

Dr. Rana Kumar Jana

*Assistant Professor,
Dept. of Electronics and Communication Engineering,
Haldia Institute of Technology, West Bengal, India*



Overview

Dr. Rana Kumar Jana is an Assistant Professor in the Department of Electronics and Communication Engineering at the Haldia Institute of Technology (HIT), West Bengal, India. Before joining HIT, he was employed as a Post-Doctoral Research Fellow at Trinity College Dublin, Ireland, where he worked on OpenIreland - the reconfigurable 5G and beyond radio, optical, and cloud testbed. His experiments on the OpenIreland testbed focused on developing the digital twin-based full-automation framework for the next-generation disaggregated open optical networks. His current research focuses on the intersection of artificial intelligence, digital twins, optical networks, and quantum communication. He earned his Ph.D. in Electronics and Communications Engineering from the IIIT-Delhi, India, where his research focused on network upgrades, AI-assisted resource provisioning, network management, and performance optimization for multiband elastic optical networks. Dr. Jana has research experience at globally recognized premier institutes and R&D sectors, including British Telecom (Ipswich, UK), University College London (UCL, UK), University of East Anglia (Norwich, UK), Aston University (Birmingham, UK), and Tejas Networks (Bangalore, India). With a strong publication record in premier journals and conferences (JOCN, ECOC, ANTS), his research journey has combined experimental validation, techno-economic analysis, and algorithmic innovation to advance future optical networking technologies.

Employment

2025 - **Assistant Professor**
Present

Organization: *Haldia Institute of Technology (HIT), West Bengal, India* (An Institute of Indian Center for Advancement of Research and Education (ICARE), Haldia, Approved by AICTE, NBA Accredited, Affiliated to West Bengal University of Technology (WBUT))

2024 - 2025 **Post-Doctoral Research Fellow**

University: *Trinity College Dublin, University of Dublin, Ireland*

Supervisor during Post-Doc: [Prof. Marco Ruffini](#) & [Prof. Dan Kilper](#)

Key Research Areas during Post-Doc:

- **Experimental Investigation on AI-Assisted Digital Twin Framework** for Full Automation of Disaggregated Optical Networks.
- Development of **Space Division Multiplexing Technology** with Strategic Deployment of Multicore Fibers.
- **Experimental Investigation on Multiband Optical Networks** for Soft-Failure Detection and Management while using Next-Generation Optical Performance Monitoring (OPM) Equipments.
- **Quantum and Classical Channel Co-existence** over Multiband Optical Networks.

Education

2019 - 2024 **Doctor of Philosophy (Ph.D.) in Electronics and Communication Engineering (ECE)**

University: *Indraprastha Institute of Information Technology (IIIT), New Delhi, India*

Advisor: Prof. Anand Srivastava & Dr. Abhijit Mitra

Thesis Title: Towards C+L Band Elastic Optical Networks: A Solution to Overcome the Optical Fiber Capacity Crunch Problem.

CGPA: 9.09 out of 10

2017 – 2019 **Master of Technology (M.Tech.)**

University: *University of Calcutta, India*

Advisor: Prof. Abhirup Das Barman

Specialization: Nanoelectronics & Photonics

Research Area: Routing in WDM Optical Networks

CGPA: 9.10 out of 10 (86%)

2014 – 2017 **Post B.Sc. – B.Tech.**

University: *University of Calcutta, India*

Advisor: Dr. Sumitra Mukhopadhyay

Specialization: Radio Physics & Electronics

Research Area: Design & Implementation of Face Recognition System For Deceiving Faces: Challenges From Plastic Surgery.

CGPA: 8.53 out of 10 (80.3%)

2011 – 2014 **B.Sc. (Hons.)**

University: *University of Calcutta, India*

Specialization: Physics

Score: First Class (61.125%)

2011 **Class-XII (Higher Secondary)**
Board: *W.B.C.H.S.E, West Bengal, India*
Score: First Division (86%)

2009 **Class-X (Secondary)**
Board: *W.B.B.S.E, West Bengal, India*
Score: First Division (81.375%)

Overseas Research Experience in Industry and Academia During Ph.D.

Dec 2023 **Visiting Researcher at British Telecom, Ipswich, United Kingdom.**
Dec 2023 **Visiting Researcher at University of East Anglia, Norwich, United Kingdom.**
Nov 2023 **Visiting Researcher at University College London, United Kingdom.**
Oct - Dec 2023 **Visiting Researcher at Aston University, Birmingham, United Kingdom.**

Experimental Expertise Gained During Ph.D.

Sep 2023 **Visiting Researcher at Tejas Networks, Bangalore, India, Experiment:** *Effect of Soft-Failure in C+L Band Optical Transmission*, Funding Agency: Department of Technology, Govt. of India under Advanced Optical Communication (AOC) Testbed Project.

Feb 2024 **Visiting Researcher at Tejas Networks, Bangalore, India, Experiment:** *Prediction of Quality of Transmission in 500 km C+L Band Optical Link*, Funding Agency: Department of Technology, Govt. of India under Advanced Optical Communication (AOC) Testbed Project.

Internship

June, 2016 **Prasar Bharati (India's Public Service Broadcaster), Doordarshan Kendra, Kolkata, West Bengal, India.**
Vocational training on basic television engineering.

Teaching Experience

Aug – Dec 2023 **Teaching Assistant, Subject:** *Quantum Communication and Networks (Course Code: ECE530)*, IIIT-Delhi, Instructor: [Dr. Abhijit Mitra](#).

Jan – May 2023 **Teaching Assistant, Subject:** *Principles of Digital Communication System (Course Code: ECE543)*, IIIT-Delhi, Instructor: [Prof. Anand Srivastava](#).

- Aug – Dec 2022 **Teaching Assistant**, *Subject: Digital Communication Systems (Course Code: ECE340)*, IIIT-Delhi, Instructor: [Dr. Abhijt Mitra](#).
- Jan – May 2022 **Teaching Assistant**, *Subject: Fields and Waves (Course Code: ECE230)*, IIIT-Delhi, Instructor: [Dr. Sayak Bhattacharya](#).
- Aug – Dec 2021 **Teaching Assistant**, *Subject: Optical Fiber Networks for Industry 4.0 (Course Code: ECE532)*, IIIT-Delhi, Instructor: [Dr. Abhijt Mitra](#).
- Jan – May 2021 **Teaching Assistant**, *Subject: Next Generation Optical Networks (Course Code: ECE532)*, IIIT-Delhi, Instructor: [Dr. Abhijt Mitra](#).
- Aug – Dec 2020 **Teaching Assistant**, *Subject: Photonics: Fundamentals & Applications (Course Code: ECE545)*, IIIT-Delhi, Instructor: [Dr. Sayak Bhattacharya](#).
- Jan – May 2020 **Teaching Assistant**, *Subject: Basic Electronics (Course Code: ECE113)*, IIIT-Delhi, Instructor: [Prof. Vivek Ashok Bohara](#).

Teaching Interest (but are not limited to)

- Optical Fiber Communication and Networks
- Optoelectronic/Photonic Devices & Systems
- Digital Communication Systems
- Digital Signal Processing
- Wireless Communication and Networks
- Computer Networks
- Artificial Intelligence and Machine Learning
- Basic Electronics & Semiconductor Devices
- Engineering Mathematics

Research Interest (Publication Link: [Google Scholar](#))

- Application of Machine Learning for Designing of Next-Generation Optical Networks
- Multiband Elastic Optical Networks (MB-EON)
- Space Division Multiplexed Elastic Optical Networks (SDM-EON)
- Optical Fiber Sensing
- Soft-failure Detection and Management
- Software Defined Networks, Network Automation
- Passive Optical Networks
- Quantum Communication and Networks
- Optical Wireless Communication

Publications (Journals)

- [J4] R. Kalkunte, **R. K. Jana**, S. Ferdousi, A. Srivastava, A. Mitra, M. Tornatore, A. Lord, and B. Mukherjee, "GSNR-aware resource re-provisioning for C to C+L-bands upgrade in optical backbone networks," in *Photonic Network Communications*, vol. 47, pp. C139-C153, July 2024, doi: 10.1007/s11107-024-01023-6. [Impact Factor: 1.8]
- [J3] **R. K. Jana**, A. Srivastava, A. Lord, and A. Mitra, "Optical Cable Deployment vs. Fiber Leasing: An Operator's Perspective on CapEx Savings for Capacity Upgrade in Elastic Optical Core Network," in *Journal of Optical Communications and Networking*, vol. 15, no. 8, pp. C179-C191, August 2023, doi: 10.1364/JOCN.483200. [Impact Factor: 4.0]
- [J2] **R. K. Jana**, B. C. Chatterjee, A. P. Singh, A. Srivastava, B. Mukherjee, A. Lord, and A. Mitra, "Quality-Aware Resource Provisioning for Multiband Elastic Optical Networks: A Deep Learning-Assisted Approach," in *Journal of Optical Communications and Networking*, vol. 14, no. 11, pp. 882-893, Nov 2022, doi: 10.1364/JOCN.465782. [Impact Factor: 4.0]
- [J1] **R. K. Jana**, B. C. Chatterjee, A. P. Singh, A. Srivastava, B. Mukherjee, A. Lord, and A. Mitra, "Machine learning-assisted nonlinear-impairment-aware proactive defragmentation for C+L band elastic optical networks," in *Journal of Optical Communications and Networking*, vol. 14, no. 3, pp. 56-68, March 2022, doi: 10.1364/JOCN.440214. [Impact Factor: 4.0]

Publications (Conferences)

- [C10] R. Kalkunte, F.S. Abkenar, S. Ferdousi, **R. K. Jana**, A. Srivastava, A. Mitra, M. Tornatore, and B. Mukherjee, "Increasing Information-Carrying Capacity by Exploiting Diverse Traffic Characteristics in Multi-Band Optical Networks," *2024 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)*, Guwahati, India, 2024, pp. 1-4, doi: 10.1109/ANTS63515.2024.10898264.
- [C9] S. Khan, **R. K. Jana**, A. P. Singh, A. Mitra, "Effect of Link Margin on Capacity Benefits in Multi-Core Optical Fiber Networks," *2024 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)*, Guwahati, India, 2024, pp. 1-6, doi: 10.1109/ANTS63515.2024.10898590.
- [C8] **R. K. Jana**, A. Yadav, P. Sowmendran, S Sai Krishna, P. Palai, A. Srivastava and A. Mitra, "Experimental Investigation over 400 km C+L Band Optical Testbed for Quality of Transmission Estimation Using Machine Learning," *2024 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)*, Guwahati, India, 2024, pp. 1-4, doi: 10.1109/ANTS63515.2024.10898384.

- [C7] **R. K. Jana**, A. Lord, A. Srivastava and A. Mitra, "An Operator's Perspective on the Introduction of Domain Knowledge-Assisted Adaptive Margin Ahead of Network Upgrade," **50th European Conference on Optical Communications (ECOC)**, Frankfurt, Germany, 2024, pp. 1049-1052.
- [C6] R. Kalkunte, F. S. Abkenar, **R. K. Jana**, D. Aureli, S. Ferdousi, A. Srivastava, A. Mitra, M. Tornatore and B. Mukherjee, "An Effective Strategy for Link Upgrade from C to C+L Band in Elastic Optical Backbone Networks," **2023 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)**, Jaipur, India, 2023, pp. 437-440, doi: 10.1109/ANTS59832.2023.104696492023.
- [C5] **R. K. Jana**, A. Srivastava, A. Lord and A. Mitra, "Effect of Gain Flattening Filter Placement for Nonlinear Impairment Mitigation in Multiband Optical Transport Network," **2023 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)**, Jaipur, India, 2023, pp. 102-107, doi: 10.1109/ANTS59832.2023.10469529.
- [C4] **R. K. Jana**, A. Srivastava, A. Lord and A. Mitra, "Effect of fill margin on network survivability for C+L band optical networks," **49th European Conference on Optical Communications (ECOC 2023)**, Glasgow, UK, 2023, pp. 1453-1456, doi: 10.1049/icp.2023.2589.
- [C3] **R. K. Jana**, M. A. Iqbal, N. Parkin, A. Srivastava, A. Mishra, J. Balakrishnan, P. Coppin, A. Lord and A. Mitra, "Multifiber vs. Ultra-Wideband Upgrade: A Techno-Economic Comparison for Elastic Optical Backbone Network," **2022 European Conference on Optical Communications (ECOC)**, Basel, Switzerland, 2022, pp. 1-4, doi: 10.1364/ECEOC.2022.We1A.5.
- [C2] **R. K. Jana**, B. C. Chatterjee, A. P. Singh, A. Srivastava, B. Mukherjee, A. Lord, and A. Mitra, "Performance Evaluation of Conventional Spectrum-Allocation Policies for C+L Band Elastic Optical Networks," **2021 IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS)**, Hyderabad, India, 2021, pp. 348-353, doi: 10.1109/ANTS52808.2021.9937024.
- [C1] **R. K. Jana**, A. Mitra, A. Pradhan, K. Grattan, A. Srivastava, B. Mukherjee and A. Lord, "When Is Operation Over C + L Bands More Economical than Multifiber for Capacity Upgrade of an Optical Backbone Network?," **2020 European Conference on Optical Communications (ECOC)**, Brussels, Belgium, 2020, pp. 1-4, doi: 10.1109/ECOC48923.2020.9333276.

Patent

- [P1] Abhijit Mitra, **Rana Kumar Jana**, Anand Srivastava, Parthasarathi Palai, Sowmen-dran P and Sai Krishna S., "Proactive Localization of Faulty Optical Amplifiers in C+L band WDM Optical Networks," Indian Patent, (Patent Application Number - 202511059485, Submission Date - 20/06/2025).

Certification

- Oct, 2019 **Participated in 2-Days Workshop on NS3 Technology with Specialization in Wireless Specific Applications**
Organized by IIIT Delhi, India.
- July, 2019 **Participated in SPARC sponsored one day workshop on “Vehicular Communication for Enhanced Road Safety”**
Organized by Dept. of ECE, IIIT Delhi, India.
- Dec, 2017 **Completed Hands-Only CPR training in the Social Awareness Workshop on “BYSTANDER CPR”**
Organized by IEEE Photonics Society, Calcutta Chapter, India.
- July - Oct, 2015 **A course on Object Oriented Programming (C++/Java)**
Organized by IEEE Student Branch, University of Calcutta, India, Sponsored by IEEE Kolkata Section.

Professional Honors, Fellowships, and Scholarships

- 2023 **Overseas Research Fellowship (ORF)**
Indraprastha Institute of Information Technology (IIIT), New Delhi, India.
- 2022 **Travel Grant for Participation in A* International Conference**
Indraprastha Institute of Information Technology (IIIT), New Delhi, India.
- 2014 - 2019 **Swami Vivekananda Merit-cum-Means Scholarship**
Government of West Bengal, India.
- 2011 - 2013 **INSPIRE Scholarship**
Government of India, Ministry of Science and Technology.

Funded Projects

- 2024 - 2028 **Twilight: Twin LightWaves, A digital twin framework for full automation of disaggregated optical networks**
- Status: Active
 - Funding Agency: Department of Further and Higher Education, Research, Innovation and Science, Govt. of Ireland.
 - Role: Post-Doctoral Research Fellow
 - Net Amount: €1.3 million

- 2023 - 2025 **AI-enabled Pre-emptive Network Control in Multiband Optical Networks in Advanced Optical Communication Testbed**
- Status: Active
 - Funding Agency: Department of Telecommunications, Govt. of India.
 - Role: Key-Collaborator
 - Net Amount: Rs. 83.6 Lakhs

Professional Services

TPC Member NAIFNET 2025 (IEEE NetSoft 2025).

Website Chair IEEE ANTS 2025

Reviewer for Journals IEEE/Optica Journal of Lightwave Technology (JLT), IEEE/Optica Journal of Optical Communication and Networking (JOCN), IEEE Communications Letters, Optics Express (Optica), Optical and Quantum Electronics (Springer).

Reviewer for Conferences IEEE International Conference on Advanced Networks and Telecommunications Systems (ANTS): 2020, 2024; National Conference on Communications (NCC): 2025.

Selected Talks

June 2024 **Quality of Transmission Estimation in DWDM System**

Workshop on Advances in Optical Communication, Department of Telecommunications, Government of India.

July 2023 **AI-Driven 5G Network: Potentials and Challenges.**

Workshop on 5G Cellular Systems, IIIT Delhi, India.

2019 **Software Defined Networking – a key technology enabler for 5G.**

Seminar talk at Institute of Radio Physics and Electronics (IRPE), University of Calcutta, India.

Professional Membership

2021 - 2022 **Graduate Student Member, IEEE**

Member of IEEE Communications Society

Member of IEEE Young Professionals

Since 2020 **Member of Centre of Excellence (CoE) on Light Fidelity (LiFi), IIIT Delhi.**

Since 2019 **Member of Broadband Information Transport and Secured Optical Network (BITS-ON) Group, IIIT Delhi.**

Technical Skills

Programming Python, MATLAB, C, C++

IDE Visual Studio Code, PyCharm, Sublime Text, Spyder, Jupyter Notebook, Google Colab

Operating System Windows, Linux (Ubuntu, Red Hat Enterprise Linux)

Software

- **Optimization:** IBM CPLEX, LPSolve, GLPK
- **Machine Learning:** Scikit-learn, PyTorch, Keras, TensorFlow
- **Optical Communication:** Optiwave OptiSystem, Riverbed OPNET, RSoft OptSim, RSoft LaserMOD, VPIphotonics transmissionMaker
- **Data Analysis:** Origin
- **Technical Writing:** LaTeX

Hardware **Optical Equipments**

- Optical Amplifiers (EDFA, Manufacturing Company: Juniper)
- Optical Fiber Spools (Manufacturing Company: Corning, Sterlite)
- Optical ROADMS (Manufacturing Company: Lumentum)
- Optical Spectrum Analyzer (Manufacturing Company: Yokogawa)
- Optical Switch (Manufacturing Company: Polatis)
- Optical Transceiver (Manufacturing Company: Teraflex, Cassini)
- Optical Broadband Source (Manufacturing Company: Apex)
- Optical Wavelength Selective Switch (WSS) (Manufacturing Company: Finisar)
- Optical Fiber Inspection, Testers and Cleaning Products (Manufacturing Company: Viavi)

Miscellaneous Microsoft 365 Apps

Mentorship for RA, B.Tech, M.Tech & Ph.D. Research Projects

Jan – Aug Aditya Ahuja (Research Assistant, IIIT Delhi)

2025 Research Area: **Development of ML-Assisted Classifier for Soft-failure Detection in C+L Band Optical Networks.**

Jan – May Aditya Ahuja (B.Tech Student, IIIT Delhi)

2024 B.Tech Project Thesis: **Soft-failure Management in AI-assisted Autonomous Optical Networks.**

- Jan – May Nyasa Panwar (B.Tech Student, IIIT Delhi)
2024 B.Tech Project Thesis: **Application of Reinforcement Learning for Failure Management in Optical Networks.**
- Jan – May Argharupa Adhikary (M.Tech Student, IIIT Delhi)
2024 Independent Project Thesis: **Transfer Learning-Assisted QoT Estimation in Geographically-Diverse Optical Networks.**
- Jan – May Suhail Khan (Ph.D. Student, IIIT Delhi)
2024 Independent Project Thesis: **Development of Space Division Multiplexed Elastic Optical Networks.**
- Jan – May Vinay Maurya (R.A. Student, IIIT Delhi)
2024 Independent Project Thesis: **Physical Layer Modeling for integrating QKD over C+L Band Optical Networks.**
- Jan – May Abhit Rana (B.Tech Student, IIIT Delhi)
2023 Independent Project Thesis: **Migration from Fix-Grid to Flex-Grid Optical Networks.**
- Jan – May Aditya Ahuja (B.Tech Student, IIIT Delhi)
2023 B.Tech Project Thesis: **Soft-Failure Detection in Elastic Optical Networks.**
- Jan – May Kshitiz Singh (B.Tech Student, IIIT Delhi)
2022 B.Tech Project Thesis: **Machine Learning Assisted EDFA Modelling for Gain and ASE Prediction.**
- Jan – May Sudarshan Buxy (B.Tech Student, IIIT Delhi)
2022 B.Tech Project Thesis: **Application of Reinforcement Learning for Routing, Modulation and Spectrum Allocation in Elastic Optical Networks.**
- 2021 – 2022 Abhishek Pratap Singh (B.Tech Student, IIIT Delhi)
B.Tech Project Thesis: **Fragmentation Mitigation for C+L Band in Elastic Optical Networks.**
- 2019 – 2021 Aniket Pradhan (B.Tech Student, IIIT Delhi)
B.Tech Project Thesis: **Network Capacity Using C+L Band Elastic Optical Networks.**
- 2019 – 2020 Shreeparna Dey (B.Tech Student, IIIT Delhi)
B.Tech Project Thesis: **Network Margin Designing for Core Optical Networks.**

Other Notable Activities

- 2024 **Organizing committee member for** [Workshop on Advances in Optical Communications](#)
- 2023 **Student coordinator at** [Quantum Seminar Series](#)
- 2022 **Student coordinator at** [Workshop on Next Generation Optical Networks](#)
- 2020 **Student coordinator at** [IEEE ANTS, 2020](#)

Personal Information

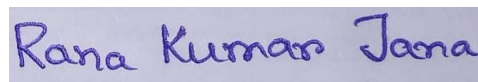
Language English (fluent), Hindi (fluent), and Bengali (native)
Date of Birth March 30, 1994
Email (main) ranakumar.jana@hithaldia.ac.in
Email (add'l) ranaj@iiitd.ac.in, kumarjar@tcd.ie, ranakumarjana@gmail.com
Mobile +918013358187
ORCID ID: 0000-0001-6555-2066
Website [LinkedIn](#), [Google Scholar](#)

References

References available upon request

Declaration

I hereby declare that all the information provided in this resume is true, complete, and correct to the best of my knowledge and belief.



Date: August 2025

(Dr. Rana Kumar Jana)