

## Curriculum Vitae



### **Dr. Atul Kumar**

Assistant Professor

Department of ECE

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## **1 Educational Qualifications**

- Ph.D., Indian Institute of Technology Guwahati, 2016
- M.Tech, National Institute of Technology Durgapur, 2010
- B.Tech, Uttar Pradesh Technical University, Lucknow, 2008

## **2 Experiences**

- Assistant Professor Grade-I, MANIT Bhopal, (December 29, 2023 – Till date)
- Assistant Professor Grade-II, PDPM-IIITDM Jabalpur, (May, 2017 – December, 2023)
- Ad-Hoc Faculty, NIT Jamshedpur, (July 2016 – April 2017)

## **3 Research Interests**

- Wireless Communications, Chaotic Communications, Visible Light Communication (VLC) and Quantum Communications.

## **4 Sponsored Projects**

- ‘*Investigation of Quantum Communication in MIMO and Cooperative Systems: A Roadmap for Future Communications*’ Science and Engineering Research Board (SERB), 19.72 Lakh (INR), (Ongoing).
- ‘*Performance Analysis of DCSK Modulation with Transmit Antenna Selection without Requiring Channel State Information*’ Faculty Initiation Grant, PDPM-IIITDM Jabalpur, 1.5 Lakh (INR), (Completed).

## 5 Awards and Achievements

- Best paper award for the paper titled ‘Leveraging Diversity Schemes to Enhance Image Data Transmission in SIMO-VLC Networks’ in IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI), ABV-IIITM Gwalior, March 6-8, 2025.

## 6 Journal Review Boards

- Reviewer of IEEE Transactions on Wireless Communications
- Reviewer of IEEE Transactions on Communications
- Reviewer of IEEE Communications Letters
- Reviewer of Applied Optics
- Reviewer of Journal of Optics
- Reviewer of Physica Scripta

## 7 Membership

- Senior Member, IEEE
- Associate Member, IETE
- Member, IE (India)

## 8 Talks and Presentations

- Expert talk on “*Wireless Communication and MATLAB Simulation*” in Advanced Signal Processing and Communication Workshop at Guwahati University, July 7, 2015.
- Presented a paper titled “*Performance Analysis of DCSK Modulation with Diversity Combining Not Requiring Channel State Information*” in National Conference on Communications (NCC) at IIT Guwahati, March 2016.
- Expert Talk on “*Visible Light Communications: Introduction and Recent Developments*” in Faculty Development Programme (FDP) on ‘Photonics Technology: A New Era of Communication’ at IIIT Ranchi, sponsored by AICTE Training and Learning (ATAL) Academy, September 21-25, 2021.

- Expert Talk on “*Fading Channels for the 5G Technologies with MATLAB Practice*” in Faculty Development Programme (FDP) on ‘5G and B5G Wireless Networks’ at PDPM-IIITDM Jabalpur, sponsored by E&ICT academy IIITDM Jabalpur, August 1-5, 2022.
- Expert Talk on “*Visible Light Communication*” in Short term training programme (STTP) on ‘Wireless Communication Systems: 5G and Beyond’ at MANIT Bhopal, May 08-12, 2024.
- Expert Talk on “*Visible light communications: A roadmap for future communications*” in ANRF sponsored High-End Workshop (Karyashala) on ‘5G & B5G Wireless Technologies with Simulations and Hands-on Training on MIMO Prototyping System’ organized at PDPM-IIITDM Jabalpur, June 10-16, 2024.
- Expert lecture on “*Visible Light Communication*” in the Department of ECE, LNCTS Bhopal in association with IEEE, STB60219977, October 04, 2024.
- Expert lecture on “*Visible Light Communication: Fundamentals and Recent Developments*” in faculty development program on ‘Wireless Communication Techniques: 5G and Beyond’ jointly organized by Department of ECE, MANIT Bhopal and EICT Academy, PDPM-IIITDM Jabalpur, January 06-10, 2025.
- Expert lecture on “*Visible Light Communications: Fundamentals & Recent Trends*” in faculty development program on ‘Emerging Trends in Electronics Engineering’ organized by Department of ECE, BIST Bhopal, May 20-25, 2025.

## 9 Extra Curricular

- Associate Counselor, Science & Technology Club, at PDPM-IIITDM Jabalpur, June 28, 2017 – April 30, 2018.
- Organizing Committee Member, 4th Inter IIIT Sports Meet 2020, at PDPM-IIITDM Jabalpur, February 29 – March 03, 2020.
- Member, Institute Innovation Council (IIC 2.0, IIC 3.0), at PDPM-IIITDM Jabalpur, November 21, 2019 – October 25, 2021.
- Faculty Representative, Training and Placement Cell, at PDPM-IIITDM Jabalpur, August 01, 2019 – December 28, 2023.
- Convener, Examinational Cell, Department of ECE, MANIT Bhopal, March 01, 2024 – Till date.

- Mentor, IEEE Student Chapter, MANIT Bhopal, August 20, 2024 – Till date.
- Co-Coordinator, Think India Club, MANIT Bhopal, August 20, 2024 – Till date.
- Telecommunication Expert, Technical Specification Committee for Dial-112 of MP Police.
- Publication Chair, 10th IEEE Students' Conference on Electrical, Electronics and Computer Science, 2025 (SCEECS-2025), MANIT Bhopal, January 18-19, 2025.
- Conference Organizing Chair, MAC 2025, MANIT Bhopal, June 27-29, 2025.
- Co-Chair, Technical Program Committee, 2nd IEEE International Conference on Innovations in High-Speed Communication and Signal Processing, Organized by Department of ECE, MANIT Bhopal, December 04-06, 2024.
- Lab In-Charge, Analog & Digital Communication Lab, ECE Department, MANIT Bhopal.

## 10 Publications

### Journals

1. P. Sharma, Atul Kumar, M. Bansal, and K. Srinivasarao, "On the outage and sum-rate of PN-NOMA over  $\kappa - \mu$  fading channel with imperfect SIC," *Sādhana*, 50 (4), pp. 1-15, 2025.
2. N.K. Pathak, V. Dixit, V. Bajaj, and Atul Kumar, "Next-Gen Cooperative Relaying: Leveraging Deep Learning for Automatic Modulation Classification with Antenna Diversity," *IETE Journal of Research*, pp. 1-22, 2025.
3. V. Dixit, A. Kumar, N. Sharan, S. Pandey, Atul Kumar, and R.S. Singh, "Optimizing intelligent reflecting surface assisted visible light communication networks under blockage and practical constraints using TLBO for IoT applications," *Scientific Reports*, 15 (1), 27400, pp. 1-16, 2025.
4. P. Dwivedy, V. Dixit and Atul Kumar, "Performance Analysis of Cooperative VLC With L-PPM Modulation and Diversity Combining Strategies Under Perfect and Imperfect CSI for IoT Devices," *IEEE Sensors Journal*, 25 (12), pp. 23028-23036, 2025.
5. V. Dixit, Atul Kumar, P. Dwivedy, and S. Agarwal, "P-NU-NOMA VLC Systems: Performance Under Imperfect SIC and CSI," *IETE Journal of Research*, 71 (7), pp. 2334-2343, 2025.

6. S. Gupta, D. Roy, S. Bose, V. Dixit, and Atul Kumar, "Illuminating the future: A comprehensive review of visible light communication applications," *Optics and Laser Technology*, 177 (111182), pp. 1-11, 2024.
7. P. Dwivedy, V. Dixit and Atul Kumar, "BEP Analysis of L-PPM Modulated Cooperative VLC System with Perfect and Imperfect CSI," *Optical and Quantum Electronics*, 56 (10), 1572, pp. 1-15, 2024.
8. P. Dwivedy, V. Dixit and Atul Kumar, "On the Performance of OOK/L-PPM Modulated NOMA Cooperative VLC System with Diversity Combining Techniques under Imperfect CSI Scenario," *IEEE Sensors Journal*, 24 (18), pp. 29331-29339, 2024.
9. G. Narang, M. Aggarwal, H. Kaushal, Atul Kumar, S. Ahuja and N.K. Shukla, "Performance Evaluation of Dual Hop Mixed FSO RF System Using Differential Chaos Shift Keying With Secrecy Analysis," *IEEE Transactions on Vehicular Technology*, 73 (11), pp. 17347-17358, 2024.
10. P. Dwivedy, Vipul Dixit, and Atul Kumar, "NOMA cooperative VLC systems: design and performance analysis with OOK and L-PPM modulation," *Applied Optics*, 62 (25), pp. 6639-6651, 2023.
11. G. Narang, M. Aggarwal, H. Kaushal, Atul Kumar and S. Ahuja, "Performance Analysis of Differential Chaos Shift Keying in Free Space Optical Communication with Diversity Techniques," *IEEE Access*, 11, pp. 54438-54447, 2023.
12. Vipul Dixit and Atul Kumar, "Error performance of an L-PPM modulated ADR-based MIMO-VLC system with and without channel estimation error," *Applied Optics*, 62 (10), pp. 2501-2509, 2023.
13. Prashant Dwivedy, Vipul Dixit and Atul Kumar, "Cooperative VLC system using OOK modulation with imperfect CSI," *Physica Scripta*, 98, pp. 1-10, 2023.
14. Vipul Dixit and Atul Kumar, "Error analysis of L-PPM modulated MIMO based multi-user NOMA-VLC system with perfect and imperfect SIC," *Applied Optics*, 64, pp. 858-867, 2022.
15. Vipul Dixit and Atul Kumar, "BER performance of MIMO based NOMA-VLC system with imperfect SIC," *Transactions on Emerging Telecommunications Technologies*, 33, pp. 1-20, 2021.
16. Vipul Dixit and Atul Kumar, "BER analysis of dynamic FOV based MIMO-NOMA-VLC system," *Int. J. Electron. Commun. (AEÜ)*, 142 (153989), pp. 1-10, 2021.
17. Vipul Dixit and Atul Kumar, "An Exact Error Analysis of Multi-User RC/MRC

- Based MIMO-NOMA-VLC System With Imperfect SIC,” *IEEE Access*, 9, pp. 136710-136720, 2021.
18. P. Sharma, Atul Kumar, and M. Banasl, “Performance Analysis for User selection based Downlink NOMA System over Generalized Fading Channels,” *Wiley Transactions on Emerging Telecommunications Technologies*, 32 (11), pp. 1-19, 2021.
  19. Vipul Dixit and Atul Kumar, “Analysis of Angular Diversity Receiver based MIMO-VLC System for Imperfect CSI,” *Journal of Optics*, 23 (8), pp. 1-9, 2021.
  20. Vipul Dixit and Atul Kumar, “An Exact BER Analysis of NOMA-VLC System with Imperfect SIC and CSI,” *Int. J. Electron. Commun. (AEÜ)*, 23 (1), pp. 1-12, 2021.
  21. P. Sharma, Atul Kumar, and M. Banasl, “Performance analysis of downlink NOMA system with diversity combining schemes over  $\eta - \mu$  fading channel,” *Physical Communication*, 47, pp. 1-10, 2021.
  22. Vipul Dixit and Atul Kumar, “Performance analysis of  $L$ -PPM modulated NLOS-VLC system with perfect and imperfect CSI,” *Journal of Optics*, 23 (1), pp. 1-10, 2020.
  23. P. Sharma, Atul Kumar, and M. Banasl, “Performance Analysis of P-N-NOMA Over Generalized Fading Channel,” *IEEE Access*, 8, pp. 105962-105971, 2020.
  24. Vipul Dixit and Atul Kumar, “Performance analysis of non-line of sight visible light communication systems,” *Optics Communications*, 459, pp. 1-6, 2020.
  25. P. Sharma, Atul Kumar, and M. Banasl, “Performance analysis of downlink NOMA over  $\eta - \mu$  and  $\kappa - \mu$  fading channels,” *IET Communications*, 14 (3), pp. 522-531, 2020.
  26. Atul Kumar and P.R. Sahu, “Performance Analysis of DCSK-BDR Systems over Nakagami- $m$  Fading Channels,” *IETE Technical Review*, 37 (2), pp. 137-146, 2019.
  27. Atul Kumar and P.R. Sahu, “Performance Analysis of Spatially Modulated Differential Chaos Shift Keying Modulation,” *IET Communications*, 11 (6), pp. 905-909, 2017.
  28. Atul Kumar and P.R. Sahu, “Performance Analysis of Differential Chaos Shift Keying Modulation with Transmit Antenna Selection,” *IET Communications*, 10 (3), pp. 327-335, 2016.
  29. Atul Kumar and P.R. Sahu, “Performance Analysis of DCSK-SR Systems Based on Best Relay Selection in Multiple MIMO Relay Environment,” *Int. J. Electron. Commun. (AEÜ)*, 70 (1), pp. 18-24, 2016.

## Conferences

1. V. Dixit, V. Jaiswal, P. Choudhary, S. Barmate, P. Rawat, V. Solanki, and Atul Kumar, "Leveraging Diversity Schemes to Enhance Image Data Transmission in SIMO-VLC Networks," IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI), pp. 1-5, 2025.
2. V. Dixit, A. Kumar, P. Dwivedy, Atul Kumar, S. Pandey and A.K. Kamal, "Enhancing Visible Light Communication: SIMO-VLC with Zero-Forcing Receiver and Equal Gain Diversity," IEEE International Conference on Interdisciplinary Approaches in Technology and Management for Social Innovation (IATMSI), pp. 1-5, 2025.
3. P. Dwivedy, V. Dixit and A. Kumar, "Enhancing Performance of Image Data Transmission Over Cooperative VLC Network," IEEE 15th International Conference on Computational Intelligence and Communication Networks (CICN), pp. 1-5, 2023.
4. P. Dwivedy, V. Dixit and A. Kumar, "Enhancing Performance through Diversity Schemes in Cooperative VLC Systems with OOK Modulation," IEEE 7th Conference on Information and Communication Technology (CICT), pp. 1-5, 2023.
5. P. Dwivedy, V. Dixit and A. Kumar, "A Survey on Visible Light Communication for 6G: Architecture, Application and Challenges," International Conference on Computer, Electronics & Electrical Engineering & their Applications (IC2E3), pp. 1-6, 2023.
6. Priyank Sharma, Atul Kumar, M. Bansal, "Performance Analysis of Downlink NOMA System with Diversity Combining Schemes over  $k$ -Fading Channel," 6th IEEE Conference on Information and Communication Technology (CICT), pp. 1-5, 2022.
7. Vipul Dixit and Atul Kumar, "Error Analysis of  $L$ -PPM modulated ADT based VLC System with Perfect and Imperfect CSI," IEEE Conference on Control, Automation, Power and Signal Processing (CAPS), pp. 1-5, 2021.
8. Vipul Dixit and Atul Kumar, "Performance Analysis of Indoor Visible Light Communication System with Angle Diversity Transmitter," 4th IEEE Conference on Information & Communication Technology (CICT), pp. 1-5, 2020.
9. P. Sharma, Atul Kumar, and M. Bansal, "On Performance of Downlink NOMA with Equal Gain Combining over  $\kappa - \mu$  Fading Channel for limiting value of  $\kappa$ " 4th IEEE Conference on Information & Communication Technology (CICT), pp. 1-6, 2020.
10. Atul Kumar, P. R. Sahu, and J. Mishra, "Performance Analysis of DCSK Modulation with Diversity Combining Not Requiring Channel State Information," IEEE National Conference on Communications (NCC), pp. 1-5, 2016.

### **Book Chapters**

1. P. Dwivedy, V. Dixit, and Atul Kumar, “Modulation and Diversity in Co-operative VLC: Trade-offs and Optimizations for System Design,” *Terahertz Technology in Microwave and Photonics for Effective Communications*, CRC Press, pp. 289-311, 2025.
2. Vipul Dixit and Atul Kumar, “Performance Analysis of OOK and L-PPM Modulated VLC System with Imperfect CSI over LOS and Non-LOS Channel,” *Wireless Communication with Artificial Intelligence*, CRC Press, pp. 143-168, 2022.

### **Patent**

1. P. Dwivedy, V. Dixit, and Atul Kumar, ‘Visible Light Communication System,’ Indian Design Patent, 411988-001, 2025