Washim Uddin Mondal

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EMPLOYMENT

Assistant Professor | Indian Institute of Technology Kanpur | 14 Feb 2024 - Current | Kanpur, UP, India

- Joined the Department of Electrical Engineering (EE)

Postdoc | Purdue University | 12 April 2021 – 31 December 2023 | West Lafayette, Indiana, USA

- Worked with Prof. Satish V. Ukkusuri and Prof. Vaneet Aggarwal on the theory of reinforcement learning and its application in large networked systems.

Quantitative Researcher | WorldQuant LLC | July 2016 – December 2016 | Mumbai, India

- Worked on framing predictive mathematical models to anticipate price movements in stock markets.

EDUCATION

Ph. D. | Indian Institute of Technology Kharagpur | 4 January 2017 - 4 January 2021

- Worked under the supervision of Prof. Goutam Das at G. S. Sanyal School of Telecommunications.
- Converted into Prime Minister's Research Fellowship (PMRF) in July 2018.

B. Tech.-M.Tech. Dual Degree (E&ECE) | Indian Institute of Technology Kharagpur | July 2011 - April 2016

- M. Tech. Specialization in Telecommunications.
- Final Cumulative Grade Point Average (CGPA) was **9.51 / 10.0**.

10+2 | Burdwan Municipal High School | Burdwan | West Bengal

- Passed the Higher Secondary Examination in May 2011 with **90.6%** marks.
- Passed the Secondary Examination in May 2009 with **90.87%** marks.

EXPERIENCE

Indian Army | Special Invitee | 27 September 2017 – 4 October 2017 | New Delhi, India

- Invited by Directorate General of Signal Intelligence, Indian Army to solve a problem of national importance.

École Polytechnique Fédérale de Lausanne (EPFL) | Internship| May 2014 – July 2014 | Lausanne, Switzerland

- Analytical modelling and simulation of different optical properties of carbon nanotube in radial mode of vibration.
- Performed under the supervision of Prof. Tobias J. Kippenberg.

AWARDS

2025 Prime Minister Early Career Research Grant (PMECRG)
2022 Winner of Graduate Thesis Evaluation in 7 minutes (GraTE-7) competition by IEEE Communications Society
2021 Best paper award at NeurIPS Workshop for Cooperative AI
2018 Prime Minister's Research Fellowship (PMRF)
2017 Appreciation Letter from Additional Director General (ADG), Signal Intelligence, Indian Army
2014 DAAD Scholarship
2011 IIT JEE| National Rank 953
2011 Kishor Vigyan Protsahan Yojana (KVPY) Scholarship| National Rank 81
2011 WB Joint Entrance Examination (Engineering)| State Rank 17
2011 Jagadish Bose National Science Talent Search (JBNSTS) Scholarship
2010 National Standard Examination in Physics| National Top 1%
2010 National Standard Examination in Astronomy (Senior)| State Top 1%
2007 National Standard Examination in Astronomy (Junior)| State Top 1%
2007 National Talent Search Examination (NTSE) Scholarship

JOURNAL PUBLICATIONS

[23] W. U. Mondal, and V. Aggarwal, 'Last-Iterate Convergence of General Parameterized Policies in Constrained MDPs', **Transactions on Machine Learning Research**, May. 2026.
[22] G. Chaudhary, W. U. Mondal, and L. Behera, 'MOORL: A Framework for Integrating Offline-Online Reinforcement Learning', **Transactions on Machine Learning Research**, May. 2025.
[21] W. U. Mondal, V. Aggarwal, and S. V. Ukkusuri, 'Mean-Field Approximation of Cooperative Constrained Multi-Agent Reinforcement Learning (CMARL)', **Journal of Machine Learning Research**, vol. 25, no. 260, pp. 1-33, Mar. 2024.
[20] L. Ling, W. U. Mondal, and S. V. Ukkusuri, 'Cooperating Graph Neural Networks with Deep Reinforcement Learning for Vaccine Prioritization', **IEEE Journal of Biomedical and Health Informatics**, vol. 28, no. 8, pp. 4891-4902, Aug. 2024.
[19] W. U. Mondal, V. Goyal, S. V. Ukkusuri, G. Das, D. Wang, M. -S. Alouini, and V. Aggarwal, 'Near-Perfect Coverage Manifold Estimation in Cellular Networks via Conditional GAN', **IEEE Networking Letters**, vol. 6, no. 2, pp. 97-100, Jun. 2024.
[18] R. Wang, W. U. Mondal, M. A. Kishk, V. Aggarwal, and M. -S. Alouini, 'Terrain-Based Coverage Manifold Estimation: Machine Learning, Stochastic Geometry, or Simulation?', **IEEE Open Journal of the Communications Society**, vol. 5, pp. 633-648, 2024.
[17] W. U. Mondal, and V. Aggarwal, 'Reinforcement Learning with Delayed, Composite, and Partially Anonymous Reward', **Transactions on Machine Learning Research**, Aug. 2023.
[16] A. A. Sardar, D. Roy, W. U. Mondal, and G. Das, 'Coalition Formation for Outsourced Spectrum Sensing in Cognitive Radio Network', **IEEE Transactions on Cognitive Communications and Networking**, vol. 9, no. 3, pp. 580-592, Jun. 2023.
[15] W. U. Mondal, V. Aggarwal, and S. V. Ukkusuri, 'Mean-Field Control based Approximation of Multi-Agent Reinforcement Learning in Presence of a Non-decomposable Shared Global State', **Transactions on Machine Learning Research**, May 2023.
[14] W. U. Mondal, P. D. Mankar, G. Das, V. Aggarwal, and S. V. Ukkusuri, 'Deep Learning based Coverage and Rate Manifold Estimation in Cellular Networks', **IEEE Transactions on Cognitive Communications and Networking**, vol. 8, no. 4, pp. 1706-1715, Dec. 2022.
[13] W. U. Mondal, V. Aggarwal, and S. V. Ukkusuri, 'On the Near-Optimality of Local Policies in Large Cooperative Multi-Agent Reinforcement Learning', **Transactions on Machine Learning Research**, Sept. 2022.
[12] A. A. Sardar, D. Roy, W. U. Mondal, and G. Das, 'Sustainability Analysis of Opportunistic CR-IoT Network Employing Microwave Power Transfer', **IEEE Transactions on Cognitive Communications and Networking**, vol. 8, no. 3, pp. 1411-1421, Sept. 2022.
[11] A. A. Sardar, D. Roy, W. U. Mondal, and G. Das, 'Queuing Analysis of QoS Aware Microwave Power Transfer Enabled CR-IoT Network', **IEEE Transactions on Wireless Communications**, vol. 21, no. 9, pp. 6834-6846, Sept. 2022.
[10] W. U. Mondal, M. Agarwal, V. Aggarwal, and S. V. Ukkusuri, 'On the Approximation of Cooperative Heterogeneous Multi-Agent Reinforcement Learning (MARL) using Mean Field Control (MFC)', **Journal of Machine Learning Research**, vol. 23, no. 129, pp. 1-46, Mar. 2022.
[9] W. U. Mondal, A. A. Sardar, and G. Das, 'Economic Analysis of Cognitive Underlay Networks: A Nash Bargaining Based Approach', **IEEE Transactions on Vehicular Technology**, vol. 70, no. 2, pp. 2024-2029, Feb. 2021.
[8] W. U. Mondal, and G. Das, 'On Exact Distribution of Poisson-Voronoi Area in K-tier HetNets with Generalized Association Rule', **IEEE Communications Letters**, vol. 24, no. 10, pp. 2142 - 2146, Oct. 2020.
[7] W. U. Mondal, D. Roy, S. Dutta, and G. Das, 'Economics of Resilient TWDM PONs', **IEEE/OSA Journal of Lightwave Technology**, vol. 38, no. 8, pp. 2114-2126, Apr. 2020.
[6] W. U. Mondal, A. A. Sardar, N. Biswas, and G. Das, 'Nash Bargaining Based Economic Analysis of Opportunistic Cognitive Cellular Networks', **IEEE Transactions on Cognitive Communications and Networking**, vol. 6, no. 1, pp. 242-255, Mar. 2020.
[5] W. U. Mondal, and G. Das, 'Economics of TWDM PONs with Nonlinear Pricing', **IEEE Communications Letters**, vol. 23, no. 5, pp. 822-825, May 2019.
[4] W. U. Mondal, D. Roy, S. Dutta, and G. Das, 'Economic Analysis of TWDM PONs: A Sustainability and Policy-Making Perspective', **IEEE/OSA Journal of Optical Communications and Networking**, vol. 11, no. 3, pp. 79-94, Mar. 2019.
[3] W. U. Mondal, and G. Das, 'Blocking Predation in Cellular Monopoly through Non-linear Spectrum Pricing', **IEEE Communications Letters**, vol. 21, no. 11, pp. 2464-2467, Nov. 2017.
[2] W. U. Mondal, and G. Das, 'Uplink User Process in Poisson Cellular Network', **IEEE Communications Letters**, vol. 21, no. 9, pp. 2013-2016, Sept. 2017.

[1] W. U. Mondal, S. Biswas, G. Das, and P. Ray, 'Traffic-Aware Green Cognitive Radio', **Physical Communication**, vol. 23, pp. 20-28, Jun. 2017.

CONFERENCE PUBLICATIONS

[14] Y. Xu, S. Ganesh, W. U. Mondal, Q. Bai, and V. Aggarwal, 'Global Convergence for Average Reward Constrained MDPs with Primal-Dual Actor Critic Algorithm', **Neural Information Processing Systems (NeurIPS)**, San Diego, USA, 2025.
[13] Y. Xu, W. U. Mondal, and V. Aggarwal, 'Finite-Sample Analysis of Policy Evaluation for Robust Average Reward Reinforcement Learning', **Neural Information Processing Systems (NeurIPS)**, San Diego, USA, 2025.
[12] S. Ganesh, W. U. Mondal, and V. Aggarwal, 'A Sharper Global Convergence Analysis for Average Reward Reinforcement Learning via an Actor-Critic Approach', **International Conference on Machine Learning (ICML)**, Vancouver, Canada, 2025.
[11] S. Ganesh, J. Chen, W. U. Mondal, and V. Aggarwal, 'Order-Optimal Global Convergence for Average Reward Actor-Critic with General Policy and Neural Critic Parametrization', **Conference on Uncertainty in Artificial Intelligence (UAI)**, Rio de Janeiro, Brazil, 2025.
[10] S. Ganesh, W. U. Mondal, and V. Aggarwal, 'Order-Optimal Regret with Novel Policy Gradient Approaches in Infinite Horizon Average Reward MDPs', **International Conference on Artificial Intelligence and Statistics (AISTATS)**, Phuket, Thailand, 2025.
[9] S. Chakrabarti, and W. U. Mondal, 'Uplink NOMA-Aided Multi-Device Multi-Target Integrated Sensing and Communication', **National Conference on Communications (NCC)**, New Delhi, India, 2025.
[8] W. U. Mondal, and V. Aggarwal, 'Sample-Efficient Constrained Reinforcement Learning with General Parameterization', **Neural Information Processing Systems (NeurIPS)**, Vancouver, Canada, 2024.
[7] Q. Bai, W. U. Mondal, and V. Aggarwal, 'Learning General Parameterized Policies for Infinite Horizon Average Reward Constrained MDPs via Primal-Dual Policy Gradient Algorithm', **Neural Information Processing Systems (NeurIPS)**, Vancouver, Canada, 2024.
[6] W. U. Mondal, and V. Aggarwal, 'Improved Sample Complexity Analysis of Natural Policy Gradient Algorithm with General Parameterization for Infinite Horizon Discounted Reward Markov Decision Processes', **International Conference on Artificial Intelligence and Statistics (AISTATS)**, Valencia, Spain, 2024.
[5] Q. Bai*, W. U. Mondal*, and V. Aggarwal, 'Regret Analysis of Policy Gradient Algorithm for Infinite Horizon Average Reward Markov Decision Processes', **AAAI Conference on Artificial Intelligence**, Vancouver, Canada, 2024.
[4] W. U. Mondal, V. Aggarwal, and S. V. Ukkusuri, 'Can Mean Field Control (MFC) Approximate Cooperative Multi Agent Reinforcement Learning (MARL) with Non-Uniform Interaction?', **Conference on Uncertainty in Artificial Intelligence (UAI)**, Eindhoven, Netherlands, 2022.
[3] W. U. Mondal, M. Agarwal, V. Aggarwal, and S. V. Ukkusuri, 'On the Approximation of Cooperative Heterogeneous Multi-Agent Reinforcement Learning (MARL) using Mean Field Control (MFC)', **Neural Information Processing Systems (NeurIPS)** Workshop for Cooperative AI, 2021, **Best paper award, Spotlight talk**.
[2] W. U. Mondal, and G. Das, 'Predation Blocking Strategies in Real Cellular Networks and Its Impact on Spectrum Revenue', **IEEE Vehicular Technology Conference (VTC-Fall)**, Honolulu, Hawaii, USA, 2019.
[1] W. U. Mondal, A. A. Sardar, N. Biswas, and G. Das, 'Nash Bargaining Based Economic Analysis of Cognitive Cellular Networks', **IEEE International Conference on Communications (ICC)**, Shanghai, China, 2019.
* Equal contribution.

BOOKS/MONOGRAPHS

[1] V. Aggarwal, W. U. Mondal, and Q. Bai, 'Constrained Reinforcement Learning with Average Reward Objective: Model-Based and Model-Free Algorithms', **Foundations and Trends® in Optimization**, vol. 6, no. 4, pp. 193-298, 2024.

TEACHING RECOGNITION

[3] **Signals Systems and Networks (EE200)**, Semester I, 2025-2026 at IIT Kanpur. Received the Director's appreciation for performing exceptionally well as a tutor.
[2] **Representation and Analysis of Random Signals (EE621)**, Semester I, 2025-2026 at IIT Kanpur. Received the Director's appreciation for performing exceptionally well as an instructor.
[1] **Quantum Computing and Communications (EE798V)**, Semester II, 2024-2025 at IIT Kanpur. Received the Director's appreciation for performing exceptionally well as an instructor.