**Personal Profile**

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| C:\Users\Admin\Pictures\16365s22227258.jpg |  | **Dr. Sayan Bayan** |
| **Assistant Professor, Department of Physics** |
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**Educational Profile**

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| Ph.D. | Tezpur University, Tezpur, Assam; 2013Supervisor: Dr. Dambarudhar Mohanta |
| M.Sc. | Tezpur University, Tezpur, Assam; 2008Subject: PhysicsSpecialization: Condensed matter physics |
| B.Sc. | Gauhati University, Guwahati; 2006Subject: Physics  |

**Professional Experience**

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| **Assistant Professor**, Department of Physics,Rajiv Gandhi University, Arunachal Pradesh, India | April, 2021-till date |
| **CSIR Senior Research Associate**, S. N. Bose National Centre for Basic Sciences, Kolkata, India | July, 2018- April, 2021 |
| Post-doctoral Fellow,Indian Institute of Technology Kharagpur, India Supervisor: Prof. Samit K. Ray | July, 2015- July, 2018 |
| Post-doctoral Fellow,Saha Institute of Nuclear Physics, Kolkata, IndiaSupervisor: Prof. Purushottam Chakraborty | March, 2013- March, 2015 |

**Awards &Honours**

1. CSIR Senior Research Associate under Scientist’s Pool Scheme by CSIR, India 2018
2. Junior Research Fellowship under the scheme of Rajiv Gandhi National Fellowship by UGC, India 2009

**Research Interests**

* Low dimensional material
* Optical properties
* Energy harvesting
* Bio-medical devices

**Research Publications**

1. Development of triboelectroceutical fabrics for potential applications in self-sanitizing personal protective equipment: Bayan, S.; Adhikari, A.; Pal, U.; Ghosh, R.; Mondal, S.; Darbar, S.; Dasgupta,T. S., Ray, S. K.; Pal, S. K.; *ACS Appl. Bio Mater.* **2021**, *4,* 5485-5493*.*
2. Boron Carbonitride Nanosheet/ZnO Nanorod Heterojunctions for White-Light Emission: Pal, S.; Bayan, S.; Goswami, D. K.; Ray, S. K.; *ACS Appl. Nano Mater.***2021***, 4,* 8572–8585*.*
3. 2D WS2 embedded PVDF nanocomposites for photosensitive piezoelectric nanogenerators with a colossal energy conversion efficiency of ∼25.6%: Bhattacharya, D.; Bayan, S.; Mitra, R. K.; Ray, S. K.; *Nanoscale* **2021**, *13,* 15819-15829*.*
4. Nanoceutical Fabric Prevents COVID-19 Spread through Expelled Respiratory Droplets: A Combined Computational, Spectroscopic, and Antimicrobial Study: Adhikari, A.; Pal, U.; Bayan, S.; Mondal, S.; Ghosh, R.; Darbar, S.; Dasgupta,T. S., Ray, S. K.; Pal, S. K.; *ACS Appl. Bio Mater.* **2021**, *4,* 5471–5484*.*
5. Two-dimensional graphitic carbon nitride nanosheets: a novel platform for flexible, robust and optically active triboelectric nanogenerators: Bayan, S.; Bhattacharya, D.; Mitra, R. K.; Ray, S. K.; *Nanoscale* **2020**, *12*, 21334-21343.
6. Self-powered flexible photodetectors based on Ag nanoparticle loaded g-C3N4 nanosheets and PVDF hybrids: Role of plasmonic and piezoelectric effects: S.; Bhattacharya, D.; Mitra, R. K.; Ray, S. K.; *Nanotechnology* **2020**, 31, 365401.
7. Flexible Biomechanical Energy Harvesters with Colossal Piezoelectric Output (∼ 2.07 V/kPa) Based on Transition Metal Dichalcogenides-Poly (vinylidene fluoride) Nanocomposites: Bhattacharya, D.; Bayan, S.; Mitra, R. K.; Ray, S. K.; *ACS Appl. Electron. Mater.* **2020**, *2*, 3327–3335.
8. Superior performance self-powered photodetectors utilizing piezo-phototronic effect in SnO nanosheets/ZnO nanorods hybrid heterojunctions: Pal, S.; Bayan, S.; Goswami, D. K.; Ray, S. K.; *ACS Appl. Electron. Mater.* **2020**, *2*, 1716–1723.
9. Forster Resonance Energy Transfer Mediated Charge Separation in Plasmonic 2D/1D Hybrid Heterojunctions of Ag-C3N4/ZnO for Enhanced Photodetection: Bayan, S.; Gogurla, N.; Ghorai, A.; Ray, S. K.; *ACS Applied Nano Materials* **2019**, *2*, 3848-3856.
10. Piezo-phototronic mediated enhanced photodetection characteristics of plasmonic Au-g-C3 N4/CdS/ZnO based hybrid heterojunctions on a flexible platform: Pal, S.; Bayan, S.; Ray, S. K.; *Nanoscale* **2018**, *10*, 19203 -19211.
11. Rectification and Amplification of Ionic Current in Planar Graphene/Graphene-Oxide Junctions: An Electrochemical Diode and Transistor: Jana, S. K.; Banerjee, S.; Bayan, S.; Inta, H. R.; Mahalingam, V.; *J. Phys. Chem. C* **2018,** *122*, 11378-11384.
12. Plasmon mediated enhancement of visible light emission of Au-ZnO nanocomposites: Gogurla, N.; Bayan, S.; Chakrabarty, P.; Ray, S. K.; *J. Luminescence*, **2018**, *194*, 15-21.
13. Plasmon mediated enhancement and tuning of optical emission properties of two dimensional graphitic carbon nitride nanosheets: Bayan, S.; Gogurla, N.; Midya, A.; Singha, A.; Ray, S. K.; *Nanotechnology* **2017**, *28*, 485204.
14. Origin of Modified Luminescence Response in Reduced Graphitic Carbon Nitride Nanosheets: Bayan, S.; Midya, A.; Gogurla, N.; Singha, A.; Ray, S. K.; *J. Phys. Chem. C* **2017**, *121*, 19383-19391.
15. Catalyst-free growth and luminescence response of single-crystalline ZnO nanorods: Bayan, S.; Pegu, L.; Mohanta, D.; *Ind. J. Pure and Appl. Phys.* **2017**, *55*, 512-517.
16. Highly Luminescent WS2 Quantum Dots/ZnO Heterojunctions for Light Emitting Devices: Ghorai, A.; Bayan, S.; Midya, A.; Gogurla, N.; Ray, S. K.; *ACS Appl. Mater. Interfaces* **2017**, *9*, 558-565.
17. Modified photoluminescence and photodetection characteristics of chemically grown SnOcoated ZnO nano-needles:Bayan, S.; Mishra, S. K.; Satpati, B.; Srivastava, R. K.; Shukla, R. K.; Chakraborty, P.; *J. Vac. Sci. Tech. B* **2016**, 34, 061201.
18. White light emission characteristics using two dimensional graphitic carbon nitride and ZnO nanorods hybrid heterojunctions: Bayan, S.; Midya, A.; Gogurla, N.; Ray, S. K.; *Carbon* **2016**, *108*, 335-342.
19. Narrowing of band gap and effective charge carrier separation in oxygen deficient TiO2 nanotubes with improved visible light Photocatalytic activity: Choudhury, B.; Bayan,S.; Choudhury, A.; Chakraborty, P.; *J. Colloid Interface Sci.* **2016**, *465*, 1-10*.*
20. A comprehensive SIMS analysis of ZnO nanowalls: Correlation to photocatalytic responses: Bayan,S.; Choudhury, B.; Chakraborty, P.; Choudhury, A.; *J. Appl. Phys.* **2015**, *117*, 095304.
21. ZnS nanoparticle decorated ZnO nanowall network: investigation through electron microscopy and secondary ion mass spectrometry:Bayan, S.;  Satpati, B.;  Chakraborty, P.; *Surf. Interface Anal.* **2015**, *47*, 37-44.
22. Enhancement of persistent photoconductivity of ZnO nanorods under polyvinyl alcohol encapsulation: Bayan, S.; Mishra, S. K.; Satpati, B.;  Chakraborty, P.; *Mat. Sci. in Semiconductor Proces.* **2014**, *24*, 200-207.
23. Secondary ion mass spectrometry and photoluminescence study on microstructural characteristics of chemically synthesized ZnO nanowalls: Bayan, S.;  Chakraborty, P.; *Appl. Surf. Sci.* **2014**, *303*, 233–240.
24. Efficient UV photosensitive and photoluminescence properties of sol–gel derived Sn doped ZnO nanostructures: Mishra, S. K.; Bayan, S.; Shankar, R.; Chakraborty, P.; Srivastava, R. K.; *Sensors and Actuators A* **2014**, *211*, 8-14.
25. Enhanced vacuum photoconductivity of chemically synthesized ZnO nanostructures: Bayan, S.; Mishra, S. K.; Chakraborty, P.; Mohanta, D.; Shankar, R.; Srivastava, R. K.; *Philosophical Magazine* **2014**, *94*, 914-924.
26. Defect-dominated optical emission and enhanced ultraviolet photoconductivity properties of ZnO nanorods synthesized by simple and catalyst-free approach: Mishra, S. K.; Bayan, S.; Chakraborty, P.; Srivastava, R. K.; *Applied Physics A* **2014**, *115*, 1193-1203.
27. Fragmentation of elongated-shaped ZnO nanostructures into spherical particles by swift ion impact: Bayan, S.; Mohanta, D.; *Physica E* **2013**, *54***,** 288-294.
28. Significant Fowler-Nordheim tunneling across ZnO-nanorod based nanojunctions for nanoelectronic device applications: Bayan, S.; Mohanta, D.; *Curr. Appl. Phys*, **2013**, 13, 705-709.
29. ZnO-nanorod based UV-photodetection and the role of persistent photoconductivity: Bayan, S.; Mohanta, D.; *Philosophical Magazine* **2012**, *92*, 3909-3919.
30. Unusual rectifying response of nanojunctions using randomly oriented nanorods (RON) of ZnO irradiated with 80-MeV oxygen ions: Bayan, S.; Mohanta, D.; *J. Electron. Mater.* **2012**, *41*, 1955-1961.
31. Interplay of native defect-related photoluminescence response of ZnO nanosticks subjected to 80 keV Ar ion irradiation: Bayan, S.; Mohanta, D.; *Radiation Effects & Defects in Solids*, **2011**, *166*, 884-893.
32. Defect mediated optical emission of randomly oriented ZnO nanorods and unusual rectifying behavior of Schottky nanojunctions: Bayan, S.; Mohanta, D.; *J. Appl. Phys.* **2011**, *110*, 054316.
33. Effect of 80-MeV nitrogen ion irradiation on ZnO nanoparticles: Mechanism of selective defect related radiative emission features: Bayan, S.; Mohanta, D.; *Nuclear Instruments and Methods in Physics Research B* **2011**, *269*, 374–379.
34. Peacock feather supported self assembled ZnO nanostructures for tuning photonic properties: Bayan, S.; Das, U.; Mohanta, D.; *Eur. Phys. J. D* **2011**, *61*, 463–468.
35. Directed growth characteristics and optoelectronic properties of Eu-doped ZnO nanorods and urchins: Bayan, S.; Mohanta, D.; *J. Appl. Phys.* **2010**, 108, 023512.
36. Development of Tb-doped ZnO nanorods: Effect of nitrogen ion irradiation on luminescence and structural evolution: Bayan, S.; Das, U.; Mohanta, D.; *Phys. Status Solidi A* **2010**, *207*, 1859-1863.
37. Role of cohesive energy on the interparticle coalescence behavior of dispersed nanoparticles subjected to energetic ion irradiation: Bayan, S.; Mohanta, D.; *J. Mater. Res.* **2010**, *25*, 814-820.

**Patent**

1. Bayan, S.; Adhikari, A.; Pal, U.; Dasgupta,T. S., Ray, S. K.; Pal, S. K.: Development of Tribo-electroceutical Fabric for Potential Application in Self Sanitizing Personal Protective Equipment (PPE), Appl.No.202031038150, 2020 (Applied).
2. Adhikari, A.; Pal, U.; Bayan, S.; Dasgupta,T. S., Ray, S. K.; Pal, S. K.: A Nanoceutical Fabric for source control to prevent COVID-19 spread including through expelled respiratory droplets, Appl.No.202031038152, 2020( Applied).

**Book Chapter published**

1. Bayan, S.; Mohanta, D.: Electrical and optoelectronic properties of non-spherical, elongated zinc oxide nanoscale systems, in Zinc Oxide: production, properties and applications. Galvan, C., Nova science publishers, USA, 2020.
2. Bayan, S.: Zinc Oxide Nanorods: The material for future optoelectronics, in *Material science and naomaterials: Recent advances and applications,* Eds. Konwer, S.; Gogoi, A., Global Publishing House, India, India, 2015, 23-41.

**Course/Conference/Workshop etc. attended**

1. Delivered a talk in ‘*Recent trends in nanotechnology and signal processing*’, a Faculty development program held at GMR Institute of Technology, Rajam, India during 23 August -29 August, 2021.

Title of the talk: Fabrication of hybrid nanomaterials and optoelectronic applications.

1. Delivered a talk in ‘*Virtual Conference on Contemporary Research in Physics 2020*’, a Virtual Conference held at Post Graduate Department of Physics, Vijaya College, Bangalore, India during 17 December - 19 December, 2020.

Title of the talk: Nanogenerators: Step Towards Self-Powered Future.

1. Delivered an oral presentation in ‘*XXth International Workshop on the Physics of Semiconductor Devices*’, an International Conference held at S.N. Bose National Centre for Basic Sciences, Kolkata, India during 17 December -20 December, 2019.

Title of the presentation: 2D g-C3N4 nanosheets and hybrids for optoelectronic and photonic devices.

1. Presented a poster in ‘*Material Research Society (MRS) Fall Meeting*’, held at Material Research Society, Massachusetts, USA during 27 November - 02 December, 2016.

Title of the presentation: Graphitic Carbon Nitride and Zinc Oxide based 2D-1D Hybrid Heterojunction for Light Emitting Device Application

1. Presented a poster in ‘*International Conference on Complex and Functional Materials*’, held at S.N. Bose National Centre for Basic Sciences, Kolkata, India during 13 December -16 December, 2018.

Title of the presentation: 2D graphitic carbon nitride with modified light emission characteristics.