

# Curriculum Vitae

## Prof. Joy Mitra

School of Physical Sciences, Indian Institute of Science Education and Research Thiruvananthapuram  
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### Educational Qualifications

PhD (2005) Indian Institute of Science, Bangalore, India  
MS (1999) Indian Institute of Science, Bangalore, India  
BSc, Physics Honours (1996) Presidency College, University of Calcutta, India

### Professional Experience

- Professor (2022 – present), IISER Thiruvananthapuram, India
- Associate Professor (2017 – 2022), IISER Thiruvananthapuram, India
- Assistant Professor (2010 – 2017), IISER Thiruvananthapuram, India
- Visiting Research Professor/Fellow (2011 – 2018) Queen’s University Belfast, UK
- Post-Doctoral Research Fellow, EPSRC (UK) 2006 – 2010, Queen’s University Belfast, UK
- Post-Doctoral Research Fellow, Nanotec NI (UK) 2004 – 2006, Queen’s University Belfast, UK

### Awards and Honours

- 10<sup>th</sup> Anniversary collection: Nanostructures 2021, RSC Advances
- Best Teacher Award, IISER Thiruvananthapuram, 2011.
- Awarded EPSRC Research Fellowship, UK 2006.
- Awarded Nanotec Northern Ireland Research Fellowship, UK 2004.
- Best Paper Award, MRS Fall 2004 meeting, Boston MA, USA
- SRF/JRF, Council of Scientific and Industrial Research, India 2000.
- Ranked 2<sup>nd</sup> in BSc (Physics Honours) University of Calcutta, India 1996.
- National Merit Scholarship, University of Calcutta, 1996.
- Govt. of India National Merit Scholarship, ICSE (Class 10), 1991.

### Research Projects

- Scheme for Transformational and Advanced Research in Sciences (STARS) 2023, IISc/MoE  
Principal Investigator (INR 7,500,000)
- SERB-DST, Govt. of India, Core Research Grant 2022  
Co-Principal Investigator (INR X,X00,000)
- Consultancy Project 2022  
Co-Principal Investigator, Accubits Invent Private Limited
- SERB-DST, Govt. of India, Core Research Grant 2021  
Co-Principal Investigator (INR 200,000)
- Indo-Poland Collaborative Research Grant 2020, DST-NAWA  
Principal Investigator (India), (INR 1,500,000)
- SERB-DST, Govt. of India, Core Research Grant 2020  
Principal Investigator (INR 5,800,000)
- DST, Govt. of India, FIST Grant 2019  
Co-Principal Investigator (INR 23,500,000)
- Royal Academy of Engineering, UK – Industry Academia Partnership Programme 2017  
Newton Bhaba Fund, Principal Investigator (GBP 50,000)
- UK India Education and Research Initiative – UGC Collaborative Research Awards 2017  
Principal Investigator (GBP 131,094)
- SERB-DST, Govt. of India, Core Research Grant 2014  
Principal Investigator (INR 4,200,000)
- UK India Education and Research Initiative – UGC Collaborative Research Awards 2014  
Principal Investigator (GBP 44, 802)
- UK India Education and Research Initiative – DST Collaborative Research Awards 2008  
Co-Principal Investigator (GBP 58, 754)
- EPSRC UK Research Grant 2006, Post-Doctoral Researcher.

### Professional Activities

- Member of the Indigo Consortium: The Indian initiative in gravity wave detection.
- Referee for IOP Journals, APS Journals, AIP Journals, Nature Publishing Journals
- Vaibhav Summit, Government of India, October 2020

### Administrative Activities

- Associate Dean of Academics, IISER TVM (2023 – )
- Head of School, School of Physical Sciences, IISER TVM (2020 – 2023)

- Initiated Integrated and Interdisciplinary Sciences Programme at IISER TVM Coordinator: 2021 –
- Established Placement Cell IISER TVM Coordinator: 2019 –
- Established Media Cell IISER TVM Coordinator: 2021 –
- IISER TVM Annual Report Committee (2020, 2021, 2022)
- Coordinator – PhD and Integrated PhD Programmes at IISER TVM (Jan 2013 – Dec 2015)
- Coordinator – BSMS Programme at IISER TVM (May – July 2014)
- Local Coordinator, Kishore Vaigyanik Protsahan Yojana 2014, 2015
- Coordinator JEST, IISER TVM
- Member of various Academic and Administrative Committees at IISER TVM.

**Patents** ● A Substrate for Analyte Detection And Method Thereof (*India patent; filed 2020*).

**Selected** ● National Conference on Quantum Materials, QMAT 2023, NISER

**Invited** ● National Conference on Quantum Materials, QMAT 2021, TIFR Mumbai

**Talks** ● Department of Physics, IISc, Bangalore, June 2019

- Advanced Technology Institute, University of Surrey, UK

### Publications:

1. Anisotropic transport and Negative Resistance in a polycrystalline metal-semiconductor (Ni-TiO<sub>2</sub>) hybrid. Harikrishnan G., Shashwata Chattopadhyay, K. Bandopadhyay, K. Kolodziejek, Dorota A. Pawlak and **J. Mitra** ([arxiv.org/abs/2310.02976](https://arxiv.org/abs/2310.02976))
2. Anomalous Photoresponse in a Reduced Metal-Semiconductor Hybrid of Nickel and Titanium Oxide. Harikrishnan G., K. Bandopadhyay, K. Kolodziejek, Vinayak B. Kamble, Dorota A. Pawlak, J. Mitra ([arxiv.org/abs/2309.17427](https://arxiv.org/abs/2309.17427))
3. Leveraging Plasmonic Hot Electrons to Quench Defect Emission in Metal - Semiconductor Nanostructured Hybrids Kritika Sharu, Shashwata Chattopadhyay, K. N. Prajapati, and **J. Mitra** (*accepted* J. Chem. Phys. December 2023) ([arxiv.org/abs/2307.10400](https://arxiv.org/abs/2307.10400))
4. Single-Layer Silver Cluster-Assembled Material for *p*-type Field Effect Transistor. Anish Kumar Das, Sourav Biswas, Arijit Kayal, Arthur C. Reber, Subhrajyoti Bhandary, Deepak Chopra, **J. Mitra**, Shiv N. Khanna, Sukhendu Mandal (Nano Letters, 23, 8923, 2023 [doi: 10.1021/acs.nanolett.3c02269](https://doi.org/10.1021/acs.nanolett.3c02269))
5. Mobility enhancement in CVD grown monolayer MoS<sub>2</sub> via patterned substrate induced non-uniform straining. Arijit Kayal, Sraboni Dey, Harikrishnan G., Renjith Nadarajan, Shashwata Chattopadhyay and **J. Mitra** (Nano Letters, 23, 6629, 2023, [doi: 10.1021/acs.nanolett.3c01774](https://doi.org/10.1021/acs.nanolett.3c01774))
6. Frequency dependent impedance response analysis of nanocrystalline ZnO Chemiresistors Abhijith P V, Abin Tom, Kusuma Urs MB, K N Prajapati, Sajana S, **J. Mitra**, Deepshikha Jaiswal-Nagar, Vinayak B Kamble (Nanotechnology, 34, 365501, 2023, [doi: 10.1088/1361-6528/acdca0](https://doi.org/10.1088/1361-6528/acdca0))
7. Symmetric Domain Segmentation in WS<sub>2</sub> Flakes: Correlating spatially resolved photoluminescence, conductance with valley polarization. Arijit Kayal, P K Barman, P V Sarma, M. M. Shaijumon, R. N. Kini and **J. Mitra** (Nanotechnology, 33, 495203, 2022 [doi: 10.1088/1361-6528/ac8d9d](https://doi.org/10.1088/1361-6528/ac8d9d))
8. Hyperspectral imaging with Raman scattered photons: A new paradigm in Raman analysis. K. N. Prajapati, A. Nair, S Ravi P Silva and **J. Mitra** (Nano Express, 3, 035007, 2022 [doi: 10.1088/2632-959X/ac90db](https://doi.org/10.1088/2632-959X/ac90db))
9. Tailoring Infrared Absorption and Thermal Emission with Ultrathin-film Interferences in Epsilon-Near-Zero Media. Ben Johns, Shashwata Chattopadhyay, **J. Mitra** (Adv. Photonics Research, 3, 2100153, 2022 [doi: 10.1002/adpr.202100153](https://doi.org/10.1002/adpr.202100153))
10. Selective Enhancement in Phonon Scattering Leads to a High Thermoelectric Figure-of-Merit in Graphene Oxide-Encapsulated ZnO Nanocomposites. Soumya Biswas, Saurabh Singh, Shubham Singh, Shashwata Chattopadhyay, K. Kanishka H. De Silva, Masamichi Yoshimura, **J. Mitra**, and Vinayak B. Kamble. (ACS Appl. Mater. Interfaces, 13, 23771, 2021 [doi: 10.1021/acsami.1c04125](https://doi.org/10.1021/acsami.1c04125))
11. Controlling the macroscopic electrical properties of reduced graphene oxide by nanoscale writing of electronic channels. Arijit Kayal, Harikrishnan G, Kingshuk Bandopadhyay, Amit Kumar, Ravi P Silva and **J. Mitra** (Nanotechnology, 32, 175202, 2021 [doi: 10.1088/1361-6528/abda72](https://doi.org/10.1088/1361-6528/abda72))
12. Refractive index-assisted UV/Vis spectrophotometry to overcome spectral interference from impurities. Airin Antony and **J. Mitra**, Analytica Chimica Acta (Analytica Chimica Acta 1149, 238186, 2021)
13. Enhancement of photoacoustic signal strength with continuous wave optical pre-illumination: a non-invasive technique. Anjali Thomas, Souradip Paul, **J. Mitra** and M Suheshkumar Singh (Sensors 21, 1190, 2021; [doi: 10.3390/s21041190](https://doi.org/10.3390/s21041190))
14. Thickness induced metal to insulator charge transport and unusual hydrogen response in granular palladium nanofilms. Dharmendra K. Singh, Praveen S. G., Adithya Jayakumar, Suma M. N., Vinayak B. Kamble, J. Mitra and D. Jaiswal-Nagar. (Phys.Chem.Chem.Phys., 2020, 22, 27861 [doi: 10.1039/D0CP05508E](https://doi.org/10.1039/D0CP05508E))
15. Epsilon-near-zero response in indium tin oxide thin films: Octave span tuning and IR plasmonics. Ben Johns, Navas M P, Harikrishnan G, Akhileshwar Mishra, Ravi Pant, and **J. Mitra** (J. Appl. Phys. 127, 043102, 2020; [doi: 10.1063/1.5128873](https://doi.org/10.1063/1.5128873))
16. Interaction of ZnO nanorods with plasmonic metal nanoparticles and semiconductor quantum dots. K. N. Prajapati, Ben Johns, K. Bandopadhyay, S. Ravi P. Silva, and **J. Mitra**. (JCP 152, 064704, 2020;

- doi.org/10.1063/1.5138944) *Selected as Editor's Pick*
17. Electrocatalysis on Edge-Rich Spiral WS<sub>2</sub> for Hydrogen Evolution. Prasad V. Sarma, Arijit Kayal, Chithra H. Sharma, Madhu Thalakulam, **J. Mitra**, and M. M. Shaijumon. ACS Nano, 13, 10448, 2019.
  18. Negative photoresponse in ZnO/PEDOT:PSS nanocomposites and photogating effects. Harikrishna G., Sesha Vempati, K Bandopadhyay, K N Prajapati, Vijith Kalathingall and **J. Mitra** (Nanoscale Advances 1, 2435, 2019, doi: 10.1039/c9na00116f)
  19. Resistive switching in individual ZnO nanorods: delineating the ionic current by photo-stimulation. K Bandopadhyay, K N Prajapati and **J Mitra\*** (Nanotechnology, 29, 105701, 2018; doi: [10.1088/1361-6528/aaa63f](https://doi.org/10.1088/1361-6528/aaa63f))
  20. Novel Routes to Electromagnetic Enhancement and its Characterisation in Surface- and Tip-enhanced Raman Scattering. P. Dawson, D. Frey , V. Kalathingall , R. Mehruz and **J. Mitra** (Faraday Discussions, 205, 121, 2017; [10.1039/C7FD00128B](https://doi.org/10.1039/C7FD00128B)) *Selected for cover page*
  21. Scanning tunnelling microscope light emission: Finite temperature current noise and over cut-off emission. Vijith Kalathingall, P. Dawson and **J. Mitra\*** (Scientific Reports 7, 3530, 2017; doi: [10.1038/s41598-017-03766-x](https://doi.org/10.1038/s41598-017-03766-x))
  22. Scanning tunnelling microscope light emission: Effect of the strong dc field on junction plasmons. Vijith Kalathingall, P. Dawson and **J. Mitra\*** (Phys. Rev. B, 94, 035443, 2016)
  23. Spatially resolved photoresponse on individual ZnO nanorods: correlating morphology, defects and conductivity. K. Bandopadhyay and **J. Mitra\*** (Scientific Reports 6, 28468, 2016; doi: [10.1038/srep28468](https://doi.org/10.1038/srep28468))
  24. EB1 regulates attachment of Ska1 with microtubules by forming extended structures on the microtubule. Geethu E. Thomas, K. Bandopadhyay, Sabyasachi Sutradhar, M.R. Renjith, Puja Singh, K.K. Gireesh, Steny Simon, Binshad Badarudeen, Hindol Gupta, Manidipa Banerjee, Raja Paul, **J. Mitra** & Tapas K. Manna (Nature Communications 7, 11665, 2016; doi: 10.1038/ncomms11665)
  25. An alternative methodology in Schottky diode physics. **J. Mitra\***, L. Feng, L. Peñate-Quesada and P. Dawson (Journal of Applied Physics 117, 244501, 2015)
  26. Zn interstitials and O vacancies responsible for n-type ZnO: what do the emission spectra reveal? K. Bandopadhyay and **J. Mitra\*** (RSC Advances, 5, 23540, 2015) *Selected 10th Anniversary collection: Nanostructures 2021*
  27. One-step synthesis of ZnO nanosheets: a blue-white fluorophore. Sesha Vempati, **J. Mitra**, and P. Dawson (Nanoscale Research Letters, 7, 470, 2012)
  28. Unusual photoresponse of indium doped ZnO/organic thin film heterojunction. Sesha Vempati, Saraswathi C., **J. Mitra\***, K. K. Nanda, P. Dawson and S. B. Krupanidhi (Applied Physics Letters, 100, 162104, 2012)
  29. Composites of poly( $\Sigma$ -caprolactone) and Mo<sub>5</sub>S<sub>3</sub>I<sub>6</sub> nanowires. Seow Jecg Chin, Peter Hornsby, Damjan Vengust, Dragan Mihailovic , **J. Mitra**, P. Dawson and Tony McNally (Poly. Adv. Tech., 23, 149, 2012, DOI: 10.1002/pat.1838)
  30. High sensitivity (1 ppm) hydrogen detection using an unconventional Pd/n-InP Schottky device Lei Feng, **J. Mitra\***, P. Dawson and G. Hill (Journal of Physics: Condens. Matter 23, 422201(*Fast Track*), 2011)
  31. The electrical characterisation and response to hydrogen of Schottky diodes with a resistive metal electrode – rectifying an oversight in Schottky diode investigation. P. Dawson, L. Feng, L. Penate-Quesada, **J. Mitra** and G. Hill (Journal of Physics D, 44, 125101, 2011)
  32. Electromagnetic interaction between a metallic nanoparticle and surface in tunnelling proximity – modelling and experiment. **J. Mitra\***, Lei Feng, Michael G. Boyle and P. Dawson (Journal of Physics D, 42, 215101, 2009)
  33. The tip-sample water bridge and light emission in electron scanning tunnelling microscopy Michael G. Boyle, **J. Mitra\*** and P. Dawson (Nanotechnology 20, 335202, 2009). Featured as Technology Update, <http://nanotechweb.org/cws/article/tech/40296>.
  34. Infrared emission from tunnelling electrons: The end of the rainbow in scanning tunnelling microscopy Michael G. Boyle, **J. Mitra\*** and P. Dawson (Applied Physics Letters, 94, 233118, 2009) also selected for publication in the *Virtual Journal of Nanoscience and Technology*, Vol. 19, Issue 26, June 2009.
  35. Very low-frequency resistance fluctuations in thin films of La<sub>0.67</sub>Ca<sub>0.33</sub>MnO<sub>3</sub> with quenched disorder. Sudeshna Samanta, A. K. Raychaudhuri and **J. Mitra** (Phys. Rev. B 78, 014427, 2008)
  36. Non-linear electronic transport in Pt nanowires deposited by focused ion beam. L Peñate-Quesada, **J. Mitra\*** and P. Dawson (Nanotechnology 18, 215203, 2007)
  37. Photon Emission at Step Edges of Single Crystalline Gold Surfaces Investigated by Scanning Tunnelling Microscopy. Michael G. Boyle, **J. Mitra** and P. Dawson (Jpn. J. Appl. Phys., 45, 2119, 2006).
  38. Temperature dependence of the gap in the Density of States in a hole doped Manganite. S. Kar, **J. Mitra** and A. K. Raychaudhuri (Solid State Commns. 136, 410, 2005)
  39. Temperature dependence of the density of states near Fermi level in a strain free epitaxial film of hole doped manganite La<sub>0.7</sub>Ca<sub>0.3</sub>MnO<sub>3</sub>. **J. Mitra\***, Mandar Paranjape, A. K. Raychaudhuri, N. D. Mathur and M. G. Blamire (Phys. Rev. B 71, 094426, 2005)
  40. Biaxial strain induced electrical inhomogeneities and phase separation in the ferromagnetic metallic phase in thin films of La<sub>0.7</sub>Ca<sub>0.3</sub>MnO<sub>3</sub>: A scanning tunnelling potentiometry/spectroscopy study. Mandar Paranjape, **J. Mitra**, A. K. Raychaudhuri, N. D. Mathur and M. G. Blamire; (Materials Research Society Symposium Proc. 838E, O1.2.1, 2005)
  41. Growth of oriented films of La<sub>0.67</sub>Ca<sub>0.33</sub>MnO<sub>3</sub> and La<sub>0.67</sub>Sr<sub>0.33</sub>MnO<sub>3</sub> on SrTiO<sub>3</sub> using chemical solution deposition. B Ghosh, L K Brar, H Jain, **J Mitra** and A K Raychaudhuri. (Journal of Physics D, 37, 1548, 2004)
  42. Non-linear electrical transport through artificial grain boundary junctions in epitaxial thin film of La<sub>0.7</sub>Ca<sub>0.3</sub>MnO<sub>3</sub>. Mandar Paranjape, **J. Mitra**, A. K. Raychaudhuri, N. K. Todd, N. D. Mathur and M. G. Blamire. (Phys. Rev. B, 68, 144409, 2003).

43. Depletion of density of states at the Fermi level in metallic colossal magnetoresistive manganites  
J. Mitra\*, A. K. Raychaudhuri, Ya. M. Mukovskii and D. Shulyatev. (Phys. Rev. B, 68, 134428, 2003).
44. Point-contact spectroscopy of single crystal  $\text{La}_{0.75}\text{Sr}_{0.25}\text{MnO}_3$  and resistivity due to electron-phonon interaction.  
J. Mitra\*, A. K. Raychaudhuri, N. Gayathri and Ya. M. Mukovskii. (Phys. Rev. B, 65, 140406(*Rapid Commun.*), 2002).
45. Low Level Measurements using OPAMP CA3140 at 77K.  
J. Mitra\*, S. Kar, A. K. Raychaudhuri (Solid State Physics, 44, 2002)
46. The Homopolar Generator in Rotating Reference Frames.  
Joy Mitra\* (Physics Education, July-September, 183, 1996)

#### Under Review/Preparation:

47. Coexistence of Multiple Magnetic Interactions in Oxygen Deficient  $\text{V}_2\text{O}_5$  Nanoparticles (*under review*)
48. Surpassing the quarter-wave limit for thin film perfect absorbers with epsilon-near-zero media  
Ben Johns, Shashwata Chattopadhyay, J. Mitra ([arXiv:2102.00239](https://arxiv.org/abs/2102.00239))

#### Selected Conference Presentations: (2018 - )

1. A novel heterostructure architecture for photodetection and photo-enhanced electron emission applications. European MRS – Spring Meeting – 2022, May 2022
2. A novel heterostructure architecture for photodetection and photo-enhanced electron emission applications. Frontier Symposium in Physics, IISER Thiruvananthapuram, India. April 2022
3. Tuning of Opto-electronic Properties in TMDCS by defect, strain, electrostatic gating and substrate interaction. Frontier Symposium in Physics, IISER Thiruvananthapuram, India. April 2022
4. Investigating the phase segmented  $\text{WS}_2$  flake with spatially resolved techniques and correlating local photoluminescence, conductance with defects. National Conference on Quantum Materials 2021.
5. Plasmon mediated electron - photon interactions in metallic nanostructures.  
National Conference on Quantum Materials 2021.
6. Ultrathin Planar Resonant Cavities with Refractive Index Below Unity. OSA Advanced Photonics Congress, 2021
7. Plasmonics in near-zero-index media.  
11<sup>th</sup> International Conference on Metamaterials, Photonic crystals and Plasmonics 2021
8. Epsilon-near-zero (ENZ) thin film on metal substrate: sub-wavelength Berreman-like modes and momentum matched SPPs. NFO16, Ottawa, Canada, 2020
9. Tunable epsilon-near-zero & plasmonic response in indium tin oxide thin films. ICONSAT 2020, Kolkata
10. Air-side optical excitation of surface plasmon polaritons on gold. 2019 COMSOL Conference, Bangalore
11. Dynamic tuning of ENZ region of ITO and sensing using a tapered optical fiber. XXI International Workshop on Physics of Semiconductor Devices, December 2021 (Best Poster Award)
12. Modelling a ITO nanostructured system for developing a spectrally selective absorber/emitter. XXI International Workshop on Physics of Semiconductor Devices, December 2021
13. ZnO: Plasmonic Hybrid System: From Photoluminescence to Surface Enhanced Raman Spectroscopy. European Material Research of Society - Fall Meeting-2019, Warsaw, Poland September 2019
14. Surprises in Optoelectronics of low dimensional conducting oxides. JNC conference, Thiruvananthapuram, 2018
15. Smartening Surfaces and Characterizing them in the Nanoscale.  
J. Mitra and C. Bhat (14<sup>th</sup> FICCI Higher Education Summit, New Delhi, 2018)
16. Nanoscale Tunnel Junctions - A Unique Forum for Plasmonic Cross-talk between Electrons and Photons.  
Vijith Kalathingall, Paul Dawson, and J. Mitra (NFO15, Troyes, France 2018)
17. Tuning the electric field enhancement at fibre taper and Indium Tin Oxide thin film junction across the epsilon-near-zero wavelength. A. Mishra, B. Johns, Navas M P, R. Pant and J. Mitra (NFO15, Troyes, France 2018)
18. Tuning the dielectric-metal transition in Indium Tin Oxide thin films and probing the crossover by modal interference of optical fibres. B. Johns, Navas M P, A. Mishra, R. Pant and J. Mitra (NFO15, Troyes, France 2018)
19. Alternative strategies in HAMR: hybrid- and gap mode-plasmon. Reyad Mehruz, Vijith Kalathingall, Paul Dawson, and J. Mitra (NFO15, Troyes, France 2018)
20. Novel Routes to Electromagnetic Enhancement and its Characterisation in SERS.  
Paul Dawson, David Frey, Vijith Kalathingall, Reyad Mehruz and J. Mitra (Surface Enhanced Raman Scattering - SERS: Faraday Discussions, Glasgow, United Kingdom, September 2017)
21. Surface plasmon polariton: Excitation and amplification using active tunnel junctions.  
Vijith Kalathingall, Paul Dawson, and J. Mitra (8th International conference on Surface Plasmon Photonics (SPP8), Taipei, Taiwan, May 2017) (*Outstanding Poster Award*)
22. Surface Plasmon Mediated Light Emission Driven by Tunnelling Electrons: Macro- to Nano-scale over 40 Years.  
Paul Dawson, Lei Feng, Michael G. Boyle, Vijith Kalathingall, and J. Mitra (8th International conference on Surface Plasmon Photonics (SPP8), Taipei, Taiwan, May 2017)
23. Designing Defects in ZnO: A few curiosities. J. Mitra (Science and Technology for Society Forum 2016, Colombo, Sri Lanka, 7 – 10 September 2016)
24. Nanoscale photo-conductivity mapping on individual ZnO nanorods: effect of spatially distributed surface defects  
K. Bandopadhyay and J. Mitra (European MRS Spring Meeting, Lille, France, 2 – 6 May 2016)



## Mentoring and Supervision

Current Post-Doctoral Fellows: 0

Current PhD Students: 3

Current Integrated PhD Students: 2

Past Post-Doctoral Fellows: 3

### Doctoral Theses Supervised

1. Dr Harikrishnan G – IISER TVM, India PhD (2023)
2. Dr Arijit Kayal – IISER TVM, India PhD (2022)  
Engineering optical, electrical and electronic properties of 2D van der Waals Materials
3. Dr Ben Johns – IISER TVM, India PhD (2021)  
Infrared photonics of epsilon-near-zero thin films
4. Dr K N Prajapati – IISER TVM, India PhD (2020)  
ZnO emission: from Photoluminescence to Surface Enhanced Raman Spectroscopy
5. Dr. V Kalathingal – IISER TVM, India PhD (2017)  
STM Light Emission: The physics of a nanoscale plasmonic light source.
6. Dr. K. Bandopadhyay – IISER TVM, India PhD (2017)  
Defect driven optoelectronic properties of ZnO nanostructures and related devices.
7. Dr. Pavan Kumar, Queen's University Belfast, UK PhD (2012)  
Thin film and nanostructured zinc oxide: characterisation and device applications.
8. Dr. L. Penate-Quesada, Queen's University Belfast, UK PhD (2008)  
[Exploiting resistive macro- to nano- scale metal electrodes in Schottky barrier structures.](#)

### Masters Theses Supervised

- |                      |                              |                             |
|----------------------|------------------------------|-----------------------------|
| <b>Physics Major</b> | 1. Shamna Subair (2023)      | 11. Abu Alex (2018)         |
|                      | 2. Alphin Joseph (2022)      | 12. Kanchan Soni (2018)     |
|                      | 3. Sreehari Rajendran (2022) | 13. G Mitra (2017)          |
|                      | 4. Anoop Nair (2021)         | 14. B C Joseph (2017)       |
|                      | 5. Sabuj Mondol (2021)       | 15. Anupama (2017)          |
|                      | 6. Miliya K M (2021)         | 16. Harikrishnan G (2016)   |
|                      | 7. Kartik E (2020)           | 17. P Mandal (2016)         |
|                      | 8. Amit Kumar (2020)         | 18. M Thampi (2015)         |
|                      | 9. Sharath Sasikumar (2020)  | 19. Sisira K (2015)         |
|                      | 10. Pratik Kumar (2018)      | 20. A Mohan (2014)          |
|                      | 21. P Pathak (2013)          |                             |
| <b>Physics Minor</b> | 1.                           | 14. Nandita Mohandas (2019) |
|                      | 2. Amulya Hejaji (2022)      | 15. Sanjeev Nanda P (2019)  |
|                      | 3. Adarsh K (2022)           | 16. Narmada Naidu (2018)    |
|                      | 4. Akashdeep (2022)          | 17. Rashmiparvathi K (2018) |
|                      | 5. C Ranjithkumar (2021)     | 18. Mohammed Siddhique      |
|                      | 6. Angela P A (2021)         | 19. Gudla Harish (2017)     |
|                      | 7. Arunima S (2021)          | 20. A Ali (2016)            |
|                      | 8. Nancy Bhadiar (2021)      | 21. A Anand Ojha (2016)     |
|                      | 9. J. Gowtham Nirmal (2020)  | 22. D Devasia (2015)        |
|                      | 10. Sreelakshmi V (2020)     | 23. D Suryavanshi (2014)    |
|                      | 11. Divya P. S. (2020)       | 24. N Thejaswi (2013)       |
|                      | 12. Vishnu V (2019)          | 25. H Lingam (2013)         |
|                      | 13. Meera Madhu (2019)       | 26. A Bhusan (2013)         |

**Teaching**

1. UGC-CSIR, National Eligibility Test, Qualified for Lectureship (1999)
2. UG/PG Teaching: Department of Physics, Queen's University Belfast, UK (2006 – 2009)
3. UGC Staff College Lectures at Kerala University (Nov 2014, Dec 2015, Feb 2016, Dec 2016).
4. Teaching at IISER-TVM (2010 – present)

Electronics	IDC211/PHY313	2010, 2012
Electricity and Magnetism	PHY 121	2011, 2012, 2013, 2021, 2022
Mechanics	PHY 111	2020
Classical Mechanics	PHY 312	2011, 2013, 2014, 2020, 2021, 2022
Statistical Mechanics	PHY 321	2013, 2023
Advanced Experimental Laboratory	PHY 315/325	2014, 2015, 2016, 2018, 2019
Experimental Methods	PHY 411/611	2015, 2016, 2017
Semiconductor Physics and Technology	PHY 4120/6120	2017, 2018, 2019, 2020, 2022, 2023
Expts. in Heat and Thermodynamics	PHY 222	2022

**Research Interests:**

1. Tunnelling induced light emission – nanoscale Plasmonics.
  - (i) Electrical and Optical excitation of Surface Plasmons – Fundamentals and Applications
  - (ii) Chemical fingerprinting of molecules via STM light emission
  - (iii) Phenomenological modelling of plasmon excitation and electron-photon coupling
2. Plasmonics and Optoelectronics of Conducting Oxides
3. Optical, electrical and optoelectronic properties of 2D layered systems
4. Metal – Semiconductor Schottky Junctions (micro to nanoscale)
  - (i) Electrical transport along elongated nanoscale Schottky junctions
  - (ii) Applications of nanoscale Schottky junction devices in high sensitivity chemical sensing
5. Nanostructured ZnO based hybrid devices for photovoltaic applications
6. Imaging Biological systems in the nanoscale