, Pune, India.
- *Best Effort Award* for final year project in B.E. project competition.

Research Grants

1. *Intelligent and Reconfigurable Deep Learning Augmented Wireless Channel Estimation at Edge* from Qualcomm Innovation Fellowship (QIF) India 2023, 2023-2024.
2. *NavISense: Design and Prototype of NavIC Signal Processing Accelerator on Heterogeneous System-on-Chip for Remote Sensing* from Chips to Startup (C2S), Ministry of Electronics & IT (MeitY), Government of India, 2023-2028.
3. *Radar Enhanced Rapid Beam Alignment for Vehicular Millimeter Wave Communications* from TiH Tihan, IIT Hyderabad, 2023-2024. (PI: Dr. Shobha Sundar Ram)
4. *Programmable Cryptosystem for 5G Telecommunication Networks* from DST C3iHub, 2023-2025. (PI: Dr. Rinku Shah)
5. *CloudLab: Physical Lab Experiments in Online Mode* from DST Prayas, 2022-2023.
6. *Consultancy: Radar Signal Processing on SoC* from Apexplus Technologies Pvt. Ltd., 2022-Present.
7. *Software/Hardware Prototype of IEEE 802.11ad/ay Based Joint RadarCommunication Transceiver* from Qualcomm Innovation Fellowship (QIF) India 2022, 2022-2023.
8. *Intelligent Joint Radar-Communication Transceiver Design and Prototype for Beyond 5G** from Ministry of Electronics & IT (MeitY), R&D in CC&BT group, Government of India, 2021-2024. (PI: Dr. Shobha Sundar Ram)
9. *Enabling Smart-sensors via Novel Edge-AI and In-memory Compute Paradigms: From Design, Prototype to Fabrication* from DST-TiH, IIIT Delhi, 2022-2025.
10. *Compute-efficient Design and Implementation of Decentralized Spectrum Learning, Tunable Bandwidth Access and Energy Harvesting Policy for Heterogeneous Cognitive Radio Networks* from DST-INSPIRE, 2015-2020.

11. *Intelligent and Flexible PHY for 5G** from Core Research Grant (CRG), Department of Science & Technology (DST), Government of India, 2020-2022.
12. *AICTE-ATAL Workshops* from AICTE-ATAL and Keysight, 2019-2022.
13. *Consultancy: 5G Base Station Design and Development* from VVDN Technologies, 2019-2021.
14. *Reconfigurable Filtered OFDM based LDACS for Air to Ground Communications* from National Instruments, 2018-2019.
15. *Sub-Nyquist Sampling and Machine Learning based Automatic Modulation Classifier Testbed for Multi-Carrier Waveform* from National Instruments, 2017-2018.

PUBLICATIONS: JOURNALS

35. A. Sneh, **S. J. Darak**, S. S. Ram and M. Hanawal, "Radar Enhanced Multi-Armed Bandit for Rapid Beam Selection in Millimeter Wave Communications," accepted in *IEEE Communications Letter*, June 2023.
34. Syed Asrar ul Haq, Abdul Karim Gizzini, Shakti Shrey, **S. J. Darak**, Sneh Saurabh and Marwa Chafii, "Deep Neural Network Augmented Wireless Channel Estimation for Preamble-based OFDM PHY on Zynq System on Chip," accepted in *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, May 2023.
33. Rohith Rajesh, **S. J. Darak**, A. Jain, S. Chandhok, and A. Sharma, "Hardware Software Co-design of Statistical and Deep Learning Frameworks for Wideband Sensing on Zynq System on Chip," in *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 31, no. 1, pp. 79-89, Jan. 2023.
32. S. V. Sai Santosh and **S. J. Darak** "Multi-armed Bandit Algorithms on Zynq System-on-Chip: Go Frequentist or Bayesian?," in *IEEE Transactions on Neural Networks and Learning Systems*, June 2022.
31. M. Hanawal, and **S. J. Darak**, "Multi-player Bandits: A Trekking Approach,"in *IEEE Transactions on Automatic Control (IEEE TAC)*, vol. 67, no. 5, pp. 2237-2252, May 2022.
30. H. Joshi, S. Santra, **S. J. Darak**, M. Hanawal and S. V. Sai Santosh, "Multi-Play Multi-Armed Bandit Algorithm Based Sensing of Non-Contiguous Wideband Spectrum for AIoT Networks, "in *IEEE Transactions on Industrial Informatics*, vol. 18, no. 5, pp. 3337-3348, May 2022.
29. M. Gupta, S. Sharma, H. Joshi, and **S. J. Darak**, "Reconfigurable Architecture for Spatial Sensing in Wideband Radio Front-End, "in *IEEE Transactions on Circuits and Systems II*, vol. 69, no. 3, pp. 1054-1058, Mar. 2022.
28. H. Joshi, S. Chandhok, A. V. Subramanyam and **S. J. Darak**, "Novel Deep Learning Framework for Wideband Spectrum Characterization at Sub-Nyquist Rate, "in *Wireless Networks (Springer)*, Aug. 2021.
27. N. Agrawal, A. Ambede, **S. J. Darak**, A. P. Vinod and A. S. Madhukumar, "Design and Implementation of Low Complexity Reconfigurable Filtered-OFDM based LDACS, "accepted in *IEEE Transactions on Circuits and Systems II*,vol. 68, no. 7, pp. 2399-2403, July 2021.
26. S. V. Sai Santosh and **S. J. Darak** "Intelligent and Reconfigurable Architecture for KL Divergence Based Multi-Armed Bandit Algorithms," in *IEEE TCAS-II*, vol. 68, no. 3, pp. 1008-1012, Mar. 2021.
25. H. Joshi, **S. J. Darak**, M. Alaee-Kerahroodi, and Bhavani Shankar Mysore Rama Rao, "Reconfigurable and Intelligent Ultra-Wideband Angular Sensing: Prototype Design and Validation, "in *IEEE Transactions on Instrumentation & Measurement*, vol. 70, pp. 1-15, Jan. 2021.
24. Neelam Singh, S. V. Sai Santosh, and **S. J. Darak**, "Towards Intelligent Reconfigurable Wireless Physical Layer (PHY),"in *IEEE Open Journal of Circuits and Systems*, vol. 2, pp. 226-240, Jan. 2021.
23. H. Joshi, **S. J. Darak**, and A. Kumar "Low Complexity Reconfigurable and Intelligent Ultra-Wideband Angular Sensing," in *IEEE Systems Journal*, vol. 14, no. 4, pp. 4931-4942, Dec. 2020.

22. S. Sawant, R. Kumar, M. Hanawal and **S. J. Darak**, "Learning to Coordinate in a Cognitive Radio Network in Presence of Jammers," in *IEEE Transactions on Mobile Computing*, vol. 19, no. 11, pp. 2640-2655, Nov. 2020.
21. N. Agrawal, **S. J. Darak**, and C. Bader "pectral Coexistence of LDACS and DME: Analysis via Hardware Software Co-Design in Presence of Real Channels and RF Impairments," in *IEEE TVT*, vol. 69, no. 9, pp. 9837-9848, Sept. 2020.
20. R. Kumar, **S. J. Darak**, M. Hanawal and A. Yadav, "Distributed Learning and Coordination in Cognitive Infrastructure-less Networks of Unknown Size," in *IEEE Systems Journal*, vol. 14, no. 2, pp. 2085-2096, Jun. 2020.
19. S. Dhabu, A. Ambede, N. Agrawal, Smitha K. G., **S. J. Darak**, and A. P. Vinod "Variable Cutoff Frequency FIR Filters: A Survey," accepted in *SN Applied Sciences*, Jan. 2020.
18. **S. J. Darak** and M. Hanawal, "Multi-player Multi-armed Bandits for Stable Allocation in Heterogeneous Ad-Hoc Networks," in *IEEE JSAC Special Issue on Machine Learning in Wireless Communications*, vol. 37, no. 10, pp. 2350-2363, Oct. 2019.
17. H. Joshi, **S. J. Darak**, and A. Kumar "Throughput Optimized Non-Contiguous Wideband Spectrum Sensing via Online Learning and Sub-Nyquist Sampling," in *IEEE Wireless Communications Letters*, vol. 8, no. 3, pp. 805-808, June 2019.
16. N. Agrawal, **S. J. Darak**, and C. Bader "New Spectrum Efficient Reconfigurable Filtered-OFDM Based L-Band Digital Aeronautical Communication System," in *IEEE Transactions on Aerospace and Electronic Systems (TAES)*, vol. 55, no. 2, pp. 1108-1122, Jun. 2019.
15. R. Kumar, **S. J. Darak**, A. Yadav A. Sharma and R. Tripathi "Distributed Algorithm for Learning to Coordinate in Infrastructure-less Network," in *IEEE Communications Letters*, vol. 23, no. 2, Feb. 2019.
14. M. Hanawal, and **S. J. Darak**, "Distributed Learning in Ad-Hoc Networks with Unknown Number of Players," in *ACM SIGMETRICS Performance Evaluation Review*, vol. 46, no. 3, pp. 171-174, Dec. 2018.
13. **S. J. Darak**, Christophe Moy and Jacques Palicot,"Distributed Decision Making Policy for Frequency Band Selection Boosting RF Energy Harvesting Rate in Wireless Sensor Nodes," in *Wireless Networks (Springer)*, vol. 24, no. 8, pp. 3189-3203, Nov. 2018.
12. H. Joshi, **S. J. Darak**, and Y. LOUET "Spectrum Blind Recovery and Application in Non-Uniform Sampling Based Automatic Modulation Classifier," in *Circuits, Systems, and Signal Processing*, vol. 37, no.8, pp. 3457-3486, Aug. 2018.
11. A. Aggarwal, A. Singhal and **S. J. Darak**, "Clean and Green India: Is Solar Energy the Answer?," in *IEEE Potential*, vol. 37, no. 1, pp. 40-46, Feb. 2018.
10. R. Kumar, **S. J. Darak**, M. Hanawal, A. Sharma and R. Tripathi "Channel Selection for Secondary Users in Decentralized Network of Unknown Size," in *IEEE Communications Letters*, vol. 21, no. 10, pp. 2186-2189, Oct. 2017.
9. **S. J. Darak**, Honggang Zhang, Jacques Palicot and Christophe Moy,"Decision Making Policy for RF Energy Harvesting Enabled Cognitive Radios in Decentralized Wireless Networks," in *Digital Signal Processing (Elsevier)*, vol. 60, pp. 33-45, Jan. 2017.
8. R. Kumar, **S. J. Darak**, A. Sharma and R. Tripathi "Two-Stage Decision Making Policy for Opportunistic Spectrum Access and Validation on USRP Testbed," accepted in *Wireless Networks*, Nov. 2016.
7. **S. J. Darak**, Christophe Moy and Jacques Palicot "Proof-of-Concept System for Opportunistic Spectrum Access in Multi-user Decentralized Networks," accepted in *EAI Transactions on Cognitive Communications*, Sept. 2016.
6. **S. J. Darak**, Sumedh Dhabu, Christophe Moy, Honggang Zhang, Jacques Palicot and A. P. Vinod, "Low Complexity and Efficient Dynamic Spectrum Learning and Tunable Bandwidth Access for

Heterogeneous Decentralized Cognitive Radio Networks," in *Digital Signal Processing (Elsevier)*, vol. 37, pp. 13-23, Feb. 2015.

5. **S. J. Darak**, Jacques Palicot, Honggang Zhang, Vinod A. Prasad and Christophe Moy , "ReconïňĄgurable Filter Bank With Complete Control over Subband Bandwidths for Multi-standard Wireless Communication Receivers," in *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 23, no. 9, pp. 1772-1782, Sept. 2015.
4. **S. J. Darak**, A. P. Vinod, E. M-K. Lai, Honggang Zhang and Jacques Palicot, "Linear Phase VDF Design with Unabridged Bandwidth Control over the Nyquist Band," *IEEE Transactions on Circuits and Systems - II (TCAS-II)*, vol. 61, no. 6, pp. 428-432, April 2014.
3. **S. J. Darak**, A. P. Vinod, K. G. Smitha and E. M-K. Lai, "Low Complexity Reconfigurable Fast Filter Bank for Multi-Standard Wireless Receivers," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 22, no. 5, pp. 1202-1206, July 2013.
2. **S. J. Darak**, A. P. Vinod, and E. M-K. Lai, "Efficient Implementation of Reconfigurable Warped Digital Filters with Variable Lowpass, Highpass, Bandpass and Bandstop Responses," *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, vol. 21, no. 6, pp. 1165-1169, June 2012.
1. **S. J. Darak**, A. P. Vinod, and E. M-K. Lai, "A Low Complexity Reconfigurable Non-uniform Filter Bank for Channelization in Multi-standard Wireless Communication Receivers," *Journal of Signal Processing Systems (Springer)*, vol. 68, no. 1, pp.95-111, July 2012.

PUBLICATIONS: BOOK CHAPTER

2. J. Gulati, B. Prakash and **S. J. Darak**, "An Efficient Timing and Clock Tree Aware Placement Flow with Multibit Flip-Flops for Power Reduction," in *VLSI Design and Test*, Brajesh Kumar Kaushik, Sudeb Dasgupta and Virendra Singh, Ed. Springer Singapore, Feb. 2018.
1. **S. J. Darak**, Amor Nafkha, Christophe Moy and Jacques Palicot, "Is Bayesian Multi-armed Bandit Algorithm Superior?: Proof-of-Concept for Opportunistic Spectrum Access in Decentralized Networks," in *Cognitive Radio Oriented Wireless Networks*, D. Noguet, K. Moessner and J. Palicot, Ed. Springer International Publishing, June 2016, pp. 104-115.

PUBLICATIONS: DEMO

3. Himani Joshi, M. Alaee-Kerahroodi, Bhavani Shankar Mysore Rama Rao, and **S. J. Darak**, "Intelligent Reconfigurable Wideband Spectrum Characterization for 5G Applications, " accepted in *IEEE 5G World Forum*, India, September 2020.
2. Himani Joshi, M. Alaee-Kerahroodi, Bhavani Shankar Mysore Rama Rao, **S. J. Darak,** Sumit Kumar, and Kumar Vijay Mishra, "Learning based Reconfigurable Wideband Non-Contiguous Spectrum Characterization for 5G Applications, " in *45th IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Spain, May 2020.
1. **S. J. Darak**, Navikkumar Modi, Amor Nafkha and Christophe Moy, "Spectrum Utilization and Reconfiguration Cost Comparison of Various Decision Making Policies for Opportunistic Spectrum Access Using Real Radio Signals," in 11^{th} *International Conference on Cognitive Radio Oriented Wireless Networks (CROWNCOM)*, Grenoble, France, May 2016. (**Best Demo Award**)

PUBLICATIONS: INTERNATIONAL CONFERENCES, WORKSHOPS, POSTERS

53. Mayank Rawat, Lasani Hussain, Neeraj Kumar Yadav, **S. J. Darak**, Praveen Tammana and Rinku Shah, "Microservice-based in-network security framework for FPGA NICs," in *23rd International Symposium on Cluster, Cloud and Internet Computing (CCGrid 2023: Poster)*, India, May 2023.
52. A. Tewari, N. Singh, **S. J. Darak**, V. Kizheppatt and M. S. Jafri, "Reconfigurable Wireless PHY with Dynamically Controlled Out-of-Band Emission on Zynq SoC," *IEEE MWSCAS*, Aug. 2022.
51. H. Verma, H. Goel, **S. J. Darak** and M. Hanawal, "Exploiting Side Information for Intelligent and Reconfigurable PHY: Experiments on LTE Transceivers," in *14th International Conference on communication Systems & Networks (COMSNETS 2022: Poster)*, India, Jan. 2022.

50. P. R. Sahoo, R. Rajoria, S. Chandhok, **S. J. Darak**, D. Pau and H. D. Dabral, "Resource Constrained Neural Networks for 5G Direction-of-Arrival Estimation in Micro-controllers," *AIMLSystems 2021 conference*, Bangalore, India, Sept. 2021. (**Best Paper Award**)

49. R. Kumar, S. Satapathy, S. Singh and **S. J. Darak**, "Multi-player Multi-armed Bandits for Dynamic Cognitive Ad-Hoc Networks," *IEEE 5G World Forum*, Sept. 2020.

48. R. Kumar, **S. J. Darak**, and M. Hanawal, "Distributed Algorithm for Opportunistic Spectrum Access in Dynamic Ad Hoc Networks," *International Workshop on Real-life Modeling in 5G Networks and Beyond (REFRESH 2020: co-located with IEEE DCOSS 2020)* , California, USA, May 2020.

47. H. Joshi, Mohammad Alaee-Kerahroodi, Achanna A. Kumar, Bhavani Shankar, and **S. J. Darak**, "Learning Based Reconfigurable Sub-Nyquist Sampling Framework For Ultra-Wideband Angular Sensing," *45th IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, Spain, May 2020.

46. Sai Santhosh and **S. J. Darak**, "Reconfigurable and Computationally Efficient Architecture for Multi-armed Bandit Algorithms," in *IEEE International Symposium on Circuits and Systems (ISCAS)*, Spain, May 2020.

45. Manohar Reddy, **S. J. Darak**, and M. Praveen "Novel Framework for Enabling Hardware Acceleration in GNU Radio," in *IEEE International Symposium on Circuits and Systems (ISCAS)*, Spain, May 2020.

44. N. Agrawal, H. Joshi, **S. J. Darak** and F. Bader, "USRP Testbed and Performance Analysis of New Reconfigurable LDACS In Presence of DME Interference," in *IEEE 16th International Symposium on Wireless Communication Systems (ISWCS)*, Oulu, Finland, Aug. 2019. (**NI Academic Travel Research Grant 2018**)

43. H. Tibrewal, S. Patchala, M. Hanawal and **S. J. Darak**, "Distributed Learning and Optimal Assignment in Multiplayer Heterogeneous Networks," in *IEEE INFOCOM*, Paris, France, April 2019. (**Core A* Conference**)

42. H. Joshi, and **S. J. Darak**, "Review: Wideband Spectrum Sensing for Next Generation Wireless Networks," in *URSI Asia-Pacific Radio Science Conference (AP-RASC 2019)*, Delhi, India, Mar. 2019.

41. S. Sharma, **S. J. Darak** and A. Srivastava, "Transfer Reinforcement Learning based Framework for Energy Savings in Cellular Base Station Network," in *URSI Asia-Pacific Radio Science Conference (AP-RASC 2019)*, Delhi, India, Mar. 2019.

40. R. Verma, **S. J. Darak**, V. Tikkiwal, H. Joshi and R. Kumar, "Countermeasures Against Jamming Attack in Sensor Networks with Timing and Power Constraints," in *11th International Conference on communication Systems & Networks (COMSNETS 2019: Poster)*, India, Jan. 2019.

39. N. Agrawal, and **S. J. Darak**, "Performance Analysis of Reconfigurable Filtered OFDM for LDACS," in *11th International Conference on communication Systems & Networks (COMSNETS 2019: Poster)*, India, Jan. 2019.

38. S. Chandhok, H. Joshi, **S. J. Darak** and A. Subramanyam, "LSTM Guided Modulation Classification and Experimental Validation for Sub-Nyquist Rate Wideband Spectrum Sensing," in *11th International Conference on communication Systems & Networks (COMSNETS 2019: Poster)*, India, Jan. 2019.(**Second Best Poster Award**)

37. R. Kumar, A. Yadav, **S. J. Darak** and M. Hanawal, "Trekking Based Distributed Algorithm for Opportunistic Spectrum Access in Infrastructure-less Network," in *16th International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt 2018)*, China, May 2018. (**WiOpt'18 Student Grant**)

36. S. Sawant, M. Hanawal, **S. J. Darak** and R. Kumar, "Distributed Learning Algorithms for Coordination in a Cognitive Network in Presence of Jammers," in *16th International Symposium on Modeling and Optimization in Mobile, Ad Hoc and Wireless Networks (WiOpt 2018)*, China, May 2018.

35. Gyan Deep, **S. J. Darak** and P. Garg, "Spectral Parameter Approximation Based Tunable Digital Filters on Zynq SoC," in *IEEE International Symposium on Circuits and Systems (ISCAS)*, Italy, May 2018.

34. H. Joshi, R. Kumar, A. Yadav and **S. J. Darak**, "Distributed Algorithm for Dynamic Spectrum Access in Infrastructure-less Cognitive Radio Network," in *IEEE Wireless Communications and Networking Conference (WCNC)*, Spain, April 2018. (**2017 National Instruments (NI) Academic Research Grant**)

33. **S. J. Darak**, "Parallel Aggregated MAB Framework for Source Selection in Multi-Antenna RF Harvesting Circuit," in *IEEE Wireless Communications and Networking Conference (WCNC)*, Spain, April 2018.

32. P. Jain, V. Batra and **S. J. Darak**, "Improved Hierarchical Decision Making Policy for Reliable and Green Electricity Grid," in *10th International Conference on communication Systems & Networks (COMSNETS 2018)*, India, Jan. 2018.

31. N. Agrawal, **S. J. Darak** and F. Bader, "Reconfigurable Filtered OFDM Waveform for Next Generation Air-to-Ground Communications," in *IEEE/AIAA 36th Digital Avionics Systems Conference (DASC)*, Florida, USA, Sept. 2017. (**Second Best Paper Award**)

30. S. Garg, N. Agrawal, **S. J. Darak** and P. Sikka, "Spectral Coexistence of Candidate Waveforms and DME in Air-to-Ground Communications: Analysis via Hardware Software Co-Design on Zynq SoC," in *IEEE/AIAA 36th Digital Avionics Systems Conference (DASC)*, Florida, USA, Sept. 2017. (**IIIT-Delhi Best MTech Thesis Award 2017 (ECE)**)

29. N. Modi, P. Mary, C. Moy and **S. J. Darak**, "Proof-of-Concept: Spectrum and Energy Efficient Multi-User CR Network via Vacancy and Quality based Channel Selection," in *XXXII General Assembly and Scientific Symposium of the URSI*, pp. 1–4, Montreal, Canada, Aug. 2017.

28. H. Joshi and **S. J. Darak**, "Sub-Nyquist Sampling and Machine Learning based Online Automatic Modulation Classifier for Multi-carrier Waveform," in *XXXII General Assembly and Scientific Symposium of the URSI*, pp. 1–4, Montreal, Canada, Aug. 2017.

27. A. Unnam and **S. J. Darak**, "Bayesian Multi-Armed Bandit Framework for Multi-Band Auction Based Dynamic Spectrum Access in Multi-User Decentralized Networks," in *XXXII General Assembly and Scientific Symposium of the URSI*, pp. 1–4, Montreal, Canada, Aug. 2017. (**Young Scientist Paper Award and Conference Travel Grant**)

26. S. Kumar, V. A. Bohara and **S. J. Darak**, "Automatic Modulation Classification by Exploiting Cyclostationary Features in Wavelet Domain, " in 23^{rd} *National Conference on Communications (NCC)*, India, Mar. 2017.

25. S. Sharma, **S. J. Darak** and A. Srivastava, "Energy Saving in Heterogeneous Cellular Network via Transfer Reinforcement Learning Based Policy, " in 9^{th} *International Conference on COMmunication Systems & NETworkS (COMSNETS)*, India, Jan. 2017.

24. P. Kumar, **S. J. Darak** and Y. Yeleswarapu, "Performance Evaluation of Cumulant Feature Based Automatic Modulation Classifier on USRP Testbed, " in 9^{th} *International Conference on COMmunication Systems & NETworkS (COMSNETS)*, India, Jan. 2017.

23. R. Kumar, **S. J. Darak**, A. Sharma and R. Tripathi, "Two-Stage Decision Making Policy Using Bayesian Multi-armed Bandit Algorithm for Opportunistic Spectrum Access, " in *International conference on Big Data and Advanced Wireless technologies (BDAW)*, Bulgaria, Nov. 2016.

22. H. Joshi, **S. J. Darak** and Y. LOUET, "Testbed and Experimental Analysis of Automatic Modulation Classifier for Non-uniformly Sampled Signal, " in 10^{th} *IEEE International Conference on Advanced Networks and Telecommuncations Systems (ANTS)*, India, Nov. 2016.

21. S. Sharma, **S. J. Darak**, A. Srivastava and H. Zhang, "A Transfer Learning Framework for Energy Efficient Wi-Fi Networks and Performance Analysis Using Real Data," in 10^{th} *IEEE International Conference on Advanced Networks and Telecommuncations Systems (ANTS)*, India, Nov. 2016.

20. H. Joshi, **S. J. Darak** and Y. LOUET, "Blind and Adaptive Reconstruction Approach for Non-Uniformly Sampled Wideband Signal," in 5^{th} *IEEE International Conference on Advances in Computing, Communications and Informatics (ICACCI)*, India, Sept. 2016.

19. S. Kumar, V. A. Bohara and **S. J. Darak**, "Blind Symbol Rate Estimation by Exploiting Cyclostationary Features in Wavelet Domain," in 5^{th} *IEEE International Conference on Advances in Computing, Communications and Informatics (ICACCI)*, India, Sept. 2016.

18. **S. J. Darak**, Christophe Moy and Jacques Palicot, "Smart Decision Making Policy for Faster Harvesting From Ambient RF Sources in Wireless Sensor Nodes," in 13^{th} *IEEE International Symposium on Wireless Communication Systems (ISWCS)*, Poland, Sept. 2016.

17. S. Garg and **S. J. Darak**, "FPGA Implementation of High Speed Reconfigurable Filter Bank for Multi-standard Wireless Communication Receivers," in 20^{th} *IEEE VLSI Design and Test Symposium (VDAT-2016)*, India, May 2016.

16. P. Sharma, J. Gulati, K. Bharath, R. Anusha, P. Walia and **S. J. Darak**, "Quantification of figures of merit of 7T and 8T SRAM cell in sub-threshold region and their comparison with the conventional 6T SRAM cell," in 20^{th} *IEEE VLSI Design and Test Symposium (VDAT-2016)*, India, May 2016.

15. **S. J. Darak**, Christophe Moy and Jacques Palicot, "Bayesian Multi-Armed Bandit Based Decision Making Policy for RF Energy Harvesting Enabled Wireless Sensor Nodes," in *URSI-France Workshop on Energy and Radio Science*, Rennes, France, March 2016.

14. **S. J. Darak**, Honggang Zhang, Jacques Palicot and Christophe Moy, "Compute-Efficient Decision-Making Policy for D2D Communications and RF Energy Harvesting in Cognitive Radio Networks: Go Bayesian!," in 23^{rd} *European Signal Processing Conference (EUSIPCO)*, pp. 1–5, Nice, France, Aug. 2015.

13. **S. J. Darak**, Christophe Moy, Honggang Zhang and Jacques Palicot, "Dynamic Spectrum Access with Tunable Bandwidth for Multi-standard Cognitive Radio Receivers," in 38^{th} *International Conference on Telecommunications and Signal Processing*, pp. 1–5, Berlin, Germany, July 2015.

12. **S. J. Darak**, Honggang Zhang, Jacques Palicot and Christophe Moy, "Efficient Decentralized Dynamic Spectrum Learning and Access Scheme for Multi-standard Multi-user Cognitive Radio Networks," in 11^{th} *International Symposium on Wireless Communication Systems (IEEE ISWCS'2014)*, pp. 271–175, Barcelona, Spain, Aug. 2014.

11. Sumedh Dhabu, **S. J. Darak**, A. P. Vinod and Jacques Palicot, "Design of Low Complexity Variable Digital Filter with Large Cutoff Frequency Range based on Second Order Frequency Transformation and Interpolation," in *XXXI General Assembly and Scientific Symposium of the URSI*, pp. 1–4, Beijing, China, Aug. 2014. (**Young Scientist Paper Award**)

10. **S. J. Darak**, Xiguang Wu, Jacques Palicot and Honggang Zhang, "Linear Phase Filter Bank Design with Unabridged Control over Bandwidth and Center Frequency of Subbands," in *XXXI General Assembly and Scientific Symposium of the URSI*, pp. 1–4, Beijing, China, Aug. 2014.

9. Xiguang Wu, **S. J. Darak**, Pierre Leray, Jacques Palicot and Honggang Zhang, "Reconfiguration Management on FPGA Platform for Cognitive Radio," in *XXXI General Assembly and Scientific Symposium of the URSI*, pp. 1–4, Beijing, China, Aug. 2014. (**Travel Grant URSI-France**)

8. **S. J. Darak**, Honggang Zhang, Jacques Palicot and A. P. Vinod, "Efficient Spectrum Sensing for Green Cognitive Radio Using Low Complexity Reconfigurable Fast Filter Bank," *IEEE International Conference on Advanced Technologies for Communications*, pp. 318-322, Ho Chi Minh City, Vietnam, Oct. 2013. (**Invited Paper for Special Session on Green Communications**)

7. **S. J. Darak**, A. P. Vinod and E. M-K. Lai, "An Area and Power Efficient Two-Stage Parallel Spectrum Sensing Scheme for Cognitive Radios," *IEEE International Symposium on Communications and Information Technologies (ISCIT)*, pp. 263-267, Gold Coast, Australia, Oct. 2012.

6. **S. J. Darak**, A. P. Vinod and E. M-K. Lai, "Design of Variable Linear Phase FIR Filters Based on Second Order Frequency Transformations and Coefficient Decimation," *IEEE International Symposium on Circuits and Systems (ISCAS)*, pp. 3182-3185, Seoul, South Korea, May 2012.

5. **S. J. Darak**, A. P. Vinod and E. M-K. Lai, "Design of Variable Linear Phase FIR Filters Based on Second Order Frequency Transformations and Coefficient Decimation," 18^{th} *Electronics New Zealand Conference (ENZCON)*, Palmerston North, New Zealand, Nov. 2011.

4. **S. J. Darak**, A. P. Vinod and E. M-K. Lai, "A Low Complexity Spectrum Sensing Scheme for Estimating Frequency Band Edges in Multi-Standard Military Communication Receivers," *International Conference on Communication, Science and Information Engineering (CCSIE)*, London, ISBN: 978-0-9556254, July 2011, in print.
3. **S. J. Darak**, A. P. Vinod and E. M-K. Lai, "A New Variable Digital Filter Design Based on Fractional Delay," *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, pp. 1629-1632, Prague, Czech Republic, May 2011.
2. **S. J. Darak**, R. Mahesh, A. P. Vinod and E. M-K. Lai, "A Reconfigurable Filter Bank for Uniform and Non-uniform Channelization in Multi-Standard Wireless Communication Receivers," 17^{th} *IEEE International Conference on Telecommunications (ICT)*, pp. 951-956, Doha, Qatar, May 2010.
1. H. M. Rode, A. S. Chiddarwar and **S. J. Darak**, "Suitability of FPGA for Computationally Intensive Image Processing Algorithms," 17^{th} *IET seminar digest*, 2009. (**Best Paper Award**)

Workshops/FDP Coordinator

- 14-day *Summer School on Digital System Design for FPGA* at IIIT Delhi under the National Academic Immersion Program (NAIP) for MIT WPU Students, IIIT-Delhi, India, July 8 - 21, 2023.
- 4-Week Online Employability Enhancement Program on VLSI ReVisited: From Analog to Digital (Third Edition), IIIT-Delhi, India, July 4- July 28, 2023.
- 15-day *Winter School on Digital System Design for FPGA and ASIC* at IIIT Delhi under the National Academic Immersion Program (NAIP) for MIT WPU Students, IIIT-Delhi, India, Jan. 4 - Jan. 19, 2023.
- Co-chair of the MINDS workshop at COMSNETS 2023.
- 6-Week Online Employability Enhancement Program on VLSI ReVisited: From Analog to Digital (Third Edition), IIIT-Delhi, India, June 20- July 29, 2022.
- 5-day *Artificial Intelligene (AI) on System-on-Chip (SoC)* under AICTE Training And Learning (ATAL) Academy Cell on Jan. 10-14, 2022 at IIIT Delhi.
- 5-Week Online Employability Enhancement Program on VLSI ReVisited: From Analog to Digital (Second Edition), IIIT-Delhi, India, June 7- July 9, 2021.
- COMSNETs 2021 Tutorial on Distributed Learning Algorithms for Wireless Networks , Jan. 2021.
- 4-Week Online Employability Enhancement Program on VLSI ReVisited: From Analog to Digital , IIIT-Delhi, India, July 20- August 14, 2020.
- Training for Industry Professionals on 5G Physical Layer, VVDN Technologies, India, June 25-July 30, 2020.
- 5-day *Artificial Intelligence: Algorithms to Architecture* under AICTE Training And Learning (ATAL) Academy Cell on June 8-12, 2020 at IIIT Delhi.
- *Open Source Software Defined Radio Workshops* in collaboration with Ettus Research, USA and National Instruments, India (June 2018 and Nov. 2019) at IIIT Delhi.
- 5-day *Internet of Things (IoT) Workshop* under AICTE Training And Learning (ATAL) Academy Cell on Dec. 17-21, 2019 at IIIT Delhi.
- 6-day FDP on *Hardware-software Co-design on Zynq SoC* on Dec. 18-23, 2018 at IIIT Delhi.
- 2-day *NGWiN: Next-Generation Wireless Networks* workshop on March 8-9, 2019 at IIIT Delhi.
- 2-day workshop at IIIT-Delhi on *FPGA Design Flow*. This workshop was held in collaboration with Coreel Technologies.
- 1-day workshop at IIIT-Delhi on *Model Based Design for Software Defined Radio Using Matlab/Simulink and FPGA*.

Institute Service

- Dean of Academic Affairs (June 2023-Present)
- UG Affairs Chair (2020-2023)
- Member of academic affairs committee (AAC) (June 2020 - Present), Disciplinary Action Committee (DAC) (Jan. 2022- Present), Convocation Committee (June 2020-Present), Senate (2019-Present), IIIT Delhi.
- Contributed to various decision making as the member of the PGC, Senate, ECE lab and library committees.

- **Online assessment portal**: Developed online assessment portal for conducting end-sem exams for online courses: http://assessments.iiitd.edu.in/. This portal has been used by over 350 students as well as for conducting preliminary test for shortlisting teaching fellow candidates.
- **Online courses with credits:** Faculty coordinator from the beginning and develop the process of course selection, approval and evaluation at IIIT Delhi.
- **ECE PhD coordinator:** Mainly involved in handling queries of PhD students and conducting PhD qualification exam (for ECE).
- **Faculty co-ordinator for Community Work:** We conducted first-ever and only the NGO Fair at IIIT Delhi where we invited 17 NGOs to interact with students. We had total 250+ students participation in this fair. Other works include poster presentation and website development.
- MTech Thesis award committee in 2018 and 2019.
- Mentor for 1-month MTech FPGA refresher course for last three years.
- Organized various workshops and FDPs on FPGAs, IoT and SDRs.
- Member of various committees such as PhD yearly reviews, MTech/PhD admissions, BTP evaluations.