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RESEARCH INTEREST

Photonics, Nanofabrication, Optical Sensors

CURRENT POSITION

Assistant Professor in Physics.

Dhenkanal Autonomous College, Dhenkanal

June 2023 – Present

RESEARCH EXPERIENCE

Institute	Post	Year
University of York, UK	Postdoctoral Research Associate	Apr 2022 – June 2023
ETH (EMPA), Switzerland	Scientist	Mar 2021 – Mar 2022
RIT, USA	Postdoctoral Research Associate	May 2019 – Sep 2020
NTU, Singapore	Postdoctoral Research Fellow	Oct 2017 – Apr 2019
KTH, Stockholm, Sweden	Erasmus Mundus (India4EU II) Research Fellow	Oct 2013 – Oct 2014

EDUCATION

Degree	Institution
Doctor of Philosophy (Ph.D.)	Indian Institute of Technology (IIT) Delhi, India
Master of Technology (Applied Optics)	Indian Institute of Technology (IIT) Delhi, India
Master of Science (Physics)	Utkal University, Bhubaneswar, India
Bachelor of Science (Physics Honours)	G. Sc. College, Utkal University, Odisha
Class XII	G. Sc. College, Athagad, Odisha
Class X	B. N. Bidyapith, Athagad, Odisha

FELLOWSHIP AND AWARDS

1. Erasmus Mundus (India4EU II) Fellowship – 2013-14.
2. Institute of Mathematics Scholarship – 2008-10.
3. CSIR National Eligibility Test (NET, June 2010) - All India Rank 29.
4. Graduate Aptitude Test Engineering (GATE, 2010) - Score 415, All India Rank 280
5. Life member of Optical Society of India.
6. Life member of Indian Association of Physics Teachers.
7. Life member Orissa Physical Society.

PATENTS

1. **US patent**: "A Method and an apparatus for manufacturing a porous graphene layer across a precursor material layer on a substrate through thermally localized laser graphitisation", Application no 17798854, Date of Publication: 23 March 2023.
2. **International PCT**: "An Optical Transmission Filter", Patent no. WO/2016/198619, Date of Publication: 15 Dec 2016.

JOURNAL PUBLICATIONS

1. Compact and bench-top common-path interferometric biosensor utilizing guided mode resonance phase enhancement, **Optics Letters**, Vol. 50, No. 21, Pages 6686-6689, (2025).
2. Recent advances of guided mode resonant sensors applied to cancer biomarker detection, **Photonics**, Vol. 12, No. 5, Pages 424 (1-20), (2025).
3. Nanophotonic platform for the highly sensitive detection of trypsin enzyme in human urine, **Chemical Communications**, Vol. 61, No. 28, Pages 5321-5324, (2025).
4. Exploring tunable single-wavelength detection schemes for guided-mode resonance sensors, **Optics and Laser Technology**, Vol. 177, Pages 111107 (1-12), (2024).
5. On the reproducibility of electron-beam lithographic fabrication of photonic nanostructures, **Nature Scientific Report**, Vol. 14, No. 1, Pages 8703 (1-8), (2024).
6. Noise tolerant photonic bowtie grating environmental sensor, **ACS Sensors**, Vol. 9, No. 4, Pages 1857–1865, (2024).
7. Phase noise matching in resonant metasurfaces for intrinsic sensing stability, **Optica**, Vol. 11, No. 3, Pages 354-361, (2024).
8. Nanophotonic and hydrogel based diagnostic system for the monitoring of chronic wounds, **Biosensors and Bioelectronics**, Vol. 242, Pages 115743 (1-6), (2023).
9. Stable hybrid plasmonic directional coupler based on an embedded silver nanostructure waveguide, **Applied Optics**, Vol. 60, No. 25, Pages 7603-7610, (2021).
10. Thermally controlled localized porous graphene for integrated graphene-paper electronics, **Advanced Materials Technologies**, Vol. 6, No. 5, Pages 2001156 (1-13), (2021).
11. High azimuthal angle tolerant dual-channel wavelength filter from visible to NIR using conically mounted guided mode resonance structures, **Optics Letters**, Vol. 45, No. 21, Pages 6010-6013, (2020).
12. Dynamic pulse propagation modelling for predictive femtosecond-laser-micro bonding of transparent materials, **Optics Express**, Vol. 28, No. 21, Pages 31103-31118, (2020).
13. Pulse-propagation modeling and experiment for femtosecond-laser writing of waveguide in Nd: YAG, **Crystals**, Vol. 9, No. 8, Pages 434 (1-11), (2019).
14. Grating-coupled plasmonic sensor for sucrose sensing fabricated using optical fiber-based interference lithography (OFIL) system, **IEEE Sensors Journal**, Vol. 19, No. 22, Pages 10477-10481, (2019).
15. Enhanced absorption in a graphene embedded 1D guided-mode-resonance structure without back-reflector and interferometrically written gratings, **Optics Letters**, Vol. 44, No. 15, Pages 3661-3664, (2019).

16. Ultrafast volume holography for stretchable photonic structures, ***Optics Express***, Vol. 27, No. 9, Pages 12196-12212 (2019).
17. Flexible and stretchable guided-mode resonant optical sensor: single-step fabrication on a surface engineered polydimethylsiloxane substrate, ***OSA Continuum***, Vol. 1, No. 4, Pages 1277-1286, (2018).
18. High sensitivity guided-mode-resonance optical sensor employing phase detection, ***Nature Scientific Reports***, Vol. 7, No.1, Pages 7607 (1-7), (2017).
19. Wide wavelength range tunable one-dimensional silicon nitride nano-grating guided-mode resonance filter based on azimuthal rotation, ***AIP Advances***, Vol. 7, No. 1, Pages 015313 (1-6), (2017).
20. ZnO nanowire-enabled light funneling effect for antireflection and light convergence applications, ***Optics Letters***, Vol. 42, No. 1, Pages 45-48, (2016).
21. High sensitivity refractive index sensor based on simple diffraction from phase grating, ***Optics Letters***, Vol. 41, No. 9, Pages 2101-2104, (2016).
22. Surface second harmonic generation from silicon pillar arrays with strong geometrical dependence, ***Optics Letters***, Vol. 40, No. 9, Pages 2072-2075, (2015).
23. Optical diode using nonlinear polystyrene ring resonators in two-dimensional photonic crystal structure, ***Applied Optics***, Vol. 52, No. 34, Pages 8252–8257, (2013).

CONFERENCE PROCEEDINGS

1. Common-Path Interferometric Phase Sensing Using Guided-Mode Resonance, in National Conference on Frontiers in Physics and Technology (FPT-2026) held on 31st January and 1st February 2026 at the Department of Physics, Panchayat College, Bargarh, Odisha.
2. Guided Mode Resonance Sensor for Cancer Biomarker Detection, Symposium on Interdisciplinary Sciences – II 2025, NISER Bhubaneswar, India.
3. Noise-Tolerant Resonant Grating Sensor for the Development of Point-of-Care Devices, in ICETP-2025 & OPS Convention, KIIT University, Bhubaneswar, India.
4. Guided Mode Resonance Sensor for detecting Leukaemia Cell Biomarker, in Conference on Scientific Endeavours, Innovations, and Exploring new Possibilities, JK SCIENCE CONGRESS-2024, Govt College for Women, MA Road Srinagar Cluster University Srinagar UT of J&K, India.
5. Consistency Study of Guided-Mode-Resonance Structures for Point-of-Care Applications”, in Conference on Optics, Photonics, and Quantum Optics (*COPaQ*), 2022, IIT Roorkee, India.
6. Comparison of Femtosecond Laser Welding of Transparent Materials at 1030 and 515 nm”, 2021 Conference on Lasers and Electro-Optics (***CLEO***), OSA Technical Digest (Optical Society of America, 2021), Pages 1-2, paper ATh2R.2.
7. Predictive ultrafast-laser-enabled microwelding using dynamic pulse propagation modelling”, Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XXVI, International Society for Optics and Photonics: (***SPIE***, 2021), Vol. 11673, Pages 116730M.
8. Ultrafast-Laser-Enabled Micro welding and Waveguide Inscription for Optics and Laser Fabrication,” in *Laser Congress 2020* (***ASSL, LAC***), Paper LW1B.5

9. Ultrafast-laser-enabled Polishing, and Waveguide Writing for Optics and Microchip Laser Fabrications, SPIE Laser Damage (*SPIE, 2020*), Vol. 11514.
10. Dynamic modelling for predicting temperature evolution and modification during fs-laser welding of borofloat glass," in Conference on Lasers and Electro-Optics (*CLEO*), OSA Technical Digest (Optical Society of America, 2020), paper ATu3K.2.
11. Nonlinear femtosecond pulse-propagation simulation and experiment for laser-based-waveguide-writing in crystal materials", *SPIE*, Laser Applications in Microelectronic and Optoelectronic Manufacturing (LAMOM) XXV, 11267-41, 3 - 5 February 2020, San Francisco, California, USA.
12. Phase measurement of guided-mode-resonance signal and its application as highly sensitive optical sensor", International topical meeting on applied and adaptive optics (*INTOPMAA-17*), 11-13 Aug 2017, IIST Trivandrum, Kerala, India.
13. Compact wavelength division multiplexer using nonlinear polystyrene cavities in 2D photonic crystal structure", *Metamaterials and Photonic Nanostructures – 2013*, 16-17 Aug 2013, I.I.T. Kanpur.
14. Pankaj K. Sahoo & Joby Joseph, "Optically Controlled Wavelength Division Multiplexer using Nonlinear Asymmetric Cavity in 2D Photonic Crystal", XXXVII National Symposium of *Optical Society of India*, 23-25 Jan 2013, Pondicherry University, India.

SKILLS AND EXPERTISE

- **Nanofabrication Skills:** Electron beam lithography, Nano Imprint Lithography (NIL), RIE (Reactive Ion Etching), ICP (Inductively Coupled Plasma Etching), PECVD (Plasma Enhanced Chemical Vapour Deposition).
- **Characterisation Skills:** SEM (Scanning Electron Microscope), Confocal Laser Microscopy, Optical Spectrum Analyser, Spectrophotometer, Optical 3D Profilometer.
- **Experimental Skills:** Laser Interference Lithography, fs-laser waveguide writing and bonding, Waveguide lasing, Embedding silicon nano-pillars in PDMS, Hydrothermal growth of ZnO nanowires on Si substrate.
- **Simulation Skills:** FDTD solutions (Lumerical and MEEP), MPB (MIT Photonic bands), S4, MATLAB.