डॉ. अमितेश कुमार

(संयुक्त प्राध्यपक)
इलेक्ट्रॉनिक्स अभियांत्रिकी विभाग, भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ)
धनबाद, भारत

DR. AMITESH KUMAR

(Associate Professor)
Department of Electronics Engineering,
Indian Institute of Technology (Indian School of Mines) Dhanbad, India

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Research Interests:

- ***Photonic Integrated Circuits***
- ***Fiber Optic Sensors***
- ***Microwave Photonics***
- ***Radio-over fiber technologies for 5G and beyond.***

Educational qualification:

Degree	Subject	Institute/University	Year of Passing
Bachelor of Engineering (BE)	Electronics and Communication Engineering	Magadh University, Bodh Gaya, India	2008
Master of Technology (M. Tech)	Electronics and Communication Engineering	Indian Institute of Technology (Indian School of Mines) Dhanbad, India.	2010
Ph.D	Microwave Photonics	Indian Institute of Technology (Indian School of Mines) Dhanbad, India.	2017

Work Experience:

Organization	Positions held/Pay band	From	To
Indian Institute of Technology (ISM) Dhanbad, India (**Under MHRD, Govt. of India**)	***Associate Professor***	*13/04/2022*	*Continuing*
	Assistant Professor (***Pay band: PB-4***)	10/06/2021	12/04/2022
	Assistant Professor ***(Grade-II & I)***	27/12/ 2011	09/06/2021
National Institute of Technology, Jamshedpur, India (**Under MHRD, Govt. of India**)	Assistant Professor	15/04/2011	26/12/ 2011

Award/Professional Accomplishment/Recognitions:

- Mentored a Ph.D. student who won the ***SRISTI Gandhian Young Technological Innovation Award 2020*** for the project Psychophysiological Monitoring of a Subject using Optical Respiration Rate Measurement System.
- Senior Member IEEE
- Senior Member OPTICA (formerly Optical Society of America)
- ***Reviewer:*** IEEE Transactions on Instrumentation and Measurement, IEEE Sensors, Optics Express, Applied Optics, ets.

Research work and funding from external/internal agencies:

- Principal Investigator of the research project entitled *" Design and Development of Artificial Intelligence Based Fiber Optic Respiration Rate Measurement System for Psychophysiological Health Monitoring",* funded by SERB, Department of Science and Technology (**DST**), Government of India. ***Recommended grant: Rs. 21 Lakhs (Ongoing)***
- *Principal Investigator of the research project entitled " Design and Development of Non- Invasive Optical Respiration Rate Measurement System for Psychophysiological Health Monitoring in MRI Environment", funded by the Department of Biotechnology, Ministry of Science and Technology, Government of India.* ***Recommended grant: Rs. 18.359 Lakhs (Ongoing)***
- Co-Principal Investigator of the research project entitled *"FIST-2019 Project of Department of Electronics Engineering",* funded by the Department of Science and Technology (**DST**), Government of India. ***Sanctioned grant: Rs. 190 Lakhs (Ongoing)***
- Principal Investigator of the research project entitled *"Study On Opto-electronics Devices And System Processing Signals at Microwave Frequencies",* funded by IIT (ISM) Dhanbad under the Faculty Research Scheme. ***Sanctioned grant: Rs. 8.0 lakhs*** *(Completed)*
- Principal Investigator of the minor research project on *"Analysis of Chromatic Dispersion in Radio over Fiber System",* funded by TEQIP-III. ***Sanctioned grant: Rs. 2.31 lakhs*** (*Completed*)
- Member project implementation group of the research project entitled *"Optical Sensors Based Traffic Weighbridge"*, funded by the Department of Science and Technology (DST), Government of India. ***Sanctioned grant: Rs. 42.39 lakhs*** *(Completed).*

Ph. D. Supervision (Supervised/Ongoing): 11

S. N	Name of research scholars	Research area of Ph. D. Work	Status of work/ Sole or Joint
(i)	*Dr. Saurabh Agarwal*	*Design and Modeling of MOEMS Photonic Crystal Waveguide Based Devices*	***Completed***
(ii)	Dr. Abhinav Gautam	Fiber Optic Sensors	***Completed***
(iii)	Dr. Annapurna Kumari	Microwave Photonic Measurements	***Completed***
(iv)	Dr. Deep Pal	Advanced Optical Sensors for Biomedical Applications: A Machine Learning Approach	***Completed***
(v)	Mrs. Kritika Awasthi	Silicon Photonics	Joint (main guide)
(vi)	Mr. Randhir Kumar Sah	Fiber Optic Sensors	Sole
(vii)	Mr. Sumit Sagar	Optoelectronic Devices	Joint
(viii)	Mrs. Kavita Jha	Microwave Photonics	Sole
(ix)	Mr. Sanjay Kumar Gupta	Fiber Optic Bio-sensors	Sole
(x)	Mr. Jaskaran Singh Phull	Microwave Photonic Sensors	Sole
(xi)	Mr. Ashish Ranjan Yadav	Fiber Optic Bio-sensors	Sole

Supervised M. Tech Dissertations: 20

S. N	Name of the Students	Title of Master Thesis Guided	Year of Completion
(i)	Mr. Santosh Kumar Shukla	Study of Microwave photonic Filter	2014
(ii)	Mr. Ritu Raj Singh	Study of Microwave Photonic Frequency Measurements	2015
(iii)	Mr. Abhinav Gautam	Microwave Photonic Filters using FBG and its Application in Pipeline Sensing Architectures	2016
(iv)	Mr. Akash Uchani	Modelling and Analysis of FBG Based Temperature Sensor for Centralized Cooling System	2016
(v)	Ms. Anju kumari	Study on Multiple Microwave Frequency Measurement Using Photonic Technique	2017

(vi)	Mr. Uttam Chetri	Study on Silicon Nanowire Optical Waveguides	2017
(vii)	Mr. Nikhil Bhatwalka	Development of Multimode Tracking Feed and Shaping Algorithm for Cassegrain Antenna	2017
(viii)	Ms. Anuradha Kumari	Study on High-Frequency Electric Field Measurement Using Electro-Optic Sensor	2018
(ix)	Mr. Pankaj Patel	Microwave Photonic Filters Based On Coherent Detection of sidebands	2018
(x)	Mr. Pritam Paul	Microwave Phase Noise Measurement Using Photonic Methods	2018
(xi)	Mr. N. Arun Revanth	Design and Analysis of Phase Noise Measurement Techniques	2019
(xii)	Mr. Kumar Kinjalk	Fiber Bragg Grating Based Optical Sensors	2020
(xiii)	Ms. Tanooja Mishra	Microwave Photonic Filters and its Performance Analysis for Digital Modulation Schemes	2020
(xiv)	Ms. Kumari Akansha	Microwave Photonics Based Sensing using Multiplexed Fiber Bragg Gratings	2020
(xv)	Mr. Amit Kumar Mandal	Microwave Photonics Based Optical Sensing	2021
(xvi)	Ms. Jyoti Kumari	Stufy on Range Detection using FMCW Lidar	2022
(xvii)	Mr. Pradeep Tomar	Design of Hand Glove to Count 1 to 10 in ASL using OTDR	2022
(xviii)	Mr. Suman Saurav	Design of FBG FP Based Fiber Optic Sensors.	2023
(xix)	Mr.Vikas Kumar	Body Posture Monitoring using Fiber Optic Sensors	2024
(xx)	Ms. Sakshi Basangar	Detection of Milk Fat Adulteration using Fiber Optic Sensor	2024

Administrative/ Professional Activities at IIT (ISM) Dhanbad:

- ***Member DPGC, and PG program coordinator (Optical Communication and Integrated Photonics)***
- ***Member DFSC***
- ***Convener DUGC-Department of Electronics Engineering till Oct. 2024***
- ***Associate Dean (Faculty) – Administration & Career Progression till Oct. 2023***
- ***Faculty In-charge of Electronics and IoT lab, NVCTI, IIT (ISM) Dhanbad till May 2024***
- ***Coordinator MPDI, NVCTI, IIT(ISM), Dhanbad till Apr. 9, 2023***
- ***Chief Warden Jasper hostel (Capacity 1200 rooms) till June, 2022***
- ***Member Central time-table committee till May, 2022***
- ***FIC Departmental time-table till May, 2022.***
- ***Member M. Tech. Admission committee at IIT (ISM) Dhanbad (2019-2020).***
- ***FIC training for B. Tech. ECE students (2017-2019).***
- *Faculty Advisor, B. Tech. ECE (2015-2019).*
- *Faculty Advisor OSA (the optical society) student chapter, IIT(ISM) Dhanbad.*
- *Tabulator for Monsoon/Winter semester examination for B. Tech (ECE) and M. Tech (ECE) students (2013-16).*
- *Faculty Treasurer, OSA (The International Optical Society).*
- *Visited Rome, Italy, in February 2016 to present one research paper at the reputed 4th International Conference on Photonics, Optics and Laser Technology (PHOTOPTICS 2016).*
- *Guided student for summer training in the ECE department.*

- *Reviewer for the IEEE-ICMAP-15 conference.*

Countries Visited:

- ***Rome, Italy***

Workshop /Conferences Organized:

- Successfully organized IEEE International Conference on Microwave and Photonics (ICMAP-2018) in the local arrangement & hospitality chair capacity at IIT (ISM) Dhanbad.
- Successfully organized RTPT- 2018 workshop under the banner of OSA & SPIE at IIT (ISM) Dhanbad.
- Members of the organizing committee of the International OSA Network of Students (IONS) conference organized by the Optical Society (OSA) held at Indian Institute of Technology (ISM) Dhanbad, India, from September 7 to 10, 2016.
- Served as coordinator for a three-day workshop on "Optical Communication, Network, and Photonic Devices" on 18th -20th December 2015, held at Indian Institute of Technology (ISM) Dhanbad, India.
- One of the organizing committee members of IEEE Technically Co-Sponsored International Conference on Microwave and Photonics 2015 (ICMAP 2015), held at ISM Dhanbad, India during 11-13 Dec 2015.
- One of the organizing committee members of IEEE Technically Co-Sponsored International Conference on Microwave and Photonics 2013 (ICMAP 2013), held during 13-15 Dec. 2013 at ISM Dhanbad India.

Industrial Training / Workshop

- Attended a two-day Workshop on Recent Advances in Photonics (WRAP2013) organized at IIT Delhi, December 17-18, 2013.

Courses Taught:

- ***Under Graduate Level***
    - Analog Communication
    - Analog Interface Electronics
    - Basic of Electronics Engineering
    - Digital Circuit
    - Electronic Devices
    - Fiber Optics and Laser Instrumentation
    - Microprocessors and their application
    - Network Theory and filter Design
- ***Post Graduate Level***
    - Advanced Optical Communication
    - Fiber optic sensors
    - Microwave Photonics
    - Optoelectronics and Photonics Devices
    - Photonic Sensors

Publications:

Patent

1. **Amitesh Kumar**, Abhinav Gautam, Jaisingh Thangaraj, and Vishnu Priye "An Optical Weighbridge with Multiple Optical Load Cells Based on Cantilever Structure for Measuring Weight" Indian patent **(Published).**

International Journals

2. Saurabh Agarwal, Kurmendra, Chandra Prakash, Sumar Kumar Mitra, and **Amitesh Kumar**, " Ultra-High Quality Factor NOMS Device Incorporating Photonic Crystal Cavity for Femto-Gram Sensing," in ***IEEE Transactions on Nanotechnology,*** *VOL. 24, pp. 1-7, 2025*.
3. Saakshi Basangar, **Amitesh Kumar**, Deep Pal, Kavita Jha, and Vikas Kumar, "Enhanced Detection of Milk Fat Adulteration Using SMS Fiber Sensor Enhanced Detection of Milk Fat Adulteration Using SMS Fiber Sensor," **Fiber and Integrated Optics, Taylor & Francis**, vol. 00, no. 00, pp. 1–19, 2024.
4. Randhir Kumar Sah, **Amitesh Kumar**, and Deep Pal, "*Design and Analysis of FBG-Based Vibration Sensor for Low Frequency Applications*," **Fiber and Integrated Optics**, **Taylor & Francis**, vol. 44, no. 01, pp. 29–49, 2025.
5. D. Pal, A. Kumar, V. Kumar, S. Basangar and P. Tomar, "Development of an OTDR-Based Hand Glove Optical Sensor for Sign Language Prediction," in **IEEE Sensors Journal**, Vol. 24, No. 3, Feb. 01, 2024.
6. Annapurna Kumari, and **Amitesh Kumar**, " Impact of laser phase noise on the ranging accuracy of a cooperative MIMO FMCW photonic radar system," **Applied Optics (OSA)** Vol. 62, No. 36, PP. 9523-9535, 2023.
7. A. Gautam and **Amitesh Kumar**, "Highly Sensitive FBG Based Tilt Sensor Using PM-IM Conversion and EFD Interrogation Technique," in ***IEEE Transactions on Instrumentation and Measurement***, Vol. 71, pp. 1-9, May 11, 2022.
8. Deep Pal, **Amitesh Kumar**, Abhinav Gautam, and Jaisingh T. "FBG Based Optical Weight Measurement System and Its Performance Enhancement Using Machine Learning", ***IEEE Sensors Journal***, Vol. 22, No. 5, 1 March 1, 2022.
9. Kumar Kinjalk, **Amitesh Kumar** and Abhinav Gautam "High-Resolution FBG based Inclination Sensor using Eigen Decomposition of Reflection Spectrum**,"** ***IEEE Transactions on Instrumentation and Measurement***, vol. 69, no. 11, pp. 9124-9131, Nov. 2020.
10. Abhinav Gautam, Kumar Kinjalk, **Amitesh Kumar** and Vishnu Priye, "FBG Based Respiration Rate Sensing with Arduino Interface," ***IEEE Sensors Journal***, Vol. 20, No. 16, August 15, 2020.
11. Abhinav Gautam, **Amitesh Kumar**, Kumar Kinjalk, Jaisingh Thangaraj, and Vishnu Priye, "A Low-Cost FBG Based Online Weight Monitoring System**,"** ***IEEE Sensors Journal***, Vol. 20, No. 8, April 15, 2020.
12. Deep Pal, **Amitesh Kumar**, Nave Avraham, Yoram Eisenbach, Yevgeny Beiderman, Sergey Agdarov, Yafim Beiderman, Zeev Zalevsky, " Noninvasive Blood Glucose Sensing by Secondary Speckle Pattern Artificial Intelligence Analyses," **Journal of Biomedical Optics 28(8) 087001**, August 2023.
13. Deep Pal, Sergey Agadarov, Yevgeny Beiderman, Yafim Beiderman, **Amitesh Kumar**, Zeev Zalevsky, "Non-invasive Blood Glucose Sensing by Machine Learning of Optic Fiber-based Speckle Pattern Variation," **Journal of Biomedical Optics 27(9) 097001,** September 2022.
14. Randhir Kumar Sah, **Amitesh Kumar**, Abhinav Gautam, Vinay Kumar Rajak, Temperature independent FBG based displacement sensor for crack detection in civil structures, **Optical Fiber Technology**, Volume 74, 103137, 2022.
15. Abhinav Gautam, **Amitesh Kumar**, Jaisingh Thangaraj, Devendra Chack, Vishnu Priye, "Optical weight measurement system using FBG based D-IM edge filter detection", ***Optical Fiber Technology Elsevier***, Nov. 2020.
16. Abhinav Gautam, **Amitesh Kumar**, R.R. Singh, and Vishnu Priye, " Optical Sensing and Monitoring Architecture for Pipelines using Optical Heterodyning and FBG, Filter", ***Optik Int. J. Light Electron Elsevier*** Volume 127, Issue 20, (Oct. 2016) Pages 9161–9166.

17. Annapurna Kumari, **Amitesh Kumar**, Abhinav Gautam, “Photonic generation and theoretical investigation of phase noise in quadrupling and 12-tupling millimeter wave Signal using optical self-heterodyne system”, **Optik, Int. J. Light Electron Elsevier**, Volume 231, Feb. 2021.
18. **Amitesh Kumar**, and Vishnu Priye, "Photonic generation of high frequency millimeter-wave and transmission over optical fiber," **Applied Optics (OSA)** Vol. 55, No. 22, PP. 5830-5839, 2016.
19. **Amitesh Kumar**, Abhinav Gautam and Vishnu Priye "Microwave Photonic Mixer Using DP-DDMZM for Next Generation 5G Cellular Systems", Fiber and Integrated Optics, **Taylor & Francis**, Vol. 39 No. 4, 149-168, 2020.
20. Annapurna Kumari, **Amitesh Kumar** and G. S. T. Reddy, “Performance analysis of the coherent FMCW photonic radar system under the influence of solar noise,” Frontiers in Physics, Vol. 11, no. June, pp. 1–14, 2023, doi: 10.3389/fphy.2023.1215160.
21. Kritika Awasthi, Nishit Malviya and **Amitesh Kumar**, “Silicon Subwavelength Grating Slot Waveguide based Optical Sensor for Label Free Detection of Fluoride Ion in Water,” IETE Technical Review, **Taylor & Francis,** August 2023, doi: 10.1080/02564602.2023.2246429.
22. **Amitesh Kumar**, Vishnu Priye, and R.R. Singh, "All optical measurement of unknown wideband microwave frequency," **Opto-Electronics Review**, Volume 24, Issue 4, PP. 191–195, 2016.
23. Abhinav Gautam, **Amitesh Kumar**, Vishnu Priye, "Microseismic wave detection in coal mines using differential optical power measurement," ***Optical Engineering***. 58(5), 056111 (2019).
24. Sunil N. Thool, Devendra Chack and **Amitesh Kumar** "Coherent Detection-Based Optical OFDM, 60 GHz Radio-over-Fiber Link Using Frequency Quadrupling, and Channel and Carrier Phase Estimation" ***Frontiers in physics***, 9:749497, October 2021.
25. Devendra Chack, Shamsul Hassan and **Amitesh Kumar** (2021) "Broadband and Mode insensitive MMI based mode power splitter for MDM" Laser Physics (IOP) Volume 31, 126205, December 2021.

International Conferences

*Presented **one paper at the 4th** International Conference on Photonics, Optics and Laser Technology (PHOTOPTICS 2016, 27-29 February 2016, **Rome, Italy.***

26. Abhinav Gautam, **Amitesh Kumar,** and Vishnu Priye. "Highly sensitive FBG-based low-strain sensing system using carrier-suppressed phase modulation". SPIE Photonics West, 2 - 7 February 2019, ***San Francisco, California, United States***.
27. Abhinav Gautam, Ritu Raj Singh, **Amitesh Kumar**, Jaisingh Thangaraj, Vishnu Priye. "FBG Based Optical Surveillance Network for Oil and Gas Pipelines". Frontiers in Optics/Laser Science 2018, 16-20 Sept. 2018, ***Washington, DC, USA***.
28. Abhinav Gautam, **Amitesh Kumar**, Vishnu Priye, and Jaising Thangaraj, "Optical Weight Measurement System Using FBG based Edge Filter Detection Technique," 2019 Workshop on Recent Advances in Photonics (WRAP), Guwahati, India, 2019, pp. 1-3.
29. Tanooja Mishra, Abhinav Gautam, and **Amitesh Kumar** "Performance Analysis of Microwave Photonic Filter for Digital Modulation Scheme," 2019 Workshop on Recent Advances in Photonics (WRAP), Guwahati, India, 2019, pp. 1-3.
30. E. S. Rohit, A. Gautam, R. R. Singh, **A. Kumar**, and V. Priye, "Analysis and Optimization of Edge-Filter Interrogation Scheme for FBG Sensors," in Frontiers in Optics / Laser Science, OSA Technical Digest (Optical Society of America, 2018), paper JTu2A.83.
31. Gautam, R. R. Singh, **A. Kumar,** and J. Thangaraj, "FBG based sensing architecture for traffic surveillance in railways," 2018 3rd International Conference on Microwave and Photonics (ICMAP), Dhanbad, 2018, pp. 1-2.DOI: 10.1109/ICMAP.2018.8354567.
32. R. Kumar, **A. Kumar,** and A. Kumari, "Frequency shifter for photonic multiple microwave frequency measurement," 2018 3rd International Conference on Microwave and Photonics (ICMAP), Dhanbad, 2018, pp. 1-2.
33. **Amitesh Kumar**, and V. Priye, "Photonic generation of microwave signal using a dual-parallel dual-drive Mach-Zehnder modulator," in 12th International Conference on Fiber Optics and Photonics) (Optical Society of America, 2014), paper S5A-66.

34. **Amitesh Kumar**, R. C. Vissampalli, and V. Priye, "Photonic microwave Up-converter Based on four-wave mixing in an SOA Using single laser source," in 12th International Conference on Fiber Optics and Photonics (Optical Society of America, 2014), Paper S5A-62.
35. **Amitesh Kumar**, R.R. Singh, and V. Priye, "Instantaneous microwave frequency measurement using dual-drive Mach Zehnder Modulator," IEEE Conference, pp. 1 - 4, ISBN: 978-1-4799-6499-4, Dec. 2014.
36. **Amitesh Kumar**, V. Priye, and Kowshik Moyya, "Performance analysis of photonically generated microwave signal using a dual-parallel dual-drive Mach-Zehnder modulator in Dispersive Media," 4th International Conference on Photonics, Optics, and Laser Technology (IEEE, 2016), pp. 266-271, Rome, Italy.
37. Jaisingh T, **Amitesh Kumar**, Vishnu Priye, "Heuristic Approach For Survivability in WDM Optical Networks With The Impact of Four Wave Mixing", IEEE ICMAP,13, December 2013
38. **Amitesh Kumar**, and V. Priye, **"**Optimization of wavelength converter in WDM networks using genetic algorithm," in IEEE International Conference on Electronics, Computing and Communication Technologies, January, (IEEE CONECCT2013 1569684119) 2013.
39. R.R. Singh, **Amitesh Kumar**, Abhinav Gautam, and Vishnu Priye, "Microwave Frequency Estimation with high Accuracy based on Mach-Zehnder Modulator and Phase Modulator", IEEE ICMAP,15, December 2015.
40. Abhinav Gautam, R.R. Singh, **Amitesh Kumar**, and Vishnu Priye, "Architecture of Optical Sensing and Monitoring for Pipelines using FBG," 3rd International Conference (RAIT 2016), March, 2016.