Dr. Abhijith T
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Nanoscience & Technology
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BIOSKETCH

Dr. Abhijith T is an experimental and theoretical researcher. Since August 2023, he has been working as an Assistant Professor in the Department of Nanoscience and Technology, PSG Institute of Advanced Studies, Coimbatore. His research mainly focuses on developing the organic/inorganic nano-architectures and utilizing such structures in optical, electronic, and optoelectronic applications. He completed his post-graduate degree from the National Institute of Technology (NIT) Calicut, India followed by the Doctor of Philosophy (Ph.D.) in Physics at the same institute. He worked as an Institute Post-doctoral Fellow in the Department of Energy Science and Engineering at the Indian Institute of Technology (IIT) Delhi for two years.

Educational Profile

- **Doctor of Philosophy (Ph.D.) in Physics**
  Year of Passing: 2020
  Thesis title: Metal and Metal Oxide Nanostructures for Applications in Organic Solar Cells and Memory Devices
  Thesis Supervisor: Dr. Vari Sivaji Reddy, Department of Physics, National Institute of Technology Calicut

- **Master of Science and Technology (M.Sc. Tech) in Photonics**
  Department of Physics
  National Institute of Technology Calicut

- **Bachelor of Science (B.Sc.) in Physics**
  University of Calicut

Positions Held

Aug 2023 – Present	Assistant Professor Department of Nanoscience & Technology PSG Institute of Advanced Studies Peelamedu, Coimbatore
July 2021 – July 2023	Institute Postdoctoral Fellow Mentor: Dr. Supravat Karak Organic & Hybrid Electronics Laboratory Department of Energy Science & Engineering, Indian Institute of Technology, Delhi

Sep 2012 – June 2013 National Photonics Fellow
Supervisor: Dr. G V Pavan Kumar
Soft-Photonics Research Group
Indian Institute of Science Education and Research (IISER) Pune

Research Areas

- Plasmonic Materials
- Photovoltaic Devices
- Optical and Optoelectronic Materials

Projects

- Development of Plasmonic-Organic Hybrid Nanowires with Enhanced Nonlinear optical Activity for Applications in Flexible Laser Protection Films. UGC-DAE (CRS/2024-25/1959) (*as PI*)
- Development of $CsPbI_3$ Quantum Dots with Short-chain Aromatic Ligands for Perovskite Quantum Dot Solar Cells. UGC-DAE (CRS/2024-25/1858) (*as Co-PI*)

Laboratories In-charge

1. Nanophotonic Materials and Devices Laboratory (NMDL)

Journal Publications

1. Abinash Das, Shriya Gumber, Nitai C. Maji, Shashi B. Mishra, Preethi M., Pujita Ningthoukhongjam, Ranjith G. Nair, Abhijith T., Elena A. Kazakova, Andrey S.Vasenko, Madhumitha R., and Oleg V. Prezhdo, "Electrostatic Self-Assembly-Driven Heterojunction of Cubic CeO_2/ g-C_3N_4 Nanosheets for Efficient Photocatalytic Hydrogen Evolution and Photoelectrocatalytic Water Splitting: A Hybrid Experimental and Theoretical Study" ACS Appl. Mater. Interfaces, Vol. **17**, 48941–48955, 2025.

2. Navami Sunil, Rajesh Unnathpadi, Rajkumar Kottayasamy Seenivasagam, **T Abhijith**, R. Latha, Shina Sheen, K Chandra Devi and Biji Pullithadathi, "3D-Printed Microfluidic-Integrated SERS Salivary Biosensor Utilizing Fe@Ag/CarbonNanofibers for Advanced Machine Learning-Driven Noninvasive,Label-Free Mass Screening of Lung Cancer" ACS Appl. Nano Mater, Vol. **8**, 15558-15571, 2025.

3. Navami Sunil, Rajesh Unnathpadi, Rajkumar Kottayasamy Seenivasagam, **T Abhijith**, R. Latha, Shina Sheen and Biji Pullithadathi, "Development of AI-Derived, Non-Invasive, Label-Free 3D-Printed Microfluidic SERS Biosensor Platform Utilizing Cu@Ag/Carbon Nanofibers for Detection of Salivary Biomarkers in Mass Screening of Oral Cancer" Journal of Material Chemistry B, Vol. **13**, 3405-3419, 2025.

4. **T. Abhijith*,** Shiju Edappadikkunnummal, Harish Prabha Sekar, Dharanisri Senthilkumar, "Plasmon-Induced Nonlinear Optical Response of N,N′-Dioctyl-3,4,9,10-perylenedicarboximide Nanoribbons Doped with Gold Nanoparticles: Implications for Optical Limiting Applications" ACS Appl. Nano Mater, Vol. 7 , p. 26126, 2024. *(First and corresponding author)

5. Om Prakash, **T. Abhijith*,** Priya Nagpal, Vivekanandan Perumal, Supravat Karak, Udai B, Udai B. Singh, Santanu Ghosh, "Highly Sensitive Label-free Biomolecular

Detection Using Au-WS2 Nanohybrid Based SERS Substrates" Nanoscale Advances, Vol. 6, p. 5978, 2024. *(Equally Contributed First author)

6. Om Prakash, **T. Abhijith**, G.R. Umapathy, Supravat Karak, Udai B. Singh, Santanu Ghosh, "Low energy ion irradiation induced Au/Ag multilayer nanostructured substrates for SERS-based molecular sensing" Optical Materials, Vol. 148, p. 114814, 2024.

7. Rakesh Suthar, **T. Abhijith** and Supravat Karak., "Machine-Learning-Guided Prediction of Photovoltaic Performance for Non-fullerene Organic Solar Cells using Novel Molecular and Structural Descriptors" J. Mater. Chem. A, Vol. 11, p. 22248-22258, 2023.

8. **T. Abhijith**, Rakesh Suthar, and Supravat Karak., "Synergistic Plasmonic Responses of Multi-shaped Au Nanostructures Hybridized with Few Layer WS2 Nanosheets for Organic Solar Cells" ACS Appl. Nano Mater, vol. 6, p. 11737–11746, 2023.

9. P Sharma, Aniket Rana, **T Abhijith**, Rakesh Suthar, and Supravat Karak., "Accessing Deep Traps Distribution in FeS2 Doped Organic Photovoltaics" Energy Technol., vol. 11, p. 2201087, 2023.

10. **T. Abhijith**, Shiju E, Rakesh Suthar, Sheenu Thomas, and Supravat Karak., "Au-WS2 Nanohybrids with Enhanced Optical Nonlinearity for Optical Limiting Applications" ACS Appl. Nano Mater, vol. 6, Issue 4, pp. 2327–2335, 2023.

11. R Suthar, **T Abhijith**, P Sharma, S Karak "Machine learning framework for the analysis and prediction of energy loss for non-fullerene organic solar cells", Solar Energy, vol. 15, p. 3214-3223, 2023.

12. R Suthar, **T Abhijith**, H Dahiya, AK Singh, GD Sharma, S Karak "Role of Exciton Lifetime, Energetic Offsets, and Disorder in Voltage Loss of Bulk Heterojunction Organic Solar Cells", ACS Appl. Mater. Interfaces, vol. 250, p. 119-127, 2023.

13. R Selvapriya, J Vinodhini, **T Abhijith**, V Sasirekha, V Ragavendran, Joshua M Pearce, J Mayandi, "Fabrication of Bimetallic Inlaid Working Electrode for Highly Efficient Dye Sensitized Solar Cells", J. Alloys Compd. vol. 939, p. 168634, 2023.

14. **T. Abhijith**, E. Shiju, R. Suthar, P. Sharma, S. Thomas, S. Karak, "Understanding the Linear and Nonlinear Optical Responses of Few-Layer Exfoliated MoS2 and WS2 Nanoflakes: Experimental and Simulation Studies", Nanotechnology, vol. 33, no. 43, p. 435702, 2022.

15. S Waheed, S Pareek, **T. Abhijith**, R Suthar, P Sharma, S Karak, "Understanding the influences of In-situ annealing and substrate vibration on the charge carrier dynamics of ultrasonic spray-coated polymer solar cell", Journal of Materials Science: Materials in Electronics, Vol. 33, pp.15180–15190, 2022.

16. R Selvapriya, **T. Abhijith**, V Ragavendran, V Sasirekha, VS Reddy, JM Pearce, J Mayandi, "Impact of coupled plasmonic effect with multishaped silver nanoparticles on efficiency of dye sensitized solar cells", J. Alloys Compd. vol. 894, p. 162339, 2022.

17. E Shiju, **T Abhijith**, Narayana Rao D, Chandrasekharan K, "Nonlinear optical behavior of Au@ Ag core-shell nanostructures", J. Mol. Liq. vol. 333, p. 115935, 2021.

18. **T. Abhijith**, C. S. Anoop, G. A. Vinod and V. S. Reddy, "Efficiency enhancement in polymer solar cells using combined plasmonic effects of multi-positional silver nanostructures", Org. Electron. vol. 86, p. 105872, 2020.

19. R. Selvapriya, **T. Abhijith**, V. Ragavendran, V. Sasirekha, V. S. Reddy and J. Mayandi, "Screen printed multifunctional TiO2 photoanode with plasmonic Ag nanoparticles for performance enhancement of dye sensitized solar cell," Mater. Lett., vol. 276, p. 128194, 2020.

20. **T. Abhijith**, P. Shamjid, and V. S. Reddy, "Multi-positional silver nanostructures for high absorption enhancement in polymer solar cells," Org. Electron., vol. 73, pp. 311–316, 2019.

21. P. Shamjid, **T. Abhijith**, P. Vivek, C. S. Joel, and V. S. Reddy, "Plasmonic effects of Ag nanoparticles for absorption enhancement in polymer solar cells with MoO3 passivation layer," Phys. B Phys. Condens. Matter, vol. 560, pp. 174–184, 2019.

22. **T. Abhijith**, P. Shamjid, and V. S. Reddy, "Influence of Ag nanostructure location on the absorption enhancement in polymer solar cells," ACS Appl. Mater. Interfaces, vol. 10, no. 38, pp. 32483–32491, 2018.

23. M. Y. Ameen, P. Shamjid, **T. Abhijith**, and V. S. Reddy, "Solution-processed transition metal oxide anode buffer layers for efficiency and stability enhancement of polymer solar cells," Opt. Mater., vol. 75, pp. 491–500, 2018.

24. M. Y. Ameen, P. Shamjid, **T. Abhijith**, T. Radhakrishnan, and V. S. Reddy, "Stability enhancement of P3HT:PCBM polymer solar cells using thermally evaporated MoO3 anode buffer layer," Phys. B Phys. Condens. Matter, vol. 530, pp. 201–207, 2018.

25. **T. Abhijith**, T. V. A. Kumar, and V. S. Reddy, "Organic bistable memory devices based on MoO3 nanoparticle embedded Alq3 structures," Nanotechnology, vol. 28, no. 9, pp. 095203, 2017.

26. M. Y. Ameen, **T. Abhijith**, S. De, S. K. Ray, and V. S. Reddy, "Linearly polarized emission from PTCDI-C8 one-dimensional microstructures," Org. Electron., vol. 14, no. 2, pp. 554–559, 2013.

Total Number of Conference Papers/Proceedings: 11