

डॉ देवेन्द्र चक

(सह - प्राध्यापक)

इलेक्ट्रॉनिक्स इंजीनियरिंग विभाग

भारतीय प्रौद्योगिकी संस्थान

(भारतीय खनि विद्यापीठ), धनबाद, 826004

भारत

Dr. Devendra Chack

(Associate Professor)

Department of Electronics Engineering

Indian Institute of Technology

(Indian School of Mines), Dhanbad, 826004

India



Contact Information:

Website: <https://www.iitism.ac.in/faculty-details?faculty=devendra>

Email: devendra@iitism.ac.in ; devendra.chack@gmail.com

Phone: (0326) 2235760;

Research Interests

- * Silicon Photonics
- * Photonic Integrated Circuits
- * CMOS-compatible photonics devices for high-performance computing
- * On-Chip Silicon Photonic Devices and circuits for Optical Phased array

Research work and funding from external/internal agencies

S. No	Title	Cost (in INR)	Duration	PI and Co-PI	Funding Agency
1.	Silicon Photonic Chip based $N \times N$ Photonic Switches for 6G and Beyond	1.98 Cr	2025 - 2028	PI	TTDF/ DoT
2.	Development of field deployable fiber bragg grating sensor for monitoring of hazardous toxic chemicals	34.0 Lakhs	2018 - 2021	Co-PI	BRNS/DAE
3.	On-chip Silicon Photonic Switches for High Performance Computing and Datacenter Networks	20.3 Lakhs	Nov 2019-2022	PI	SERB/DST
5.	Study on basic Photonics Components for WDM Applications	2.0 Lakhs	2017 - 2019	PI	TEQIP-III

Employment Details

Sl No	Organization	Designation	From (Date)	To (Date)
1.	Indian Institute of Technology (Indian School of Mines), Dhanbad, India	Associate Professor	13/04/2022	Continuing
2.	Indian Institute of Technology (Indian School of Mines), Dhanbad, India	Assistant Professor	23/12/2011	12/04/2022
3.	BT-Kumaon Institute of Technology, Dwarahat, Almora UK, India <i>(An Autonomous Institute of Govt. of UK), India</i>	Assistant Professor	08/08/2011	19/12/2011
			16/08/2010	30/06/2011

Education

Degree	Subject	Institute/University	Course Duration Details	
			Year of Commencement	Year of Passing
Bachelor of Engineering (BE)	Electronics Engineering	Madhav Institute of Technology & Science (MITS) Gwalior, M.P, India, <i>(A govt. Aided UGC autonomous institute, Affiliated to RGPV Bhopal Estd. In 1957)</i>	2002	2006
Master of Technology (M.Tech)	Electronics and Communication Engineering	Indian School of Mines, Dhanbad, <i>(Under Ministry of H.R.D., Govt. of India)</i>	2007	2009
Ph.D	Photonic integrated circuits	Indian Institute of Technology (Indian School of Mines), Dhanbad, <i>(An Institute of National Importance under Ministry of H.R.D., Govt. of India)</i>	31, January, 2011	08, February 2017

Ph.D Supervision

Research Scholars	PhD Status	Research Interest/thesis title	Guides
Dr. Shamsul Hassan	Date of joining: 17/03/2017	Silicon photonic devices using multimode interference coupler for photonic integrated circuits	Devendra Chack
	Thesis Submitted on 05/10/2021	<i>Joined as Senior Principal Engineer, CoE-CPPICS, IIT Madras</i> https://cppics.iitm.ac.in/technology-officers	
Dr. Rukmani Singh	Date of joining: 01/08/2017	Modelling and Design of Silicon Optical Waveguides for Biosensor Applications	Prof. (Retd) Vishnu Priye. Devendra Chack
	Thesis Submitted on 07/01/2022	<i>Joined as Research & Development Scientist / Optical Design Engineer at Seagate, UK</i>	
Dr. Gaurav Kumar	Date of joining: 01/08/2019	Design of Silicon Photonic Switches Based on Multi-Mode Interference Coupler	Devendra Chack
	Thesis Submitted on 28/07/2025		
Dr. Sunil Narayan Thool	Thesis Submitted on 17/10/2025 (Part-time)	Advanced Modulation and Digital Signal Processing Techniques for High-Capacity Optical Communications	Devendra Chack
		Working as Scientist-E (Radar Division), India Meteorological Department (GoI), Delhi	
Dr. Diksha Maurya	Date of joining: 12-08-2021	Subwavelength Grating Based Photonic Devices for On-Chip Optical Phased Array Applications	Devendra Chack
	Thesis Submitted on 11/02/2026		
Mr. Ravi Roushan Kumar	Date of joining: 08-08-2022	Silicon Photonic Devices for Classical and Quantum Photonic Computing	Devendra Chack
	Full-time-Ongoing		
Mr. Rishu Kumar	Date of joining: 07-03-2025	CMOS-compatible silicon photonic chip	Devendra Chack
	Full-time-Ongoing		

Courses Introduced and/or Teaching at IIT Dhanbad

- * Post Graduate Level
 - Optical fiber communications
 - Photonic Integrated Circuits
 - Advanced optical communication
- * Undergraduate Level
 - Digital Electronics
 - Control systems
 - Signals and Networks
 - Signals and Systems
 - Optical Communication
 - Electronics Engineering

Additional Responsibilities at IIT (ISM) Dhanbad

- * Member of the Library Advisory Committee [Ongoing]
- * Member of Departmental Faculty Screening Committee (DFSC) from 04.05.2023- 2025
- * Member DPGC of ECE Department (17.01.2023 – 17.10.24)
- * Member, Departmental Post Graduate Committee (DPGC) (15.10.2020 – 14.10.2022)
- * Member of Centre of Societal Mission (CSM) (24.05.2021- 14.02.25)
- * Time Table coordinator from 23.08 2019 – 30.08.23.
- * Served as Chief Warden of Sapphire Hostel (from July 1 2021, to 30 June 2022).
- * Member of Departmental faculty screening committee (DFSC) from 01.12.2021 – 28.02.2023
- * Served as Warden of Sapphire Hostel (from July 1 2019 to June 30 2021).
- * M.Tech Coordinator for Optoelectronics and Optical Communication Engineering (25.10.2017- 2019)
- * Faculty Advisor (3rd year of Electronics and Communication Engineering) (session 2019-20)
- * Member of Doctoral Scrutiny Committee for Ph. D scholars of other sister departments
- * Faculty Advisor (2nd year of Electronics and Communication Faculty Screening Committee Engineering) (session 2018-19)
- * Faculty Advisor (1st of Electronics and Communication Engineering) (session 2017-18).
- * Time Table Coordinator (EXAM) in the Department (February 19, 2015 – May, 2017)

University Visited

- * University of Ottawa (April 2026)
- * McGill University, Montreal (April 2026)

Conference /Workshop/Event Organized:

- * Organized a invited talk on the occasion of the International Day of Light Week under the Optica Student Chapter. The talk invited was delivered by Prof. Ksenia Dolgaleva, Professor in the School of Electrical Engineering and Computer Science at the University of Ottawa, on May 13, 2026.
- * Organized an invited talk under the Optica Student Chapter. The lecture was delivered by Shailendra K. Varshney, Indian Institute of Technology Kharagpur, on April 24, 2026.
- * Organised the 2nd IEEE-ELEXCOM 2025, an international conference held during 20–22 December 2025 at IIT (ISM) Dhanbad, in the capacity of Organising Chair.
https://www.iitr.ac.in/elexcom/Organizing_Committee.html
- * Organized an invited lecture under the Optica Student Chapter. The lecture was delivered by Lawrence R. Chen, Department of Electrical and Computer Engineering, McGill University, Montreal, Canada, on October 15, 2024.
- * Organized an SPIE TECHNICAL Webinar 3.2 (PHOTONIC INDIANS LECTURE SERIES) delivered by Prof. Deepa Venkitesh (EE, IIT Madras) on 24/03/22.
Title: "The Changing Phases of Optical Communication"
- * Organized an SPIE TECHNICAL Webinar 3.1 (PHOTONIC INDIANS LECTURE SERIES) delivered by Prof. Bijoy Krishna Das, IIT Madras on 30/09/2022.
- * Organized an SPIE Webinar talk delivered by Prof. Winnie Ye, Carleton university, Ottawa, Canada) on 24/03/22
- * Organized an SPIE Webinar series 1.1, 1.2, 1.3 and 1.4 (International and national talk) on October 2021
- * Steering committee member of International Symposium on 5G and Beyond for Rural Upliftment, 08-09 February 2020 at Indian Institute of Technology (ISM) Dhanbad, India. [Twinning activity between BIT Sindri & IIT(ISM) Dhanbad]
- * Organized invited talk delivered by Brajesh Kumar Kaushik, Indian Institute of Technology, Roorkee, under the SPIE Visiting Lecturer Program on December 4, 2019.
- * Organized School Outreach Activities on 28th and 29 September 2019. In this activity, the application of light and optical experiments have been demonstrated to government schools such as Kendriya Vidyalaya-2 Dhanbad and our institute social and welfare society (Karma-Jyoti Society school students.
- * Organized a technical quiz competition, an Exhibition of photography, and Sky lantern event on International Day of Light (IDL) on May 16 2019 under the SPIE Student chapter.
- * Organized invited talk delivered by Prof. Lorenzo Pavesi, Nanoscience Laboratory, University of Trento, Italy under the SPIE Visiting Lecturer Program on 27, October 2018.
- * Coordinator of the 4th workshop on "Recent Trends in Photonics Technology 2018" is to be held during 25-27 October 2018 at Indian Institute of Technology (ISM), Dhanbad, India [jointly organized by Optical Society (OSA) and International Society of Optics & Photonics (SPIE), student chapters]

- * Steering committee member of IEEE Technically Co-Sponsored International Conference on Microwave and Photonics 2018 (ICMAP 2018), held during 09-11 February 2018 at Indian Institute of Technology (ISM) Dhanbad, India.
- * Served as Co-Convener for two days' workshop on "Emerging trends in photonics technologies" on 3-4 February 2017 under the aegis of TEQIP-II held at Indian Institute of Technology (ISM) Dhanbad, India.
- * 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.
- * One of the organizing committee members of IEEE Technically Co-Sponsored International Conference on Microwave and Photonics 2013 (ICMAP 2013), held at ISM Dhanbad, India, during 13-15 Dec. 2013.
- * One of the organizing committee members of IEEE Technically Co-Sponsored International Conference on Microwave and Photonics 2013 (ICMAP 2015), held during 11-13 Dec. 2015 at ISM Dhanbad India.

Other Professional Assignments

- * Faculty Advisor of **Optica (formerly OSA)** (from December 10, 2022).
- * Faculty Advisor of **SPIE** (SPIE is the international society for optics and Photonics) (November 1, 2018 – December 10, 2022).
- * Reviewed research papers of OSA- Optics Express
- * Reviewed research papers of OSA- Applied Optics
- * Reviewed research paper of IEEE-Photonics Technology Letters.
- * Reviewed research papers of Optical Engineering (SPIE).
- * Reviewed research paper of Journal of Nanophotonics (SPIE).

Membership of Professional Bodies:

- * Life Time Associate Member of the Institution of Electronics and Telecommunication Engineers (IETE) Associate Member No AM-219689
- * Life fellow of Optical Society of India (OSI), ID# L657
- * IEEE & IEEE Photonics Society, Senior Member # 93027538
- * SPIE (the international society for optics and Photonics), Senior Member ID# 3649141
- * Optica (formerly OSA) Senior Member ID# 1041033

Supervised M.Tech Dissertations:

Name of the Student	Title of Master's Thesis Guided	Year of Completion
Mr. Kollati Santhosh	Inverse-Designed 1xN Digital Metamaterial Power Splitter for Advanced Optical Communication	2026
Ms. Jayanti Nanda Sinha	Design and analysis of photonics integrated phased array	2026
Mr. Prashant Rajbhar	Topological waveguide-based communication device	2025
Mr. G Vickey	Optimization of Broadband Surface Grating Antenna on a CMOS 3D Integration Platform	2024
Mr. Abhay Pratap Singh Bhadauria	Design and analysis of Photonic Devices for Photonic Integrated Circuits	2023
Mr. Pretom Das	Design and analysis of optical phased array	2022
Mr. Bipul Basumatary	Study and Optimization of Mach Zehnder Interferometer based 2x2 Optical Switches	2021
Mr. Ankit kumar Singh	Study of Optical Gates for Optical Interconnect	2021
Mr. Neha Tiwari	Performance analysis of 5G WDM-MIMO Optical Wireless Communication System.	2020
Mr. Rishabh	Study of optical switching devices for next generation communication system	2020
Mr. Mohd Qasim	Mode Converters based on MMI waveguide	2020
Mr. Dipanwita Aich	Study of Plasmonic Waveguides and its Applications	2019
Mr. Devdutt Tripathi	Study of Mode Division Multiplexing for Optical Communication Systems	2019
Mr. Jayant Kumar	Study of Fiber Bragg Grating and Applications for optical communication	2018
Mr. Debasmita Sarkar	Study of Plasmonic Waveguide and its applications	2018
Mr. Abhishek Kumar	Optical Beam Splitter Devices using MMI couplers	2017
Mr. Aayush Kumar	Study of Optical Devices Based on Photonic Crystal Waveguides	2016
Mr. Ravi Shankar Kumar	Study of Multilayer Waveguide with Metamaterial Structure	2016
Mr. Ran Vijay Singh	Implementation of Signal Processing & Ranging Electronics for Laser Range Finders	2015
Mr. Muzaffar Imam	Study of Guided Wave Optical Devices	2014
Mr. Niteshkumar Agrawal	Study of Integrated optical Waveguides	2013

Research Publications:

Publications as Associate Professor

1. R. R. Kumar, P. Basu, and **Devendra Chack**, "Adaptive Phase Control of 44 Clements MZI Mesh for Stabilizing Noisy Gaussian Boson Sampling in Integrated Quantum Photonics." *Advanced Quantum Technologies* (Wiley) 9, no. 7 (2026): e70353. <https://doi.org/10.1002/qute.70353> (WoS SCIE, JIF: 4.3)
2. R. Guchhait, D. Maurya and **Devendra Chack**, "Compact on-chip Dual Grating Filter using Backward Mode Conversion," in *IEEE Journal of Lightwave Technology*, vol. 43, no. 15, pp. 7305-7310, 1 Aug.1, 2025, doi: <https://doi.org/10.1109/JLT.2025.3573514> (WoS SCIE, JIF: 5.2)
3. R. Guchhait, S. Hassan, **Devendra Chack** and G. Kumar, "Broadband On-Chip Three Mode (De) Multiplexer Using SWG-Asymmetric Adiabatic Coupling," in *IEEE Photonics Technology Letters*, vol. 37, no. 8, pp. 497-500, 15 April 15, 2025, doi: <https://doi.org/10.1109/LPT.2025.3556783>
4. Diksha maurya , **Devendra Chack** and Vickey G, "Compact and Efficient Transverse Spliced Waveguide Grating Antenna for Integrated Optical Phased Array," in *IEEE Transactions on Nanotechnology*, vol. 23, pp. 665-672, 2024, doi: <https://doi.org/10.1109/TNANO.2024.3459472>
5. **Devendra Chack** and G. Kumar, "On-chip Non-Blocking 4×4 and 8×8 Photonic Switches Using MMI-MZI Configuration for Next-Generation Data Center Networks," in *IEEE Transactions on Nanotechnology*, vol. 24, pp. 216-223, 2025, doi: 10.1109/TNANO.2025.3558256
6. Gaurav Kumar, **Devendra Chack**, $1 \times N$ ($N = 2, 4$) dual-mode optical switch based on multimode interference coupler. *Opt Quant Electron* 57, 236 (2025). <https://doi.org/10.1007/s11082-025-08174-4>
7. Sunil Narayan Thool, **Devendra Chack**, "Next-generation optical networks: Integrating adaptive FEC rate LDPC and higher order probabilistic constellation shaping", *Optical Fiber Technology*, Volume 94, 2025, 104324, ISSN 1068-5200, <https://doi.org/10.1016/j.yofte.2025.104324>
8. Shamsul Hassan, **Devendra Chack** and Lorenzo Pavesi "Reconfigurable and Multifunction All Optical Logic Gates using Thermo-optic phase shifter for optical computing" AIP Advances 12, 055304 (03 May 2022) <https://doi.org/10.1063/5.0086185>

Publications as Assistant Professor

9. Rukmani Singh, **Devendra Chack**, and Vishnu Priye, "SNROW-based highly sensitive label-free surface biosensor for hepatitis B detection," *Appl. Opt.* 61, 6510-6517 (2022). DOI No.: <https://doi.org/10.1364/AO.463800>
10. **Devendra Chack**, Shamsul Hassan, and Mohd Qasim. "Broadband and low crosstalk silicon on-chip mode converter and demultiplexer for mode division multiplexing." *Applied Optics* 59.12 (2020): 3652-3659. <https://doi.org/10.1364/AO.390085>
11. Shamsul Hassan, **Devendra Chack**, and Varad Mahajan. "High extinction ratio and low loss polarization beam splitter based on multimode interference for PICs." *Applied Optics* 59.11 (2020): 3369-3375. <https://doi.org/10.1364/AO.387418>

12. **Devendra Chack**, Shamsul Hassan and Amitesh Kumar (2021) "Broadband and Mode insensitive MMI based mode power splitter for MDM" *Laser Physics (IOP)* **31** 126205
<https://iopscience.iop.org/article/10.1088/1555-6611/ac312c>
13. Shamsul Hassan, and **Devendra Chack**. "Design and analysis of polarization independent MMI based power splitter for PICs" *Microelectronics Journal* 104 (2020): 104887.
14. **Devendra Chack**, and Shamsul Hassan. "Design and experimental analysis of multimode interference-based optical splitter for on-chip optical interconnects." *Optical Engineering* 59.10 (2020): 105102.
15. Rukmani Singh, Vishnu priye and **Devendra Chack**, "Highly sensitive refractive index based sensor for DNA hybridization using subwavelength grating waveguide" *IETE Technical Review* (2022)
16. Sunil Thool, **Devendra Chack**, Amitesh Kumar (2021) "Coherent Detection-Based Optical OFDM, 60 GHz Radio-over-Fiber Link Using Frequency Quadrupling, and Channel and Carrier Phase Estimation" *Front. Phys.* **9**:749497
17. **Devendra Chack**, V. Kumar, S. K. Raghuwanshi and Dev P Singh "Design and analysis of O-S-C triple band wavelength division demultiplexer using cascaded MMI couplers" *Optics Communications*, Volume 382, pp. 324–331, (2017)
18. **Devendra Chack**, V. Kumar and S. K. Raghuwanshi, Design and performance analysis of InP/InGaAsP-MMI based 1310/1550-nm wavelength division demultiplexer with tapered waveguide geometry, *Opto-Electronics Review*, Volume 23, Issue 4, pp. 271–277, (2015),

Conferences

1. Diksha Maurya and **Devendra Chack**, "Sub Wavelength Grating Based High Directionality Silicon Photonic Antenna for Beam Steering Application," *2026 IEEE Silicon Photonics Conference (SiPhotonics)*, Ottawa, ON, Canada, 2026, pp. 1-2, doi: [10.1109/SiPhotonics68911.2026.11520704](https://doi.org/10.1109/SiPhotonics68911.2026.11520704).
(The paper was presented by Devendra Chack at the IEEE Silicon Photonics Conference 2026, held in Ottawa from April 13–15, 2026)
2. K. Santhosh, Diksha. Maurya and **Devendra Chack**, "Design and Monte Carlo-Based Fabrication Robustness Analysis of a Binary-Encoded 1×2 Silicon Power Splitter," *2026 IEEE Silicon Photonics Conference (SiPhotonics)*, Ottawa, ON, Canada, 2026, pp. 1-2, doi: [10.1109/SiPhotonics68911.2026.11520763](https://doi.org/10.1109/SiPhotonics68911.2026.11520763).
(The paper was presented by Devendra Chack at the IEEE Silicon Photonics Conference 2026, held in Ottawa from April 13–15, 2026)
3. R. R. Kumar, R. Guchhait, and **Devendra Chack**, "Tilted Subwavelength Grating Assisted Directional Coupler Based WDM," in *Advanced Photonics Congress (IPR, Networks, NOMA, SOLITH, SPPCom)*, Technical Digest Series (Optica Publishing Group, 2025), paper JTU3A.5.
<https://doi.org/10.1364/IPRSN.2025.JTu3A.5>
(Advanced Photonics Congress, 13–17 July 2025, Marseille, France)
4. D. Maurya, **Devendra Chack**, and R. R. Kumar, "Highly efficient and compact non-uniform waveguide grating antenna for off-chip coupling," in *Advanced Photonics Congress (IPR, Networks, NOMA, SOLITH, SPPCom)*, Technical Digest Series (Optica Publishing Group, 2025), paper JTU3A.6.
<https://doi.org/10.1364/IPRSN.2025.JTu3A.6>
(Advanced Photonics Congress, 13–17 July 2025, Marseille, France)

5. **Devendra Chack**, Shamsul Hassan, and Abhishek Kumar "Design and analysis of polarization beam splitter based on cascaded MMI on SOI", Proc. SPIE 11283, Integrated Optics: Devices, Materials, and Technologies XXIV, 1128320 (25 February 2020); <https://doi.org/10.1117/12.2544405> Photonics West OPTO 2020 (SPIE, the international society for optics and photonics), at **San Francisco, USA)**
6. S. Hassan and **Devendra Chack**, "MZI based Silicon photonic circuits for arbitrary power splitting application", *JSAP-OSA Joint Symposia 2018*, paper 21p_211B_8. at Nagoya Japan 18–21 September 2018.
7. S. Hassan and **Devendra Chack**, "Design and performance analysis of MMI based all optical logic gates on SOI substrate," *2018 3rd International Conference on Microwave and Photonics (ICMAP), Dhanbad, 2018, pp. 1-2.*
8. S. K. Raghuwanshi, V. Kumar, **Devendra Chack**, and R.R. Pandey, "Dispersion study of even mode thin planar slab dielectric waveguide without computing $\frac{d^2\beta}{dk^2}$ numerically" *Procedia Technology*, Volume 1, pp 286–290, (2012).
9. **Devendra Chack**, V. Kumar and D. Singh. "Performance Analysis of 1310/1490 nm Demultiplexer based on Multimode Interference Coupler for PON", In *Proceedings of the 4th International Conference on Photonics, Optics and Laser Technology* ISBN 978-989-758-174-8, pp 223-226 (2016), Rome, Italy
10. **Devendra Chack**, S. K. Raghuwanshi, V. Kumar and N. Agrawal, "Field Propagation Study of Y- Branch Assisted by MMI Coupler" *Proceedings of 3rd World Conference on Information Technology (WCIT-2012)*, 14-16 November 2012 pp 1795-1800 (2013), at University of Barcelona, Barcelona, Spain
11. **Devendra Chack**, S. K. Raghuwanshi and V. Kumar "Pulse Propagation Study of 1x4 Multibranch Optical Waveguide Using 3-Y Branch Optical Waveguide" *Proceedings of 3rd World Conference on Information Technology (WCIT-2012)*, 14-16 November 2012, pp 1790-1794 (2013), at University of Barcelona, Barcelona, Spain.

Patents:

1. **Devendra Chack**, Ms. Rajarshi Guchhait, Ms. Diksha Maurya "Two-stage wavelength selective filter with MWG-based CDC and SWG-assisted adiabatic dual mode converter for higher order backward mode conversion" (Published on 21-03-2025)
2. **Devendra Chack**, Ravi Roushan Kumar, Prantik Basu, "Dual-Mode Non-Blocking 4x4 Integrated Photonic Multifunctional Switch" (Filed on 18-03-26)

(Devendra Chack)