

Resume

Name and Designation

Aneek Adhya, Associate Professor

Organization

G. S. Sanyal School of Telecommunication

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Specialization and Expertise

- Computer Communication and Networks
- Optical Communication and Networks
- Wireless Networks
- Sensor Networks

Ph.D. Students (Degree Awarded)

1. **Dr. Suman Kumar Dey** (Institute Fellowship), Thesis Title: Design and Operation Strategies for IP-over-WDM Networks with Awareness of Cost and Energy Efficiency, Defended: 2017, IIT Patna.
2. **Dr. Jitendra Gupta** (UGC NET-JRF), Thesis Title: Design of Quality of Service aware Time Division Multiplexing Based Long-reach Optical Access Networks, Defended: 2020, IIT Patna.
3. **Dr. Pramit Biswas** (Deity Visvesvaraya), Thesis Title: Energy-efficient IP-over-Elastic Optical Network Planning and Operation Strategies, Defended: 2021, IIT Patna.
4. **Dr. Shahbaz Akhtar** (Deity Visvesvaraya), Thesis Title: Capex and Opex Efficient Access Network Planning Strategies using TWDM/WDM PON, Defended: 2021, IIT Patna.

Journal Publications (Published)

1. T. Bose, N. Chatur, S. Baberwal, and **A. Adhya**, "Caching and Computing Resource Allocation in Cooperative Heterogeneous 5G Edge Networks using Deep Reinforcement Learning", IEEE Transactions on Network and Service Management, Volume 21, Issue 4, pp.1-18, 2024.
2. N. Chatur, T. Bose, and **A. Adhya**, "Planning Cost-Efficient FiWi Access Network with Joint Deployment of FWA and FTTH", IEEE Transactions on Communications, Volume 72, Issue 9, pp.1-16, 2024.
3. T. Bose, N. Chatur, M. Mukherjee, S. Verma, and **A. Adhya**, "Traffic-Aware Optimal Multi-Beam Resource Allocation in 5G Networks Impaired by Rain and Foliage", IEEE Communications Letters, Vol. 26, pp. 1-5, 2024.
4. J. Gupta, R. Bansal, SK Dey, and **A. Adhya**, "MAC-DBA based new cost-efficient architectures of network-congestion-aware and survivable fiber-wireless and FTTx networks", Optical Fiber Technology, Elsevier, 84, pp. 1-15, 2024.
5. P. Biswas, S. Akhtar, S. Saha, S. Majhi, and **A. Adhya**, "Q-Learning Based Energy-Efficient Network Planning in IP-over-EON", IEEE Transactions on Network and Service Management, Volume 20, Issue 1, pp. 3-13, 2023.
6. S. K. Dey, J. Gupta, and **A. Adhya**, "Design of CapEx and OpEx aware IP-over-WDM network using different types of traffic bypass and grooming techniques", Optical Fiber Technology, Elsevier, 81, pp. 1-12, 2023.
7. S. Akhtar, J. Gupta, I. Alam, S. Majhi, and **A. Adhya**, "Fronthaul latency and capacity constrained cost-effective and energy-efficient 5G C-RAN deployment", Optical Fiber Technology, Elsevier, 80, pp. 1-11, 2023.
8. N. Chatur and **A. Adhya**, "TDM-PON and LTE-A Based Cost-Efficient FiWi Access Network Deployment", IEEE Communications Letters, Volume 26, Issue 11, pp. 1-5, 2022.

9. J. Gupta, S. Akhtar, **A. Adhya**, and S. Majhi, "Design of QoS-aware Long-reach Optical Backhaul for Wireless and FTTx Networks with Enhanced Backup Resource Utilization", *Optical Fiber Technology*, Elsevier, 72, pp. 1-11, 2022.
10. P. Biswas, S. Das, D. G. Adhya, and **A. Adhya**, "Wavelength-routed Optical Backbone Network Planning Under Fuzzy Environment", *Optical and Quantum Electronics*, Volume 54, pp. 1-17, 2022.
11. J. Gupta, S. Akhtar, **A. Adhya**, and S. Majhi, "Optimal Planning and Design of SRLG-aware Survivable LR-PON for Wireless and FTTx Networks", *Computer Networks*, Elsevier, Volume 194, pp. 1-13, 2021.
12. P. Biswas and **A. Adhya**, "Energy-Efficient, EDFA Lifetime-Aware Network Planning Along With Virtualized Elastic Regenerator Placement for IP-over-EON", *Photonic Network Communications*, Springer, Volume 41, pp. 119-135, 2021.
13. S. Akhtar, **A. Adhya**, J. Gupta, and S. Majhi, "Cost-optimal Architecture Design for Adaptive Multi-stage TWDM-PON with PtP WDM Overlay", *Optical Engineering*, Volume 60, pp. 1-22, 2021.
14. P. Biswas and **A. Adhya**, "Energy-efficient Network Planning and Traffic Provisioning in IP-over-Elastic Optical Networks", *Optik*, Elsevier, Volume 185, pp. 1115-1133, 2019.
15. S. Akhtar, P. Biswas, and **A. Adhya**, "An ILP-based CapEx and OpEx Efficient Multi-stage TDM/TWDM PON Design Methodology", *Optical Fiber Technology*, Elsevier, Volume 46, pp. 205-214, 2018.
16. S. K. Dey and **A. Adhya**, "Delay-aware Green Service Migration Schemes for Data Center Traffic", *IEEE/OSA Journal of Optical Communications and Networking*, Volume 8, pp. 962 – 976, 2016.
17. J. Gupta and **A. Adhya**, "Clustering-based Multi-hop Protection Scheme for Long-reach Passive Optical Network Against Single Shared-risk Link Group Failure", *Photonic Network Communications*, Springer, Volume 32, pp. 372–385, 2016.
18. S. K. Dey and **A. Adhya**, "IP-Over-WDM Network Design Methodology to Improve Efficiency in Overall Expenditure Due to Cost and Energy Consumption", *IEEE/OSA Journal of Optical Communications and Networking*, Volume 7, Issue 6, pp. 563 - 577, 2015.
19. **A. Adhya** and D. Datta, "Lightpath Topology Design for Wavelength-Routed Optical Networks in Presence of Four-Wave Mixing", *IEEE/OSA Journal of Optical Communications and Networking*, Volume 4, Issue 4, pp. 314–325, 2012.
20. **A. Adhya** and D. Datta, "Design Methodology for WDM Backbone Networks using FWM- Aware Heuristic Algorithm," *Optical Switching and Networking*, Elsevier, Volume 6, pp. 10-19, 2009.

Conference Publications (Published/Accepted)

1. N. Das, K. Sarkar, T. Bose, **A. Adhya**, S. Misra, "DeMPUP: Energy-Efficient UPF Placement for Beyond 5G Social Metaverse Traffic", *IEEE Global Communications Conference (GLOBECOM)*, pp. 1-6, Cape Town, South Africa, Dec. 2024.
2. T. Bose, N. Chatur, **A. Adhya**, "Energy-Efficient Disjoint Multi-UAV Deployment for Emergency Communication in Disaster-Affected Areas", *IEEE India Council International Conference (INDICON)*, pp. 1-6, IIT Kharagpur, Dec. 2024.
3. S. Guria, C. Debnath, D. Guha, **A. Adhya**, "A Novel Ensemble Learning Approach based on Choquet Integral using Multi Assessment of Classifiers for Breast Cancer Prediction", *IEEE India Council International Conference (INDICON)*, pp. 1-6, IIT Kharagpur, Dec. 2024.
4. S. Poyekar, A. Samanta, A. K. Dutta, **A. Adhya**, "Efficient Low-Latency and Traffic Aware Dynamic Bandwidth Allocation for XG-PON", *Workshop on Optical Wireless communication Systems, IEEE ANTS 2024*, pp. 1-6, IIT Guwahati, Dec. 2024.
5. G. Reddy, C. Debnath, D. Guha, **A. Adhya**, and M. Mahadevappa, "Epileptic EEG Signals Classification Based on Multi-Criteria Decision Aid Classifier Ensemble Approach", *National Conference on Communications (NCC)*, IIT Madras, pp. 1-6, Feb. 2024.
6. S. Verma, S. Kaur, **A. Adhya**, G. Kaddoum, and B. Brik, "CROP: Cluster-based Routing using Optimized Framework for IoT-based Precision Agriculture", *IEEE International Conference on Communications (ICC)*, Rome, Italy, pp. 1-6, May 2023.

7. S. Verma and **A. Adhya**, "DAAPEO: Detect and avoid path planning for UAV-assisted 5G enabled energy-optimized IoT", International Workshop on Drone-Assisted Wireless Communications for 5G and Beyond (DroneCom) in conjunction with IEEE Infocom, pp. 1-6, New York, USA, Virtual, May 2023.
8. H. Singh, S. Verma, and **A. Adhya**, "A Brief Review on Position-based Routing Protocols in Flying Ad-hoc Networks", International Conference on Contemporary Computing and Informatics (IC3I), AMITY University, Virtual, pp. 1-6, Dec. 2022.
9. S. Verma, S. Akhtar, **A. Adhya**, and V. G. Menon, "Towards energy-efficient UAV-assisted 5G Internet of Underwater Things", ACM Workshop on Drone Assisted Wireless Communications for 5G and Beyond, ACM MobiCom Workshop, Sydney, Australia, Oct. 2022.
10. S. Verma and **A. Adhya**, "Routing in UAVs-assisted 5G Wireless Sensor Network: Recent Advancements, Challenges, Research Gaps, and Future Directions", IEEE International Conference on Intelligent Engineering and Management (ICIEM), AMITY University technically co-sponsored by the IEEE United Kingdom and Ireland Section, Virtual, pp. 422-428, April 2022.
11. A. Gupta, V. Chandra, S. Mukherjee, and **A. Adhya**, "Distributed DBA Scheme for Fog Node Equipped LR-EPON Based FiWi Network", IEEE INDICON, IIT Guwahati, 2021.
12. S. Akhtar, P. Biswas, **A. Adhya**, and S. Majhi, "Cost-efficient Mobile Backhaul Network Design over TWDM-PON", IEEE International Conference on Advanced Networks and Telecommunication Systems (ANTS), IIIT Delhi, Virtual, pp. 1-6, Dec. 2020.
13. S. Akhtar, J. Gupta, P. Biswas, **A. Adhya**, and S. Majhi, "Heuristic-Based Cost-Efficient C-RAN Fronthaul Deployment Over TWDM-PON", IEEE International Conference on Recent Advances and Innovations in Engineering (ICRAIE), Jaipur, Virtual, pp. 1-6, Dec. 2020.
14. P. Biswas, **A. Adhya**, S. Akhtar, J. Gupta, and S. Majhi, "EDFA Active-sleep Transition Frequency and EDFA Occupancy Aware Dynamic Traffic Provisioning for Energy-efficient IP-over-EON", International Conference on Signal Processing and Communication Systems (ICSPCS), Surfers Paradise, Gold Coast, Australia, pp. 1-6, Dec. 2019.
15. J. Gupta and **A. Adhya**, "A Novel Design of Cost-Efficient Long-Reach Survivable Wireless-Optical Broadband Access Network", IEEE Vehicular Technology Conference (VTC-Fall), Honolulu, Hawaii, pp. 1-7, Sept. 2019.
16. J. Gupta and **A. Adhya**, "A Novel Partial Protection Architecture to Enhance Reliability in Optical Access Networks", International Conference on Communication Systems and Network Technologies (CSNT 2018), Bhopal, pp. 1-3, Nov. 2018.
17. J. Gupta and **A. Adhya**, "A Novel Fiber-Constrained Protection Scheme for Passive Optical Networks", International Conference on Advances in Computing, Communications and Informatics (ICACCI), Bangalore, pp. 1358-1361, Sept. 2018.
18. J. Gupta and **A. Adhya**, "Novel Architectures to Enhance QoS in Long-Reach Passive Optical Networks", International Conference on Advances in Computing, Communications and Informatics (ICACCI), Bangalore, pp. 1362-1365, Sept. 2018.
19. P. Biswas, S. K. Dey, and **A. Adhya**, "Auxiliary graph based energy-efficient dynamic connection grooming for elastic optical networks", IEEE International Conference on Advanced Networks and Telecommunication Systems (ANTS), IISc. Bangalore, pp. 1-3, 2016.
20. J. Gupta and **A. Adhya**, "A Cost-efficient Protection Scheme for Service Recovery Against Single Shared-risk Link Group Failure in Long-reach Passive Optical Network," IEEE International Conference on Advanced Networks and Telecommunication Systems (ANTS), ISI Kolkata, pp. 1-6, Dec. 2015.
21. S. K. Dey and **A. Adhya**, "Design of CapEx-Efficient IP-over-WDM Network using Auxiliary Matrix based Heuristic," IEEE International Conference on Advanced Networks and Telecommunication Systems (ANTS), New Delhi, pp. 1-6, Dec. 2014.
22. S. Das, D. Guha and **A. Adhya**, 'Capacity planning for wavelength-routed optical backbone network under imprecise environment, International Conference on Facets and Uncertainties and Applications, ORSI Kolkata Chapter and Department of Applied Mathematics, University of Calcutta, Dec. 2013.

23. S. K. Dey and **A. Adhya**, 'Dynamic Connection Allocation in WDM Network with Limited Grooming and Regeneration Facilities', IEEE International Conference on High-capacity Optical Networks and Emerging Technologies (HONET), King Saud University, Riyadh, Kingdom of Saudi Arabia, pp. 65-70, Dec. 2011.
24. S. K. Dey and **A. Adhya**, 'Integrated grooming and regeneration capable OXC-based connection provision in WDM network, IEEE INDICON, Hyderabad, pp. 1-5, Dec 2011.
25. **A. Adhya**, and D. Datta, "Design Methodology for WDM Backbone Networks using FWM-Aware Heuristic Algorithm," IEEE International Symposium on Advanced Networks and Telecommunication Systems (ANTS), IIT Bombay, Mumbai, Dec., 2007.
26. **A. Adhya**, P. Goswami, S. K. Ghosh, and D Datta. "Design Methodology for WDM Backbone Networks using Traffic-Aware Heuristic Algorithm," National Conference on Communications (NCC), IIT Delhi, pp. 419-423, Jan. 2006.
27. P. Goswami, **A. Adhya**, S. K. Ghosh, and D. Datta, "Traffic-Aware Design Methodology for High-speed Backbone Networks using WDM Technology," All India Seminar on Emerging Trends in Wireless Communication, The Institution of Engineers, Kolkata, pp. 53-58, March 2006.
28. P. Goswami, **A. Adhya**, S. K. Ghosh, and D. Datta, "Traffic-Aware Lightpath Topology Design for Survivable WDM Networks," International Conference on Computers and Devices for Communications (CODEC), Kolkata, pp. 566-569, Dec. 2006.

Book Chapter

1. S. Ghosh, V. Chandra, and **A. Adhya**, "Machine Learning for Fog Computing Based IoT Networks in Smart City Environment", Book Chapter for Intelligent Internet of Things for Healthcare and Industry, Springer, pp. 267-285, 2022.

Patent

1. S. Verma, S. Akhtar, and **A. Adhya**, "Methods and Systems for Energy-efficient UAV-assisted Internet of Underwater Things" (Indian patent filed in 2023).
2. S.Poyekar, A. samanta, **A. Adhya**, and A. K. Dutta, "Efficient low-latency and traffic aware dynamic bandwidth assignment method for passive optical network" (Indian patent filed in 2023).
3. Samanta, S. Poyekar, **A. Adhya**, and A. K. Dutta, "Method and system for low-latency proactive virtualized cloud radio access network (LLP-VCRRAN)" (Indian patent filed in 2023).

Sponsored R&D projects

1. **Sponsoring Agency:** Telecom Centers of Excellence, Department of Telecommunications (DOT)
Title: Prototype Development for XGS-PON OLT and ONU
Role: Principal Investigator
Date of Start: June 2024
Date of completion: June 2026
2. **Sponsoring Agency:** Science and Engineering Research Board (SERB)
Title: Testbed Deployment of XG-PON based Fronthaul Network and Transportation of 5G Traffic
Role: Principal Investigator
Date of Start: April 2021
Date of completion: April 2024
3. **Sponsoring Agency:** IIT Kharagpur, MHRD
Title: Development of NG-PON2 Based Mobile Fronthaul Transport for Cloud Radio Access Networks
Role: Principal Investigator
Date of Start: Nov. 2018
Date of completion: March 2024

4. **Sponsoring Agency:** Department of Science and Technology (DST)
Title: RAIDO: Reliable AI and Data Optimization
Role: Co-Principal Investigator
Date of Start: Nov. 2024
Date of completion: Nov. 2027
5. **Sponsoring Agency:** Science and Engineering Research Board (SERB)
Title: Resource Allocation in a Communication Network using Quantum Laplacian Operator based Graph Signal Optimization
Role: Co-Principal Investigator
Date of Start: Feb. 2024
Date of completion: Feb. 2027
6. **Sponsoring Agency:** Ministry of Electronics and Information Technology
Title: Next Generation Wireless Research and Standardization on 5G and Beyond
Role: Co-Principal Investigator
Date of Start: July 2021
Date of completion: March 2025
7. **Sponsoring Agency:** IIT Kharagpur AI4ICPS I Hub Foundation
Title: AI assisted point-of-care device for pre-screening of Glaucoma using predictive modeling of tear film patterns (ASRU)
Role: Co-Principal Investigator
Date of Start: Sept. 2023
Date of completion: Sept. 2025