Nitish Kumar Gupta

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Educational Qualifications:

- **Doctor of Philosophy**: Indian Institute of Technology Kanpur (July 2017 - April 2023) (CPI: 9.5/10)
- **Bachelor of Technology *in Electrical & Electronics Engg***: U.P. Technical University, Lucknow (2010) (77 %, Ist division with Honours)
- **Intermediate**: U.P. Board (2005) (67 %, Ist division)
- **High School**: U.P. Board (2003) (75 %, Ist division)

Professional Experience:

- September 2011 - July 2017: **NTPC Ltd, *A Govt. of India Maharatna Undertaking***: As Deputy Manager entrusted with the responsibility of optimizing the efficiency parameters of 210/500MW Sub-Critical Thermal Power Plant.
- July 2010 - May 2011: **Jindal Steel & Power Ltd.**: Graduate Engineer Trainee in the Power Plant division.

Research/Academic Work Experience:

- May 2024 - Present: Assistant Professor in Department of Electrical & Electronics Engineering, BITS Pilani, Hyderabad Campus.
- Feb 2024 - May 2024: Postdoctoral Researcher, Centre for Disruptive Photonic Technologies, NTU Singapore.
- August 2023 - Feb 2024: Project Scientist I, Centre for Nanoscience & Engineering, IISc, Bangalore.
- December 2022 - July 2023: Project Associate II, Department of Electrical Engg, IIT Kanpur.
- August 2021 - June 2022: On leave from IIT Kanpur to conduct experimental research work at CSIR-CSIO, Chandigarh.
- July 2018 - July 2021: Teaching assistant for postgraduate course, Centre for Lasers & Photonics, IIT Kanpur.

Ph.D. Thesis: Multispectral Dispersion Engineering of Sub-Wavelength & Surface States

Supervisors: Prof. Harshawardhan Wanare & Prof. S. Anantha Ramakrishna

Focus of my thesis-related research work was to unveil novel sub-wavelength and surface electromagnetic states through phase dispersion and bandstructure engineering. The significant research outcomes of my thesis are:

- Reported a new method to experimentally ascertain bandgap relative topological character in photonic crystals based on spectroscopic ellipsometry measurements.
- Reported a new method to experimentally ascertain bandgap absolute topological character in photonic crystals & reported a new quantized classifier of topological order.
- Experimentally demonstrated nanophotonic equivalents of Zero-Energy states with complete control on their very existence conditions.
- Experimentally demonstrated a metasurface-based state-of-the-art multispectral signature management solution in a non-hierarchical configuration, with extremely low-profile.
- Developed and experimentally demonstrated a method to employ singular phase characteristics of metasurface absorbers for their identification in low-SNR environments.
- Worked with one of the leading research groups in the world (in the domain of transparent microwave absorbers) to develop FSS/metasurface-based sub-wavelength cavity absorbers.

Awards & Achievements:

As a Ph.D. Student (2017-2023)

- Conferred with the **Outstanding Ph.D. Thesis Award, IIT Kanpur** at the 56^{th} Convocation of the institute (2023).
- Conferred with the **Best Ph.D. Thesis Award by Indian Laser Association** at DAE-BRNS National Laser Symposium (NLS-31), held at IIT Kharagpur (2022).
- **Featured Article in Applied Physics Letters**: Our article on spectroscopic ellipsometry-based determination of topological order has been adjudged as one of journal's best articles and promoted as a Featured Article (2022).
- **Third Position in 100 Seconds Thesis Competition** organized by INAE Kanpur Chapter (2021).
- **Best Poster Presentation Award** at SCQPT organized by OSA Student Chapter NISER, Bhubaneswar (2021).
- **Shortlisted for METANANO Summer School** at ITMO University, St. Petersburg, Russia, with Full Fee Waiver (2020).
- **Best Poster Award by IEEE- Photonics Society** at IEEE-Workshop on Recent Advances in Photonics (WRAP)-2019 at IIT Guwahati (2019).
- **Second Position in Technical Writing Competition** organized by OSA-IEEE-PS Student Chapter, IIT Bombay (2021).
- **First Position in Technical Writing Competition** organized by OSA-IEEE-PS Student Chapter, IIT Bombay (2020).

During Professional Experience (2010-2017)

- **General Manager's Meritorious Award (NTPC Ltd.)**: For successfully handling critical 210MW thermal generating unit emergencies (2015).
- **Represented FGUTPP in NTPC Open Competition for Executive Talent (NOCET)**: Drafted a roadmap on NTPC's Foray in Solar Thermal Business (2014).
- **CMD's Gold Medal (NTPC Ltd.)**: Adjudged as best officer trainee among a batch of nearly 1100 executives (2013).
- **Director's Meritorious Certification (NTPC Ltd.)**: For securing highest marks in NTPC's one year executive training program (2013).

During Undergraduate Studies (2006-2010)

- **Best Engineer Award** among a graduating batch of nearly 500 engineers (2010).
- **Shri Ram Murti Smarak Trust Meritorious Student Fellowship**: For distinction in academic performance (2007).

Certifications & Recognitions:

- Successfully completed the AICTE ATAL Academy online Faculty Development Program on Photonics, organized by IET-DAVV, Indore (2020).
- Successfully completed NPTEL certification course in Network & Systems, offered by IIT Madras and recognized as one of the overall topper of the course (2015).
- Qualified Online Certification course on Nanotechnology offered by Rice University (2014).
- Qualified Online Certification course offered by TU Delft on Solar Energy with 97 $\%$ grades (2013).
- Qualified Online Certification course, Energy 101, offered by UT Austin with 100 $\%$ grades (2013).
- Certified Power Plant Desk Engineer trained on two 660MW Super-Critical simulators (Power Management Institute, Noida & NTPC Sipat).

Scientific Reviewer:

- **AIP Publishing:** Applied Physics Letters.
- **Nature Portfolio:** Scientific Reports.
- **IoP Publishing:** Journal of Physics: D.
- **AIP Publishing:** Journal of Applied Physics.
- **IoP Publishing:** Materials research express.
- **IoP Publishing:** Physica Scripta.

List of Articles in Refereed Journals:

[1] Komal Sharma, Nitish Kumar Gupta, Venkatachalam P, Shankar Kumar Selvaraja, and Jaydeep Basu, "Guided-mode resonance dispersion engineering on a SiN-based integrated photonic platform for diverse polarization state generation," **ACS Photonics**, https://doi.org/10.1021/acsphotonics.5c01774 (2025).

[2] Nitish Kumar Gupta, Venkatachalam P, Sushma Gali, and Shankar Kumar Selvaraja, "Guided-mode resonance dispersion engineering on a SiN-based integrated photonic platform for diverse polarization state generation," **Optics Letters**, Vol. 50, no. 14, pp. 4578-4581 (2025).

[3] Jaspreet Singh, Nitish Kumar Gupta, Subhendu Sarkar, "Engineering epsilon-near-zero response and polarization-independent radiative Ferrell–Berreman modes in nanoporous gold–silver films," **Journal of Physics D: Applied Physics**, Vol. 58, no. 42, pp. 425305 (2025).

[4] Nikita Choudhary, Deependra Singh Gaur, Diksha Sharma, Anjani Kumar Tiwari and Nitish Kumar Gupta, Sapireddy Srinivasu, Anjani Kumar Tiwari, Harshawardhan Wanare and S. Anantha Ramakrishna, "Controlled angular correlations and polarization speckle in scattering birefringent films," **Scientific Reports**, Vol.15, pp. 35779 (2025).

[5] Nitish Kumar Gupta, Sudeb Bhattacharya, Abhinav Bhardwaj, Kumar Vaibhav Srivastava, Janakarajan Ramkumar, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Harmonic Engineering in Sub-Wavelength Cavities & Design of Ultrabroadband Microwave Absorbers by Reflection Phase Manipulation," **IEEE Transactions on Electromagnetic Compatibility**, Vol. 66, no. 4, pp.1079-1086 (2024).

[6] Jaspreet Singh, Nitish Kumar Gupta, Subhendu Sarkar, "A hybrid effective medium description for nanoporous gold films and thickness-mediated control of optical absorption," **Nanotechnology**, Vol. 35, no. 39, pp. 395702 (2024).

[7] Nitish Kumar Gupta, Sapireddy Srinivasu, Mukesh Kumar, Anjani Kumar Tiwari, Sudipta Sarkar Pal, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Realization of Jackiw-Rebbi Zero-Energy Modes at Photonic Crystal Domain Walls: Emergence of Polarization-Indiscriminate Surface States," **Applied Physics Letters**, Vol. 124, no. 09, pp. 091104 (2024).

[8] Nitish Kumar Gupta, Sapireddy Srinivasu, Mukesh Kumar, Anjani Kumar Tiwari, Sudipta Sarkar Pal, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Direct Determination of Photonic Stopband Topological Character: A Framework based on Dispersion Measurements," **Advanced Photonics Research**, Vol. 5, no. 04, pp. 2300155 (2024).

[9] Nitish Kumar Gupta, Aditi Chopra, Mukesh Kumar, Anjani Kumar Tiwari, Sudipta Sarkar Pal, Harshawardhan Wanare and S. Anantha Ramakrishna, "Surface State Engineering Using Bulk-Band Geometric Phases: Band Inversion and its Observable Implications in One-Dimensional Photonic Crystals," **Indian Journal of Pure & Applied Physics (IJPAP)**, 61, no. 7, pp. 560-567 (2023).

[10] Nitish Kumar Gupta, Mukesh Kumar, Anjani Kumar Tiwari, Sudipta Sarkar Pal, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Spectroscopic Ellipsometry-based Investigations into the Scattering Characteristics of Topologically Distinct Photonic Stopbands," **Applied Physics Letters**, Vol. 121, no. 26, pp. 261103 (2022).
Selected as a Featured Article in APL.

[11] Nitish Kumar Gupta, Gaganpreet Singh, Sapireddy Srinivasu, Harshawardhan Wanare, Kumar Vaibhav Srivastava, J. Ramkumar, and S. Anantha Ramakrishna, "Singular Phase Characteristics of Electromagnetic Absorbers and a Framework for Low-RCS Target Detection," **IEEE Antennas and Wireless Propagation Letters**, Vol. 22, no. 1, pp.134-138 (2022).

[12] Nitish Kumar Gupta, Sapireddy Srinivasu, Anjani Kumar Tiwari, Harshawardhan Wanare and S. Anantha Ramakrishna, "Realizing Quasi-monochromatic Switchable Thermal Emission from Electro-Optically induced Topological Phase Transitions," **Scientific Reports**, Vol.12, pp. 7400 (2022).

[13] Nitish Kumar Gupta, Gaganpreet Singh, Harshawardhan Wanare, S. Anantha Ramakrishna, Kumar Vaibhav Srivastava, and J. Ramkumar, "A low-profile consolidated metastructure for multispectral signature management" **Journal of Optics** Vol. 24, no. 3, pp. 035102 (2022).

[14] Nitish Kumar Gupta, Anjani Kumar Tiwari, Harshawardhan Wanare and S. Anantha Ramakrishna, "Near singular-phase optical biosensing with strongly coupled modes of a plasmonic-photonic trimer," **Journal of Optics**, Vol. 23, no. 6, pp. 065003 (2021).

[15] Nitish Kumar Gupta, Harshawardhan Wanare, and S. Anantha Ramakrishna,"Design of transparent conducting plasmonic metasurfaces and theory of impedance-matched metastructure" **Plasmonics** Vol. 15, no. 6, pp. 2109-2117 (2020).

[16] Nitish Kumar Gupta, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Broadband infrared emissivity engineering in optically transparent metamaterials by regulation of electromagnetic resonances," **Asian Journal of Physics**, 28, no. 10, pp. 899-905 (2019).

[17] Chandra Sekhar Reddy Kolli, Gowtham Polumati, Aleksandra A Kutuzova, Ekaterina E Maslova, Andres De Luna Bugallo, Nitish Kumar Gupta, Mikhail V Rybin, Parikshit Sahatiya,"A High Responsivity Broadband Photodetector Based on a WSe2 NiO Nanowire Heterostructure with Engineered Nanophotonic Enhancement" (Under Review).

[18] Nitish Kumar Gupta, A. M. Jayannavar, and S. Anantha Ramakrishna,"Clocking the Quantum Sojourn Time: Spurious Scatterings and Correction to the Larmor Clock" (Under Review).

Book Chapters:

[1] Nikita Choudhary, Anjani Kumar Tiwari, and Nitish Kumar Gupta, "Active Tunability in Resonant Metamaterials Using Phase Transitions," In Handbook of Metamaterial Antennas, Measurement and Characterizations, **Springer Nature Singapore**, pp. 1-29, (2025).

International Conference Proceedings:

[1] Nitish Kumar Gupta, Anjani Kumar Tiwari, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Polarization speckle generation & control of angular memory effect in optically anisotropic media," **ISBN: 978-1-957171-05-0, Paper JW3B-89**, CLEO, San Jose, California, USA (2022).

[2] Nitish Kumar Gupta, Harshawardhan Wanare, Aditi Chopra, Mukesh Kumar, Sudipta Sarkar Pal, Anjani Kumar Tiwari, and S. Anantha Ramakrishna, "Topological Surface State by Hierarchical Concatenation of Photonic Stopbands," **DOI: 10.1109/WRAP54064.2022.9758314**, IEEE WRAP 2022, IIT Mumbai (Contributory Talk) (2022).

[3] Nitish Kumar Gupta, Harshawardhan Wanare, Gaganpreet Singh, J. Ramkumar, Kumar Vaibhav Srivastava, and S. Anantha Ramakrishna, "Multispectral Non-Hierarchical Metastructures for Radiation Management and Limits of Perfect Absorption," **DOI: 10.1109/IMaRC49196.2021.9714575**, 2021 IEEE MTT-S International Microwave and RF Conference (IMaRC) (Contributory Talk) (2021).

[4] Nitish Kumar Gupta, Anjani Kumar Tiwari, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Unidirectional narrowband perfect absorption in quasi-random structures - interplay of gap states and Tamm plasmon modes," **DOI: 10.1109/IPC47351.2020.9252319**, IEEE Photonics Conference, Vancouver, Canada (Contributory Talk) (2020).

[5] Nitish Kumar Gupta, Harshawardhan Wanare, and S. Anantha Ramakrishna,"Information encryption in thermal metamaterials by emissivity engineering," **DOI: 10.1109/WRAP47485.2019.9013689**, IEEE WRAP 2019, IIT Guwahati (2019).
Won the Best Poster Presentation Award for this work.

National Conference Proceedings:

[1] Nisha Yadav, Nitish Kumar Gupta, and S. A. Ramakrishana, "Additively Manufactured Metamaterial Luneburg Lens for X-band," **DOI: 10.23919/URSI-RCRS56822.2022.10118562**, 2022 URSI Regional Conference on Radio Science (USRI-RCRS), pp. 1-4. IEEE (2022).

[2] Nitish Kumar Gupta, "Multispectral Dispersion Engineering of Sub-Wavelength & Surface States," Ph.D. Thesis Oral Presentation at **DAE-BRNS Nation Laser Symposium, NLS-31**, IIT Kharagpur (2022).
Won the Best Ph.D. Thesis Award by ILA .

[3] Nitish Kumar Gupta, Mukesh Kumar, Anjani Kumar Tiwari, Sudipta Sarkar Pal, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Experimental Determination of Topological Order in Photonic Stopbands," XLV Symposium of OSI: **Conference on Optics, Photonics & Quantum Optics (COPaQ)**, IIT Roorkee (2022).

[4] Nitish Kumar Gupta, Anjani Kumar Tiwari, Harshawardhan Wanare, and S. Anantha Ramakrishna, "Ultra-narrowband asymmetric perfect absorption in quasi-random planar structures," **Student Conference on Photonic and Quantum Technology** (SCPQT)-2021, NISER Bhubaneswar (2021).
Won the Best Poster Presentation Award for this work.

Patents and Intellectual Property Ownership

Invention title: Complementary Quarter-wave Retardance Device for Generating One or More Polarization States.
Inventors: Nitish Kumar Gupta, Pradeep Chakravarthy, Mukesh Kumar, Anjani Kumar Tiwari, Sudipta Sarkar Pal, Kumar Vaibhav Srivastava, Harshawardhan Wanare, S. Anantha Ramakrishna.
Patent No: 563145.

List of Referees:

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(2) Prof. Harshawardhan Wanare (Professor & Head Dept. of Physics and Centre for Lasers & Photonics, IIT Kanpur)
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