



VIDYASAGAR COLLEGE

39 SANKAR GHOSH LANE
KOLKATA

Name.....

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Academic qualifications

	Degree	Subject	University	Year
6	Ph.D	Nano photonics & Applied optics	University of Calcutta	Pursuing
	M.Phil/M.Tech	Electronics & Communication Engineering	West Bengal University of Technology (Presently MAKAUT)	2014
	MA/M.sc	NA	NA	NA
	BA/B.Sc/B.Tech	Electronics & Instrumentation Engineering	West Bengal University of Technology (Presently MAKAUT)	2012

PH.D. DETAILS

7	Title of the Thesis	
	Field of specialization under subject/ discipline	Nano photonics & Applied optics
8	PREVIOUS POSITIONS/Engagement	<ol style="list-style-type: none"> Teaching Assistant at MCKV Institute of Engineering, WBUT (Presently MAKAUT) for the period (01/04/2013 – 30/06/2014) Guest Lecturer at Surendranath College Sealdah, Kolkata, West Bengal, India for the period (28/08/2018 – 31/12/2019) Guest Lecturer at Scottish Church College Kolkata, West Bengal, India for the period (13/02/2019 – 30/06/2019)
9	Google scholar page:	https://scholar.google.co.in/citations?user=l400aTAAAAAJ&hl=en
10	ORCID ID	0000-0001-5327-1806
11	HONOURS AND AWARDS	
12	CURRENT RESEARCH PROJECT/Field of Research	Nano photonics & Applied optics
13	TECHNICAL UNDERSTANDING AND EXPERIENCE	A strong foundation in Electronics and Computer Systems, along with expertise in cutting-edge areas like IoT, Artificial Intelligence, and VLSI. Research work is carried out in the field of Nano photonics & Applied optics.
14	SUMMARY OF RESEARCH EXPERIENCE	<p>My research journey in nanophotonics and optical waveguide analysis has been focused on understanding and improving the propagation characteristics of photonic crystal fibers (PCFs) and photonic nanowires (PNWs). My work integrates analytical methods, simulation techniques, and experimental validations, with an emphasis on both fundamental physics and practical applications.</p> <p>Photonic Crystal Fibers (PCFs) Objective: Investigated the electromagnetic properties and structural impacts on endlessly single-mode propagation, dispersion control, and nonlinear optical processes in PCFs. Key Achievements: Developed novel numerical methods for analyzing PCFs with liquid infiltration to achieve ultra-flat dispersion profiles suitable for</p>

		<p>supercontinuum generation. Designed PCF structures with varying hole diameters and pitches to optimize birefringence and sensing applications. Proposed and validated models for effective refractive index calculations using the Finite Difference Method (FDM), improving the understanding of PCFs' mode-field distributions and loss characteristics (Research proposal_revis...)(chakraborty2018). Photonic Nanowires (PNWs) Objective: Explored nonlinear optical processes and waveguide mode confinement in PNWs to enhance sensing capabilities and energy harvesting mechanisms. Key Achievements: Established theoretical models for nonlinear Schrödinger equation (NLSE) solutions in PNWs, highlighting their applications in Mach-Zehnder interferometers and fiber lasers. Analyzed the role of core materials with high nonlinear indices, like silicon and chalcogenides, to maximize nonlinear parameters, enabling efficient light-matter interaction(Research proposal_revis...)(chakraborty2018). Experimental and Simulation Approaches Simulation Development: Pioneered the use of customized simulation algorithms in MATLAB to analyze and predict the propagation characteristics of PCFs and PNWs. My work has minimized reliance on commercially available simulators, emphasizing self-developed methods. Experimental Validation: Collaborated with laboratories to experimentally validate the theoretical models and simulation results. For example, coupling efficiencies of PCFs with laser diodes were modeled using simplified ABCD matrix formulations for practical alignment scenarios(chakraborty2017). Applications Sensing and Filtering: Utilized PCFs and PNWs for advanced sensing applications, including hydrostatic pressure sensors and spectral filters. Energy and Telecommunication: Worked on dispersion-flattened fibers for high-speed data communication and energy-efficient optical systems. Integrated Photonics: Contributed to designing waveguide structures for photonic integrated circuits, combining FDM and complementary numerical techniques for versatile applications(Research proposal_revis...)(chakraborty2018). Future Directions Building on this foundation, my future research aims to: Extend the design of photonic structures for quantum information systems. Integrate nanophotonics into biomedical imaging and diagnostics, emphasizing real-time sensing. This experience has honed my expertise in theoretical modeling, numerical simulations, and experimental validations, fostering a deep understanding of photonics with significant academic and industrial relevance.</p>
15	EXPERIENCE OF PROJECT MANAGEMENT	NA
16	COMPLETE LIST OF PUBLICATIONS (Maintain Harvard Format)	<ol style="list-style-type: none"> 1. Chakraborty, S., Roy, D., Mukhopadhyay, S. and Sarkar, S., 2017. An investigative study of efficient coupling mechanism of a hemispherical microlens tipped single mode photonic crystal fiber to a laser diode by ABCD matrix formulation and determination of the optimal separation distance. <i>Optik</i>, 149, pp.81-89. 2. Chakraborty, S., Ghosh, P. and Sarkar, S., 2018. Propagation characteristics of some intricate planar waveguides of practical interest by finite difference method. <i>Optik</i>, 158, pp.15-27.

		<p>3. Soumita Chakraborty, Tamoghna Mukherjee, Swagatam Roy. Solar powered smart water quality monitoring and bacteria detection system. One Day International Conference on Non-Conventional Renewable Energy: Impact on Environment (2023). ISBN : 978-93-5506-626-8</p> <p>4. M.Mitra Soumita Chakraborty, Debesh Bandopadhyay, J.Banerjee. A Novel Approach to Reduce Avalanche Noise of DDR Ka Band IMPATT. Recent Developments in Electrical, Electronics and Engineering Physics (RDE3P-2013)</p>
17	Extracurricular Activities	Recitation & Playing synthesizer
18	Link to personal website (if any)	-