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Qualifications : Ph.D. (IIT Patna)

Research Interest:

Optical fiber communication, Coherent optical communication, Optical signal processing, Long haul optical communication, All-optical signal processing, Optical network, Photonics.

Awards and achievements:

- Went to CNIT, Italy as a visiting PhD student for 9 months.
- Best poster award in the Research Scholar Day 2012 at IIT Patna
- Best paper award in 3rd International Conference on Intelligent Systems, Advanced Computing and Communication ISACC 2025, organized by the Department of Computer Science and Engineering Assam University, Silchar, Assam, India

Member of Professional Bodies:

- IEI (Graduate member)

Research scholars:

Sl no.	Name	Title of the Thesis	Status
1	Satyabrata Singha	Design and characterization of microring resonator based devices for high-speed optical communication	Awarded on 24-05-2023
2	Srikanta Das	Microring Resonator based devices for Optical Signal Processing and their Characterization Analysis	Awarded on 13-10-2025
3	Nitish Sinha	Designing of higher order optical modulator and ML based optical transmission characterization	Thesis submitted on 06-07-2026

4	Suman Debnath	Design and Analysis of Advanced Next-Generation Smart Photonic System	On going
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Publication Details:

2026

JOURNAL

1. N Sinha, S Das, S Debnath, S Singha, S Pal, BB Bhowmik, “40 Gbps hexagonal 16QAM using silicon microrings for green optical interconnects: modeling and performance study”, *Optical Engineering*, vol. 65, no. 3, 035102

2025

JOURNAL

1. S Debnath, R Acharjee, S Das, N Sinha, BB Bhowmik, “Implementation of electro-optic XOR and XNOR gates using dual silicon microring resonator assisted MZI structure”, *Interactions*, vol. 246, no. 1, p. 36

CONFERENCE

1. S Singha, N Sinha, S Das, BB Bhowmik, P Vedavalli, GS Reddy, “Enhancing PAM-4 Modulation with Zigzag Constellation and Variable Extinction Ratios Using Microring Modulators”, *International Conference on Sustainable Science and Technology for Tomorrow*
2. S Das, S Debnath, N Sinha, BB Bhowmik, “Multi-Wavelength Enhanced Optical Half-Adder Circuit Using MRR assisted with Mach-Zehnder Interferometric Structure”, *2025 3rd International Conference on Intelligent Systems, Advanced Computing and Communication*

2024

JOURNAL

1. AR Bin, JK Rakshit, M Hossain, BB Bhowmik, JN Roy, “Design of Phononic Crystal Ring Resonator-Based Acoustic $2 \times 1/4 \times 1$ Multiplexer and $1 \times 2/1 \times 4$ Demultiplexer”, *Brazilian Journal of Physics*, vol. 54, no. 2, p. 57
2. S Debnath, S Das, N Sinha, S Singha, BB Bhowmik, “Generation of an optical 8-amplitude phase shift keying modulator using silicon microrings in add-drop configuration”, *Optical Engineering*, vol. 63, no. 3, 035110
3. N Sinha, S Das, S Debnath, S Singha, J Pal, S Pal, SK Dey, BB Bhowmik, “Realization of 2-bit multiplier based on Vedic mathematics using electro-absorption microring modulator”, *Optical Engineering*, vol. 63, no. 10, 105104

2023

JOURNAL

1. S Das, N Sinha, AR Bin, JK Rakshit, S Pal, BB Bhowmik, “Microring assisted Mach–Zehnder interferometric structure based electro-optic adder for photonic integrated circuits”, *Optical and Quantum Electronics*, vol. 55, no. 12, p. 1119

CONFERENCE

1. S Das, K Debnath, S Debnath, N Sinha, BB Bhowmik, “Re-configurable Optical XNOR to XOR Gate Based on Silicon Microring Resonator”, *2023 IEEE 3rd International Conference on Applied Electromagnetics, Signal Processing & Communication*
2. C Kumar, S Das, S Singha, BB Bhowmik, JL Sarkar, “IoT in Health Sector: An optical sensor for detection of tuberculosis in suspected patients’ blood sample”, *2023 IEEE Globecom Workshops (GC Wkshps)*, pp. 62–67

2022

JOURNAL

1. SatyabrataSingha, Sanjukta Bhowmik, Nitish Sinha, Bishanka Brata Bhowmik, “Optical 8PSK modulation format generator based on three microring modulators” in *Microwave and Optical Technology Letters*, Willey.
2. S Das, N Sinha, S Pal, BB Bhowmik, “An electro-optic reconfigurable OR to Ex-OR gate based on microring resonator loaded on Mach–Zehnder interferometric structure”, *Results in Optics*, p. 100299

2021

CONFERENCE

1. SatyabrataSingha, Nitish Sinha, Srikanta Das, SumanDebnath and Bishanka Brata Bhowmik. “Re-configurable higher order optical modulation format generator based on microring modulator”, 2021 IEEE International Conference on Telecommunications and Photonics (ICTP), BUET, Bangladesh.
2. Nitish Sinha, Manthan Ghosh, SwanirbharMajumdar, Bishanka Brata Bhowmik, “Deep Learning based noise identification in the Optical fiber communication using Variational Mode Decomposition” in International Conference on Applied Electromagnetics, Signal Processing and Communication.
3. SumanDebnath, Nitish Sinha, Bishanka Brata Bhowmik, “ML Based Modulation Format Identifier using K-NN Algorithm”, in XII Biennial National Conference of Physics Academy of North East (PANE2021) 15-17 December, 2021
4. Deepa Das, HarjeetNath, Bishanka Brata Bhowmik, “A Comparative Review on the Application of Arduino for Gas & Water Sensing”, in XII Biennial National Conference of Physics Academy of North East (PANE2021) 15-17 December, 2021.
5. Deepa Das, HarjeetNath, Bishanka Brata Bhowmik, SourabBaidya, “Arduino Microcontroller Based Sensor for Effective Drinking Water Monitoring”, in XII Biennial National Conference of Physics Academy of North East (PANE2021) 15-17 December, 2021.

6. Manthan Ghosh, Nitish Sinha, Bishanka Brata Bhowmik, "Benchmarking of Representative DNN Architectures for Detection of Various Types of Optical Noise", in XII Biennial National Conference of Physics Academy of North East (PANE2021) 15-17 December, 2021.
7. TanmoyDebnath, Nitish Sinha, SatyabrataSingha, Bishanka Brata Bhowmik, "Proposal of microring resonator based PAM-4 modulator with variable ER", in XII Biennial National Conference of Physics Academy of North East (PANE2021) 15-17 December, 2021.
8. TiashaShome, Nitish Sinha, Bishanka Brata Bhowmik, "A Review on the Design Of An X-NOR Gate Using Micro-ring Resonator", in XII Biennial National Conference of Physics Academy of North East (PANE2021) 15-17 December, 2021.

2020

JOURNAL

1. SatyabrataSingha, Bishanka Brata Bhowmik, and Nitish Sinha "Performance evaluation of microring modulator based two-circular 16QAM modulator under amplitude spontaneous emission noise," Optical Engineering 59(3), 036102 (3 March 2020).

CONFERENCE

1. Nitish Sinha, SanjuktaBhowmik, SatyabrataSingha and BishankaBrataBhowmik,"Dual Modulation of QPSK And OOK Using silicon Microring modulator", 3rd International Conference on Computing and Communication Systems, 2020.
2. Rajat Kumar Das, BishankaBrataBhowmik, "A study on the effect of the optical receiver filter's bandwidth in a high-speed optical fiber communication with linear impairments", in ICCCIoT 2020.
3. Sujata Dash, BishankaBrataBhowmik, "Constellation diagram analysis of different modulation format in Optical Fiber Communication in the presence of fiber and laser-induced impairment"ICCCIoT 2020.
4. Debbarma P., Das S., Bhowmik B.B. A Study of Micro-ring Resonator-Based Optical Sensor. InApplications of Internet of Things. Lecture Notes in Networks and Systems, vol 137. Springer, Singapore.
5. Debnath S., Bhowmik B.B. Design of a Low-Cost Li-Fi System Using Table Lamp. In: Mandal J., Mukhopadhyay S., Roy A. (eds) Applications of Internet of Things. Lecture Notes in Networks and Systems, vol 137. Springer, Singapore.
6. S. bhowmik, S. Das, P. Debbarma, B. B. Bhowmik, H. Nath, "How light can help to fight against COVID-19", in NCECC-2020, NIT Jamshedpur.
7. Nitish Sinha, SumanDebnath, Rajat Kumar Das, Sangita Choudhury and BishankaBrataBhowmik, "Visual Representation of COVID-19 Outbreak in India", in NCECC-2020, NIT Jamshedpur.

8. Debnath, Suman, BishankaBrataBhowmik, and Mithun Mukherjee. "Free Space Optical Communication Channel Modelling with PIN Receiver." *Smart Computing Paradigms: New Progresses and Challenges*. Springer, Singapore, 2020. 259-268.
9. KankanaDebnath, Srikanta Das, Arka Roy Bin, Bishanka Brata Bhowmik, "A Brief Study of Optical Flip-flops based on Microring Resonator" in Technical Volume of 35th Indian Engineering Congress, December 18-20, 2020.
10. Nitish Sinha, SatyabrataSingha, Mohua Chakraborty, Bishanka Brata Bhowmik, "ML-based Constellation-rotation Correction of QPSK Signal in Optical Fiber Communication" in Technical Volume of 35th Indian Engineering Congress, December 18-20, 2020.
11. Arka Roy Bin, Srikanta Das, kankanaDebnath and Bishanka Brata Bhowmik, "Wavelength dependent Configurable optical AND to OR Gate based on Micro Ring Resonator loaded on Mach-Zehnder Structure" in Technical Volume of 35th Indian Engineering Congress, December 18-20, 2020.

2019

JOURNAL

1. Nitish Sinha and BishankaBrataBhowmik, "Digital Signal Processing Based Laser Phase Noise Compensation at Coherent Optical Quadrature Phase-Shift Keying Receiver Using K-means Clustering and Viterbi-Viterbi Method Jointly", *International Journal of Information Technology and Electrical Engineering* Vol.9 No.3, Oct 2019.
2. Bhowmik, Sanjukta, SatyabrataSingha, and BishankaBrataBhowmik. "Optical 8PSK generation by cascading squared and rectangular QPSK using microring modulators." *Fiber and Integrated Optics* 38.6 (2019): 362-368.

CONFERENCE

1. Das, Nibedita, and BishankaBrata. "A Study on Microring Resonator Based Sensor in the Health Sector." *International Journal of Computational Intelligence &IoT* 2.4 (2019).
2. SatyabrataSingha, BishankaBrataBhowmik, Nitish Sinha, "Error probability analysis of Hexagonal 16QAM" in CODEC 2019 19-20 December 2019.

2018

JOURNAL

1. S. Das and B. B Bhowmik," Design and simulation of optofluidic sensor based on ring resonator for the quality testing of diesel oil defiled by kerosene", *Journal of the Tripura Mathematical Society (JTMS)*, Vol. 20 (2018) pp 122-128.

Book Chapters

1. Ahmmed A. Rifat, Rajib Ahmed and B. B Bhowmik," SOI Waveguide-Based Biochemical Sensor" *Computational Photonic Sensors*, pp 423-448 (Book Chapter).

CONFERENCE

1. Bipasa Deb and B. B Bhowmik," Telemedicine and Free space optical communication" in ICRTMS 2018 March 24-25, 2018, MBB University.
2. S. Singha and B. B. Bhowmik, "On-chip Photonic Temperature Sensor Using Micro Ring Resonator," 2018 Fifteenth International Conference on Wireless and Optical Communications Networks (WOCN), Kolkata, 2018, pp. 1-4.

2016

JOURNAL

1. B. B. Bhowmik and S. Gupta, "Wavelength Division Multiplexed 16-QAM Generator using Micro-Ring Modulator with Preconditioned Electronic Input," Journal of Optics, Springer, 45, pages26–38(2016).
2. Imran, M., et al. "A programmable optical few wavelength source for flexgrid optical networks." Optical Fiber Technology 30 (2016): 100-111.

2015

JOURNALS

1. B. B. Bhowmik and S. Gupta, "Proposal for an Optical Multicarrier Generator Based on Silicon Micro-Ring Modulator," Optics Communications, Elsevier, Vol. 349, pp. 132-137, 15 August 2015.

2014

CONFERENCES

1. F. Paolucci, A. Castro, F. Fresi, M. Imran, A.Giorgetti, B. B. Bhowmik, G.Berrettini, G. Meloni, F. Cugini, L. Velasco, L. Pot, and P. Castoldi "Active PCE Demonstration performing Elastic Operations and Hitless Defragmentation in Flexible Optical Networks," Springer, Photonic Network Communications, pp. 1-10, 2014.
2. B. B. Bhowmik, S. Gupta, "Silicon Micro-Ring Assisted WDM Modulator for Flexible Modulation Format," in Twentieth National Conference on Communications (NCC), 2014, pp.1-6, Feb. 28 2014-March 2 2014.
3. B. B. Bhowmik, S. Narayana and S. Gupta, "Simultaneous Demodulation and CD Compensation using Optical Ring Resonator under Nonlinear Transmission," in Photonics 2014, IIT Kharagpur.

2013

CONFERENCES

1. B. B. Bhowmik, S. Gupta, and R. Gangopadhyay, "All Optical Packet Power Equalizer Realized by nonlinear Micro Ring Resonator Loaded Mach Zehnder Interferometer Structure," in International Conference on Microwave and Photonics (ICMAP), 2013 pp.1-4, 13-15 Dec. 2013.

2. B. B. Bhowmik, S. Gupta, "Silicon Micro-Ring Resonator Based 16-QAM Modulator for WDM Transmission Systems," International Conference on Microwave and photonics (ICMAP), 2013, pp.1-5, 13-15 Dec. 2013.
3. Castro, F. Paolucci, F. Fresi, M. Imran, B. B. Bhowmik, G. Berrettini, G. Meloni, A. Giorgetti, F. Cugini, L. Velasco, L. Pot, and P. Castoldi "Experimental Demonstration of an Active Stateful PCE Performing Elastic Operations and Hitless Defragmentation," in ECOC 2013 London, 2013.
4. B. Bhowmik, S. Gupta, and R. Gangopadhyay, "All-Optical Packet Power Equalizer for DPSK Signal Using Nonlinear Micro Ring Resonator," in National Conference on Communications (NCC), 2013, pp.1-5, 15-17 Feb. 2013.

2012

JOURNALS

1. B. Bhowmik, S. Gupta, and R. Gangopadhyay, "Enhancement of equalization range in nonlinear micro ring resonator based all-optical packet power equalizer using genetic algorithm," Journal of Optics, Vol. 14, No. 7, July 2012.
2. B. B. Bhowmik, S. Gupta, and R. Gangopadhyay, "Simultaneous Demodulation and Dispersion Compensation of WDM DPSK Channels Using Optical Ring Resonator," Optics Communications, Elsevier, Vol. 285, No. 16, pp. 3483-3486, 15 July 2012.

2011

CONFERENCES

1. B. B. Bhowmik, S. Gupta, and R. Gangopadhyay, "All-optical packet power equalizer using nonlinear micro-ring resonator," in Annual IEEE India Conference (INDICON), 2011, pp.1-4, 16-18 Dec. 2011.

Details of Invited talk/ Resource person in Programme/ event

Sl. No.	Programme / Event	Level	Role / Contribution	Date
1	All India Seminar on "Flexible Nanoelectronics for Sensing and Biomedical Applications"	National	Invited Talk	07-02-2026
2	Recent Trends in Electrical and Electronics & Communication Technology	National	Resource Person	14-11-2025
3	3rd International Conference on Intelligent Systems, Advanced Computing and Communication	National	Paper Presenter	27-02-2025

Sl. No.	Programme / Event	Level	Role / Contribution	Date
4	Artificial Intelligence for Rural Development and Agriculture	International	Resource Person	25-01-2025
5	Faculty Development Programme on “Industrial Advancement in Electronics and Communication Engineering”	National	Resource Person	04-06-2024
6	Short-Term Training Programme on Application Development Software, Security and Different AI Tools	State	Resource Person	23-02-2024
7	Workshop entitled “Challenges and Opportunities of AI Tools in Higher Education”	State	Resource Person	28-12-2023
8	ICAR–National Research Centre on Pig, Guwahati, Assam	National	Resource Person	23-06-2023
9	Faculty Development Programme on ICT in Teaching-Learning Process	National	Resource Person	12-04-2023
10	One-Week Training Programme on “State of the Art in Artificial Intelligence and Machine Learning”	National	Hands-on Demo	19-12-2022
11	Bi-Monthly Seminar Programme of Computer Science and Electronics & Telecommunication Engineering Division, IET, Tripura State Centre	State	Invited Speaker	06-08-2022
12	Skill Development Programme on Basic Computer Literacy and Mathematical Programming, Simulation & Numerical Methods	State	Hands-on Trainer	31-03-2022
13	Skill Development Programme on Basic Computer Literacy and Mathematical Programming, Simulation & Numerical Methods	State	Invited Lecturer	30-03-2022
14	1st International Conference of Machine Intelligence and System Sciences (MISS-2021)	International	Keynote Speaker	01-11-2021

Sl. No.	Programme / Event	Level	Role / Contribution	Date
15	5-Day Online Programme for Youth on “Embedding Computational Thinking to Make Education Systems Relevant for the Youth”	National	Speaker	11-08-2021
16	3rd One-Week National Workshop on Emerging Tools and Technologies in Research	National	Invited Speaker	17-12-2020
17	3rd One-Week National Workshop on Emerging Tools and Technologies in Research	National	Session Co-Chair	06-09-2020
18	One-Day National Webinar on “Fiber Optics Communication – Fiber Optics Sources, Dispersions, Receivers”	National	Invited Speaker	20-08-2020