Dr. Mrinal Pal

Chief Scientist, CSIR-Central Glass and Ceramic Research Institute, Kolkata-32
palm@cgcri.res.in, mrinalp@yahoo.com, Mobile: 9433066938

Dr. Pal obtained his **M.Sc. degree in Physics from Calcutta University with First Class** and Ph.D. from Indian Association for the Cultivation of Science (IACS), Kolkata. He started his Post-Doctoral venture with a short term assignment at **University of Roma, Italy** under the framework of an **Indo-Italy exchange project**. He successfully completed the prestigious **Science and Technology Association (STA) fellowship** of **Govt. of Japan** during 1998-2000. He also made a short term visit to Kotel'nikov Institute of Radio-engineering and Electronics, ***MOSCOW*** under an **Indo-Russian exchange project** to carry out some research work. Dr. Pal joined as a **Lecturer in Physics at The University of Burdwan** 2002 and prompted to Senior Lecturer, Assistant Professor (grade three). He moved to **CSIR-Central Mechanical Engineering Research Institute (CSIR-CMERI)**, **Durgapur,** in 2010 as **Principal Scientist (senior scale)**. Presently, he is a **Chief Scientist (Sr. Professor equivalent) at CSIR-Central Glass and Ceramic Research Institute (CSIR-CGCRI), Kolkata.**

For more than **30 years** he has been doing research in the area of Nanomaterials precisely functional nanocomposites including **gas sensors, multiferroic nanocomposites, magnetic nanocomposites, spintronics material, perovskite, glass and glass-ceramics.** He has published more than **125 research articles** in the International Journals of high repute. Dr. Pal has supervised **10 Ph.D.**'s, **2 candidates** are pursuing. He **completed 12 Major** Research Projects **and few are ongoing** sanctioned by National funding agencies. He contributed **5 Chapters** in the different important books including **Encyclopaedia on Nanoscience and Nanotechnology**. His Google scholar citation is 4750 + and H-index 39. He has also delivered several **Plenary /keynote /invited** talks in the conferences, acted as a **Chairman** for various technical sessions and also **organised many conferences in various capacities.** He has been serving as one of the potential Referees to various International Leading Journals. He is **Life member of several research society** and serving /served as key members .

Dr. Pal's Awards and Honors:

- Recipient of the **Materials Research Society of India (MRSI) Medal** (2016)
- **Fellow** of the West Bengal Academy of Science and Technology (2018)
- **Visiting Scientist** at S.N. Bose National Centre for Basic Sciences (2008-2010)
- Prestigious **STA Fellowship of the Government of Japan** (1998-2000)
- **CSIR-NET JRF qualified (1991)**
- **Top cited paper award: IOP Publishing, 2023**

Administrative Experience:

- **Head:** Functional Materials and Devices Division, CGCRI, 2022 – Till date
- **Chairman:** Technical & Purchase Committee (above 25 Lakhs), CGCRI (2019-2023)
- **Coordinator:** Joint UGC-CSIR NET (2019), West Bengal
- **Executive Committee Member:** West Bengal State Council of Science and Technology, India (2014-2018, 2023-----)
- **Chairman:** Work, Planning & Execution Committee (WOPEC), CGCRI (2024 - present)
- **Nodal Officer:** RTI, CGCRI, 2021 – Till date
- **Management Representative:** ISO 9001:2015, CGCRI, 2018-19.
- **Chairman:** Security tender committee, 2025 -
- **Court Member:** The University of Burdwan (2008-2010), India
- **Reviewing Officer:** Scientists, Technical Officers, and Technical Assistants in the Division
- **Member:** Collegium and Empower Committee.
- **Chairman:** Infrastructure audit committee, CGCRI, 2024.
- **Chairman:** Emerging trends in advanced materilas (ETAM-2025)

BIO-DATA

1. Name: DR. MRINAL PAL

2. Date of Birth: 06.06.1966

3. Gender: Male

4. Nationality: Indian

5. Current Position and Address:

Chief Scientist & HEAD
Functional Materials and Devices Division
CSIR- Central Glass and Ceramic Research Institute
Kolkata – 700032
email: palm@cgcri.res.in, mrinalp@yahoo.com

6. Educational Qualifications:

Degree	Discipline	University	Year
B.Sc.	Physics (Hon)	Calcutta Univ.	1986
M.Sc.	Physics (Solid State Special)	Calcutta Univ.	1990
Ph.D.	Science	IACS (Jadavpur Univ.)	1997
Rastra Bhasa	Praveen (Hindi)	Govt. of India.	2011

7. Employment / Research Experience

Sl. No.	From	To	Name of Organization	Position held
1	**2022**	**Till date**	CSIR-Central Glass and Ceramic Research Institute (CGCRI)	**Chief Scientist**
2.	2016	2022	CSIR-Central Glass and Ceramic Research Institute (CGCRI)	Senior Principal Scientist
3.	2014	2016	CSIR-Central Glass and Ceramic Research Institute (CGCRI)	Principal Scientist
4.	2010	2014	CSIR-Central Mechanical Engineering Research Institute (CMERI)	Principal Scientist
5.	2006	2010	The University of Burdwan	Sr. Lecturer
6.	2002	2006	The University of Burdwan	Lecturer

POSTDOCTORAL RESEARCH EXPERIENCE				
1.	2000	2002	Institute Association for the Cultivation of Science, **India**	CSIR- Research Associate
2.	1998	2000	NIMC, AIST, Govt. Of **JAPAN**	Science and Technology Association (STA) Postdoctoral fellow
3.	1998	1998 (Four Months)	University of Roma, **ITALY**	Visiting Scientist

8. Administrative responsibility

Head: Functional Materials and Devices Division
Chairman: Technical & Purchase committee (above 25 Lakhs), CGCRI, 2019 - 2023
Coordinator: Joint **UGC-CSIR NET** 2019, West Bengal.
Executive committee member: West Bengal State Council of Science and Technology, India (2014-2018, 2021-2023)
Chairman: Work, Planning & execution committee (WOPEC), CGCRI, 2024 –
Nodal Officer: RTI, CGCRI.
Management representative: ISO 9001: 2015.
Court member: The University of Burdwan (2008-2010), India.
Reviewing officer: All Scientists, Technical Officers, Technical Asst. of Division
Member: Collegium and Empower committee, CSIR-CGCRI

9. Honours/Awards received:

Fellow: West Bengal Academy of Science and Technology – **2018**
MRSI Medal – 2016
STA fellowship (JISTEC) of Govt. Of Japan (1998-2000).
CSIR fellowship (JRF) of Govt. Of India, 1991.
Bharat Joyti Award 2012 honoured by India International Friendship Society (IIFS).

10. Other significant activities

Convenor-Fellow Sectional committee – II (Physical Sciences), West Bengal Academy of Science and Technology (WAST)
Expert panel member: "Nanotechnology in Agriculture", ICAR, India.
Member: Collegium and Empower committee
Reporting Officer: Divisional Scientists, Technical officers / Assts.
UGC-CSIR NET: Coordinator (West Bengal), 2019
Honorary Visiting Associate at S. N. Bose Centre (2007-2010).
Planning committee member: West Bengal State Council of Science and Technology, India (2014-2018).
Member: West Bengal State Council of Science and Technology, India (2018-2021).
Editor-in-Chief: Journal of Modern Nanotechnology.
Associate Editor: Frontier in Chemistry (Nanoscience)

Guest editor: Some special issues in different high impact journal.
Selection committee: Served as expert / member of committees.
Advisory Board member. South African Nanotechnology Initiative (**SANI**), 2012-16
Conference organized: Organized Conference / Workshop /Seminar
Chaired several technical sessions in seminar / conferences.

11. Research experience

28 years (after Ph.D.)

12. Teaching experience

Eight years P.G. teaching at University of Burdwan
Six years teaching in ACSIR.
Courses Taught: Solid state physics / Condensed matter physics, Materials science
Courses Designed: Solid state physics, Materials characterization, Electro ceramic.

13. Dissertations supervised:

(a) **Ph.D.**: **9** completed, **3** (continuing)
(b) **Post Graduation**: **30 +**

14. **Number of Research Publications: 120 +**

H-index: 39 Citation: 4600 + (Source: Google scholar)

15. Projects undertaken:

Completed 10 Major research projects.

16. **Number of Books / proceedings authored/edited:**

Book chapter contributed: **FIVE**

17. Plenary / Keynote /Invited /Popular Lecturers: Deliver more than 50.

18. Area of Specialization:

Materials synthesis: Preparation of materials (amorphous, crystalline, thin film, powder) both in bulk and nanocrystalline forms using physical as well chemical route. Solid state reaction, melt-quenching, ball-milling, sputtering and laser ablation are commonly used physical process. Sol-gel, hydrothermal, co-precipitation solution reduction are among the chemical process.

Characterization of materials: Structural and microstructural characterization of synthesized materials using DTA-TGA, SEM, XRD, TEM, FTIR, UV-VIS, BET surface area etc. Determination of microstructural parameters like lattice parameters, particle size, lattice, strain, porosity.

Studies on materials properties: Various properties like, electrical, optical, magnetic, gas sensing study to established a structure-property correlation ship.

Magnetic: M-H hysteresis loop, FC-ZFC study, Mossbauer, EPR studies of various Ferrites both in bulk and nanocrystal line form to improve magnetic properties by doping / morphological changes.

Gas sensing: Sensitivity study (resistive sensor) at various temperature and concentration of target gas.

Electrical: Current-voltage (IV), conductivity, relaxation, dielectric, magneto-dielectric, P-E hysteresis loop.

Optical: UV-VIS study, determination of band gap, Photoluminescence study.

Glass-ceramics: Studied various glass and glass ceramic systems prepared by melt-quenching / sol-gel technique to create multifunctionallity as well as improved performance.

19. Professional Affiliations:

Materials Research Society of India (MRSI) - Life member (no. LMB117)
Indian Association for the Cultivation of Science - Life member (no.2890)
Thermophysical Society of India (TPSI) - Life member (no. L070)
Magnetic Society of India (MSI) – Life member (no. LM739)
Electron Microscopy Society of India (EMSI) – Life member (no. LM1353)
Ceramic Society of India - Life member (No. EL-760).

20. Highlights of contributions to the area of specialization:

- ***Developed Ferrite based magnetic materials*** *having* ***improved properties*** *for different applications.*

- Nanocomposite based gas sensor for ***monitoring human health by analysing exhale breath.***
- ***Developed prototype*** developed for human ***exhale breath analysis to monitor diabetes (patent filled).***

- Defect controlled emission study of nanocrystalline pristine ZnO ***synthesized by chemical route***. We have achieved ***novel multiple phosphorescence*** in nanocrystalline pristine ZnO for the first time. We are inching towards ***White LED*** just from ***pristine ZnO which is quite new.***

- Enhancement of multifunctionality of nanocrystalline bismuth ferrites (BFO) ***through chemical /coprecipitation route*** by tailoring size and suitable doping. We are able to achieved very ***high magnetodielectric*** constant in BFO by doping.

- Optical and electrical study of nanocrystalline ZnO prepared by ***soft chemical route***. We have reported ***novel blue and violet emission from ZnO nanorings*** prepared through template free method.

21. Patent filled / granted: 1 (filled) + 1 (underprocess)

"A Breath Analyzer System for the Detection of Diabetes and a Process for The Preparation Thereof" Patent filled: 0238NF2024/IN,

LIST OF PUBLICATION

1) Spinel Chromite MCr2O4 (M = Cu, Mg, Zn) Nanoparticle-Based Sensors for Trace Acetone Detection and Non-Invasive Diabetes Diagnosis from Exhaled Breath"
Authors: Mojumder, Subhajit; Das, Tanushri; Das, Sagnik; Das, Subhajit; Biswas, Maitrayee ; Ghosh, Srabanti; **Pal, Mrinal*** *ACS Applied Nano Materials* **8** (2025) 6188

2) Synergistic effect of $ZnO–ZnFe_2O_4$ heterostructures for enhanced surface catalytic activity in Cr (vi) reduction, green H_2 generation and CO sensing: an experimental study … Subhajit Mojumder, Tanushri Das, Sanchi Monga, Prantik Bhattacharya, Sourabh Pal, Srabanti Ghosh, Saswata Bhattacharya, **Mrinal Pal***. *Nanoscale*, **17** (2025) 5941

3) Improved ammonia sensing performance achieved through defect modulation by Li doping in cauliflower-like ZnO for exhaled breath analysis towards renal diseases detection: An experimental venture supported by DFT calculation …S Mojumder, T Das, T Mondal, S Ghosh, D Saha, CK Ghosh, **M Pal*** *TrAC Trends in Analytical Chemistry*, **180** (2024) 117896

4) $BiFeO_3$ Nanoparticles Embedded on α-MoO_3 Nanorods: A Heterostructure for Oxygen Vacancy-Driven Photocatalytic Activity and Gas Sensing. T Das, S Mojumder, D Sarkar, S Ghosh, **M Pal*** *ACS Applied Nano Materials* **7** (2024), 25675-25692

5) Highly sensitive and selective rGO-LaFeO3 nanocomposite based formaldehyde sensors towards air quality monitoring. S Dash, S Mojumder, T Das, D Saha, **M Pal*** *Chemosphere* **367** (2024) 143499

6) Multifunctional $NaEu(WO_4)_2$: defect-tuned red emission and acetone sensing at room temperature. KR Sahoo, T Das, **M Pal,** MR Karim, AH Seikh, CK Ghosh *Materials Advances* **5** (2024) 8238

7) Enhanced triethylamine detection at room temperature using layered MoS_2 nanosheet coated PPy nanorod: A comprehensive study. Monalisa Adhikari, Debdulal Saha, Dipankar Chattopadhyay, **Mrinal Pal*** *Langmuir*, **40** (2024) 15767

8) Highly sensitive and selective chemiresistive temperature-dependent trace formalin sensor using hydrothermally grown hexagonal yttrium ferrite. S Mojumder, T Das, D Saha, **M Pal*** *Materials Chemistry and Physics* **319** (2024) 129329

9) A truncated octahedron NaCe $(MoO_4)_2$ nanostructure: a potential material for blue emission and acetone sensing. N Haldar, T Mondal, T Das, D Sarkar, **M Pal,** AH Seikh, CK Ghosh *Materials Advances* **5** (2024) 4480

10) Enhanced ammonia sensing performance of barium hexaferrite enabled through Zn doping: Mechanistic study considering modulation of Fe^{2+}/Fe^{3+} ratio and oxygen vacancy. T Das, S Mojumder, D Saha, **M Pal*.***Sensors and Actuators B: Chemical* **406** (2024) 135358

11) Development of highly sensitive and selective trace acetone sensor using perovskite yttrium ferrite: Mechanism, kinetics and phase dependence study. S Mojumder, TDas, M Mukherjee, D Saha, A Datta, **M Pal*.** *Chemical Engineering Journal* **477** (2023) 146855

12) Improved Ethanol Sensing Performance of α-MnO2 Nanorods at Room Temperature Enabled through PPy Embedding, M Adhikari, D Saha, D Chattopadhyay, **M Pal*** *Langmuir* **39** (2023) 12248

13. Beneficial effect of Pd and MWCNT co-loading in SnO_2 nanoparticles towards the low temperature detection of n-butane gas: synergistic effect on sensing performance, P Rana, M Narjinary, A Sen, **M Pal***. *Sensors & Diagnostics* **2** (4), (2023) 909

14) Facile and Green Synthesis of Novel Fluorescent Carbon Quantum Dots and Their Silver Heterostructure: An In Vitro Anticancer Activity and Imaging on Colorectal, S Mishra, K Das, S Chatterjee, P Sahoo, S Kundu**, M Pal***, A Bhaumik, *ACS omega* **8** (2023) 4566

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17) Band gap engineered Sn-doped bismuth ferrite nanoparticles for visible light induced ultrafast methyl blue degradation. S Chakraborty, N Chakraborty, S Mondal, **M Pal*** *Ceramics International* **48** (24), (2022) 37253

18) Y and Al co-doped ZnO-nanopowder based ultrasensitive trace ethanol sensor: A potential breath analyzer for fatty liver disease and drunken driving detection. S Mojumder, T Das, S Das, N Chakraborty, D Saha, **M Pal*** *Sensors and Actuators B: Chemical* **372** (2022) 132611

19) Beneficial effect of Sn doping on bismuth ferrite nanoparticle-based sensor for enhanced and highly selective detection of trace formaldehyde, T Das, S Mojumder, S Chakraborty, D Saha, **M Pal*** *Applied Surface Science* **602** (2022) 154340

20) Influence of major parameters on the sensing mechanism of semiconductor metal oxide based chemiresistive gas sensors: A review focused on personalized healthcare. S Das, S Mojumder, D Saha, **M Pal*** *Sensors and Actuators B: Chemical* **352** (2022) 131066

21) White light phosphorescence from ZnO nanoparticles for white LED applications. S Das, UK Ghorai, R Dey, CK Ghosh, **M Pal*** *New Journal of Chemistry* **46** (2022) 17585

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23) Effect of annealing on the defect mediated blue phosphorescence in ZnO nanocrystals, Sagnik. Das, Uttam Kumar Ghorai, Rajib Dey, Chandan Kumar Ghosh and **Mrinal Pal*.** *RSC. Adv.,* **11** (2021) 335

24) Microporus copper chromite thick film based novel and ultrasensitive capacitative humidity sensor., P.L. Mahapatra, S. Das, P.P. Mondal, T.Das, D. Saha, **M. Pal***. *J. Alloys and Comp.,* **859** (2021) 157778

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27) Novel barium hexaferrite based highly selective and stable trace ammonia sensor for detection of renal disease by exhaled breath analysis., T. Das, S. Das, M. Karmakar, S. Chakraborty, D. Saha and **M. Pal*.** *Sensor and Actuator B:* **325** (2020) 128765

28) Non-invasive monitoring of human health by exhaled breath analysis: A comprehensive review., S. Das and **M. Pal***, *J. Electrochemical Soc.*, **167** (2020) 037562

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33) Highly selective and stable acetone sensor based on chemically prepared bismuth ferrite nanoparticles, Sonam Chakraborty and **Mrinal Pal***, *J.Alloy. Comp*. **787** (2019) 1204

34) A Light Induced Tunable n-Doping of Ag Embedded GO/RGO Sheets in Polymer Matrix, N. Singh, D. Kothari, J. Ansari, **M. Pal,** S. Mandal, S. Dhara and A. Datta, *J. Phys. Chem. C*. 123 (2019) 10557.

35) Impact of morphology on the electrical and photocatalytic property of CdS nanostructures, Sonam Chakraborty, Sucheta Sau and **Mrinal Pal*,** *Mater. Today: Proceedings*, 18 (2019) 5481

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38) Effect of yttrium doping on structure, magnetic and electric properties of nanocrystalline cobalt ferrites, S. Chakraborty, A. Datta and **M. Pal*,** *J. Mag. Mag. Mater*., **461** (2018) 69

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40) Highly efficient novel carbon monooxide gas sensor based on bismuth ferrite nanoparticles for environmental monitoring. S. Chakraborty and **M. Pal*,** *New. J. Chem*., **42** (2018) 7188

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43) Improved sensitivity of CdS nanoparticles by virtue of calcium doping: Promising candidate for monitoring alcohol in exhale human breath, S. Chakraborty and **M. Pal*,** *Materials & Design*, **126** (2017) 18

44) Improved ethanol sensing behaviour of cadmium sulphide nanoflakes: Beneficial effect of morphology, S. Chakraborty and **M. Pal*,** *Sensor Actuator B,* **242** (2017) 1155**.**

45) Enhanced and selective acetone sensing properties of SnO2-MWCNT nanocomposites: Promising materials for diabetes sensor. M. Narjinary, P. Rana, A. Sen and ***M. Pal*,*** *Materials & Design, **115** (2017) 158*

46) Nanoporous γ-alumina based novel sensor to detect trace moisture in high temperature and high pressure environment, D Saha, DK Ghara, **M Pal*,** *Sensors and Actuators B: Chemical* **222**, (2016) 1043.

47) Enhanced magnetic properties of Mn-Ni codoped cobalt ferrite nanoparticles corroborated with microstructural analysis. Sabyasachi Chakrabarty · **Mrinal Pal** and Abhigyan Dutta, *Adv. Sc. Lett.,* **22** (2016) 89.

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49) Multifunctionality in graphene decorated with cobalt nanorods. O. Mondal, **M. Pal**, D. Chakravorty and A. Dutta, *Materials & Design,* 101 (2016) 204

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Manisha Pal and **M. Pal***. *Jpn. J. Appl. Phys.*, **44** (2005) 7901.

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M. Pal*, and D. Chakravorty, *PHYSICA E* ., **5** (3) (2000) 200.

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M. Pal, P. Bramha and D. Chakravorty, *J. Mag. Mag. Mater*. **152** (1996) 370.

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M. Pal, P. Brahma and D. Chakravorty, *J. Phys. Soc. Jpn.* **63** (1994) 3356.

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A.Mukherjee, M. Banerjee, S.Basu and **M. Pal**, *AIP Con. Proc*., **1591** (2014) 1339.

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Book (chapter contributed)

128) Superplastic Nanoceramics
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S. Mondal, H. Dutta, S.K. Pradhan and **M. Pal***, *"Dielectrics and Ferroelectrics: Modern Perspectives"* 2008.

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PLENARY /KEYNOTE /INVITED TALK DELIVERED

1) Fourth International Conference on Material Science (ICMS-2024)" during 31st Jan., – 2nd Feb., 2024, Tripua University.
2) "International Conference on Emerging Multifunctiona l Materials and Devices for Sustainable Technologies (IEMDST-2024)" hosted by Department of Physics, National Institute of Technology (NIT), Warangal, India.
3) Delivered Keynote talk in International Conference on Processing and Characterization of Materials on 5-7th December 2024, NIT Rourkella.
4) Invited Talk delivered in one day Symposium on "Sensors for Society" JNU, Delhi, , 2023.
5) Deliver talk as a Resource person in Refresher Course entitled with "Contemporary Issues of Nanoscience and Nanotechnology", Jadavpur University, January, 2023 (Online mode)
6) Deliver talk as a Resource person in Refresher course in Chemistry at University of Calcutta, December, 2022 (Online mode)
7) Invited talk delivered in 4th International conference on Sensors and Transducers UEMCOS2022, September, 2022
8) Invited Talk delivered in 29th National Conference on Condensed Matter Physics - Condensed Matter Days (CMDAYS21) during December 10-12, 2021 organized by Central University of Jharkhand.
9) Invited Talk delivered in 65th DAE Solid State Physics Symposium (DAE-SSPS 2021) during December 10-12, 2021 organized by BARC , Mumbai.
10) Keynote speaker in "Diabetes Conclave 2021" Global Virtual Summit on Diabetology and Endocrinology on 8th March, 2021.
11) Invited talk delivered in "India – Russia Scientific Webinar on Materials Science on New materials and Nanotechnology" during 9-10 December, 2020, organized by Embassy of India, Moscow.
12) Invited Talk delivered in XII biennial National Conference of Physics Academy of North East (PANE 2021) during 15-17 December, 2021, organized by Tripura University.
13) Plenary talk delivered in "International conference on nanomaterials driven advances in chemical and biosensors (NanoSe 2019)", at Alagappa University, 2019
14) Plenary lecture delivered in "International conference on nanomedicine (ICON-2019)" at Madurai Kamraj University, 2019.
15) Plenary lecture delivered in a Workshop on "Fabrication of Optoelectronics devices and Sensors Hands-on-Experience" at NIT Warangal, 2019.
16) Delivered Invited talk in International Conference on Materials Science (ICMS-2020), at Tripura University.
17) Delivered Invited talk in International Conference on "Synthesis, Characterization and Application of Nanomaterials (SCAN 2019)" during 1-2 Nov, 2019 at Kolkata, Organized by IEI.
18) Delivered Invited talk in International Conference on Recent Advances in Chemical, Pharmaceutical and Life processes (RACPL-2019) at Andhra University.
19) Delivered Invited talk in Industry-Institute Interaction meet at NIT, Durgapur held on 13th August, 2019.
20) Delivered invited talk in 4th International Conference on Nanoscience and Nanotechnology (NanoAfrica 2012), During 1-4th April, 2012 at Bloemfontein, South Africa.

21) Delivered invited talk in 7th BANGALORE NANO 2014, India.
22) Delivered invited talk in International conference on Nanoscience and Nanotechnology "ICONN-2015" Chennai, India.
23) Delivered invited talk in International Conference on Nanoscience, Engineering and Technology (ICONSET-2011), India.
24) Delivered **MRSI Award lecture** at NEIST, Jorhat during MRSI symposium – 2016.
25) Delivered invited talk in International conference on Nanoscience and Nanotechnology (NanoSciTech 2012) at Punjab University, Chandigarh, India, 2012.
26) Delivered invited talk in 21st International symposium on Processing and Fabrication of advanced materials (PFAM21), IITG, 2012.
27) Delivered invited talk in 3rd International conference on "Recent Advances in Materials Processing Technology "RAMPT-13" Tamilnadu, India.
28) Delivered invited talk in"International conference on Materials Science (ICMS2013)" at Tripura University, 2013.
29) Delivered invited talk in International Workshop on "Futuristic Materials: Characterization, Properties and Applications in Technology FMCPAT-2014" Rohilkhand University, UP, India.
30) Delivered invited talk in 4th International conference /workshop on computational condensed matter physics and materials science (IWCCMP-2016), Gwalior, India.
31) Delivered invited talk on "Nanostructured Metal Oxide Semiconductor based Gas Sensors for Healthcare" by Mrinal Pal, 2nd International on Materials Science (ICMS 2017), organized by Tripura University during 16-18 February.
32) Delivered Invited talk in International Conference on Nanotechnology (ICN:31 -2017) at IIT Roorkee, during 6-8th December, 2017.
33) Invited talk delivered in 1st International conference on ubiquitous and emerging concepts on sensors & transducers UEMCOS2019, University of Engineering and Management, 2019.
34) Delivered invited talk on "Magnetic Nanocomposites" at S. N. College, Kolkata, 2006.
35) Delivered invited talk on "Nanostructured Materials" at St. Edmond College, Shilong, India, 2007.
36) Delivered invited talk on "Magnetism and magnetic Materials" at Ramananda College, Bishnupur, W.B., India, 2008.
37) Delivered invited talk on "Magnetic materials and its applications" at Govt. College of Textile Engineering, Serampore, W.B., India, 2008.
38) Delivered invited talk on "Nanoscience and Nanotechnology" at Barasat Govt. College, 2009.
39) Deliver lecture in National Symposium of Nanoscience and Technology (NANOSTech 2011), Kerala.
40) Deliver lecture in 6th National Conference on Thermophysical Properties (NCTP-2011) at BHU, India.
41) Deliver lecture in a National Conference on Recent Trends of Research in Physics, Tripura University, 2012.
42) Delivered talk in "Second National Seminar on Recent Trends in Condensed Matter Physics including Laser Application (SNSCMPLA 2012)", Burdwan University, 2012.
43) Delivered presentation in "National conference on Innovative molecules for sustainable future (NCIMSF-2013)", Thappar Univiersity.
44) Deliver invited lecture in National conference on Microwave communication and devices at Vidyasagar University, 2014

45) Delivered presentation in "National workshop on "Physics of Low Dimensional Structures (PLDS-2015)" at Vidyasagar University.
46) Invited talk in "Advanced Nanomaterials: Characterizations and Applications (WANCA-2015)" during Nov., 2015, BHU, India.
47) Invited Talk in "Advanced Materials & Nanotechnology (AMN-2016), Durgapur, India.
48) Invited Talk in "National Symposium on Advances in Chemical Sciences (NSACS-2017)" Organized by Assam University, Silchar – 2017.

Resource person

49) Resource person of "Refresher Course in Advances in Nano-Science and Nano-Technology", conducted by the UGC – Human Resource Development Centre, The University of Burdwan from 26.11.2021 to 09.12.2021.
50) Delivered a presentation as a Resource Person in Faculty development program (FDP) at National Institute of Technical Teachers Training and Research (NITTTR), Chandigarh on 24th September, 2020.
51) Delivered lecture in National Workshop on Quantum Perspective on Advandec Materials (QPAM-11) at Vidyasagar University 2011.
52) Delivered talk in "Workshop on Advanced Functional Materials", NIT Durgapur, 2013.
53) Delivered presentation in "Workshop on Nanomaterials: Synthesis, Characterization and Applications", NIT Durgapur, 2014.
54) Delivered presentation in Refresher course on "Thin films and Nanoscience" at Tripura University, 2015.
55) Delivered presentation in "2nd Refresher course on Nanoscience and Nanotechnology" during August, 2015 at The University of Burdwan.
56) Delivered presentation in Short term course on "Advanced Materials and Processing (AMP-2017)" Organised by Department of Physics, NIT Durgapur, 2017.
57) Invited talk delivered in "National workshop on emerging sensor technologies" organized by Department of Nanoscience and Nanotechnology, Bharathiar University, Coimbatore, 2019.
58) Invited talk delevered in a Refresher course organised by Faculty Development Council of Tripura University on 1st March, 2019.
59) Invited talk delivered in Short term course on "Fundamentals and recent advances in nanomaterials (FRAN-2019)" at NIT, Durgapur.

Popular lecture:

60) Deliver lecture on "Renewable energy for sustainable future" in a science camp on "Vigyan O Amra" organized by JBNSTS, 2014.
61) Deliver lecture on "Semiconductor nanostructured based breath sensor towards human health monitoring" in International Conference on Material Science (ICMS2024) organized by Tripura University.
62) Deliver lecture on "Semiconductor nanostructured based gas sensors towards healthcare application" in Physicists' Conclave 2024 (NPC 2024) organized by SRM Institute of Science and Technology.

63) Deliver lecture on "Semiconductor nanostructured based gas sensor for affordable healthcare" 29th International Conference on Processing and Fabrication of Advanced Materials (PFAM-XXIX Sep 2023) organized by IIT Tirupati.
64) Deliver lecture on "Breath sensor towards improve healthcare" in International Conference on Translational Research (*ICTR) organized by* AIIMS, New Delhi.
65) Deliver lecture on "Superstition and science" in an awareness camp 2014.
66) Deliver lecture on "Renewable energy" in a science awareness camp in 2013.
67) Deliver lecture on Magnetism, Magnetic materials and Application, Vidyasagar College for Women, Kolkata, 2013.
68) Deliver lecture on "Introduction to Nanoscience and nanotechnology" 2007.

Technical Session Chaired / Chairperson / Honourable judge:

1. 4th International conference on Nanoscience and Technology (NanoAfrica 2012), Suoth Africa.
2. National conference on Recent Trends of Research in Physics, 2012, Tripura University, India.
3. 21st International symposium on Processing and Fabrication of advanced materials (PFAM21), IITG, 2012.
4. National conference on Innovative molecules for sustainable future (NCIMSF-2013), Thappar Univiersity.
5. National Conference on Nanotechnology: Materials and Applications (NCoN:M&A) – 2016.
6. National Conference on Characterization of Nanomaterials – 2016, Ramananda College, Bishnupur, West-Bengal.
7. "National Symposium on Advances in Chemical Sciences (NSACS-2017)" Organized by Assam University, Silchar – 2017.
8. 2nd International on Materials Science (ICMS 2017), organized by Tripura University during 16-18 February.
9. International Conference on Nanotechnology (ICN:31 -2017) at IIT Roorkee, during 6-8th December, 2017.
10. 125th Birth Anniversary of Satyendra Nath Bose Bose Tagore National Advanced Workshop on "Recent Advances in Condensed Matter Physics: Theory and Experiment" (NAWCMP - 2018), Visva-Barati, India.
11. Act as a Judge to evaluate e-poster in NCRDNN 2019 at Jadavpur University during 29th January, 2019.
12. Technical session chaired at ICONSAT-2020.
13. Technical session chaired at Vidyasagar - Satyendranath Bose National Workshop 2023.

Organizers/ Member of Important Committees:

1) Secretary, National Workshop on Advanced Laser and Nanomaterials (**NWALNM 2005**), India.
2) Secretary, National Workshop on Characterization of Laser and Nanomaterials (**NWCLNM 2006**), India.
3) Secretary, Third National Workshop on Characterization of Laser and Nanomaterials (**TNWCLNM 2007**), Burdwan, India.
4) Secretary, Fourth National Workshop on Characterization of Laser and Nanomaterials (**FNWCLNM 2007**), Burdwan, India.
5) Jt. Secretary, International conference on "Radiation Physics and Applications (**ICRPA-2010**)" at Burdwan, India.
6) Jt. Organizing Secretary, National Symposium on Advanced Functional Materials-(**NSAFM-2013**)" at Central Mechanical Engineering Research Institute, India.
7) Convener of One day Awareness Program on **ISO 9001: 2015**.
8) Organizing Secretary, **31st MRSI-AGM cum 2nd Conclave, 2020**.
9) Organizing committee member, **ICOSAT-2020**.
10) **Chairman** of MRSI-YSC-2022, Organized by MRSI Kolkata Chapter.

Projects undertaken:

1. Development of graphene metal nanocomposites based ammonia sensing device for medical application.

*(A major research project supported by **DST**, During 2018-2021)*

Principal Investigator (P.I.): Mrinal Pal

2. Development of an array based low temperature sensing devices for early detection of multiple diseases by monitoring exhales breath.

*(A multi institutional network project supported by **CSIR**, During 2020-2022)*

P.I.: Mrinal Pal

3. Novel boron-rich B-C, B-O and B-P phases for sensing applications in harsh environment: establishing correlation between charge-density distribution and sensing property".

*(A major research project supported by **DST,** During 2018-2021)* **Co-P.I.: Mrinal Pal**

4. Nano-Biosensors and Microfluidics for Health Care

*(A multi institutional network project supported by **CSIR**, During 2018-2020)*

P.I.: Mrinal Pal

5. RARE EARTH DOPED NANOCRYSTALLINE SPINEL FERRITES: Promising materials for magneto-optical storage media. *(Major research project supported by **DST**, 2006-2009.* **P. I. Mrinal Pal**

6. Mesoscopic Strucutral Investigation Using SANS on TMI-doped Nanocrystalline ZnO: Promising DMS for Spintronics Devices"

*(Major Research Project supported by **UGC-DAE** Consortium for Scientific Research, Duration 2009-2011)* **P.I. Mrinal Pal**

7. Design and Exploration of Nanocrystalline Multiferroics Materials
*(Major Research Project supported by **BRNS**, Duration 2011-2014, **GAP 190912**)*
P.I. Mrinal Pal

8. Permanent magnetic materials based on hexaferrite nanocomposites"
*(Major Research Project supported by **CSIR**, Duration 2011-2014, **OLP 190812**)*
P.I. Mrinal Pal

9. Development of Breath Sensor based on nanocomposites for noninvasive monitoring of Diabetes.
(Part of a multi-crore Network project sponsored by **CSIR** 12 FYP),
P.I. Mrinal Pal

10. Investigation on synthesis and properties of magnetic nanostructures and nanocomposites by electromagnetic methods
*(An Indo-Russian project supported by **DST**)* **Co-P.I. Mrinal Pal**

11. Development of energy efficient materials for next generation (DNEED).
(Part of a multi-crore Network project sponsored by **CSIR** 12 FYP),
Develop of permanent magnet for motor based on NdFeB. **Member**

Editorial service

1). Special Editor
Scientific reports (Nanotechnology)

2). Associate Editor
Frontier in Chemistry (Nanoscience)

3). ChemXpress
Trade Scientific Inc.
Editorial Board member

Guest Editor:
a). Special issue "***Analytical Methodology for the Detection of Clinical Volatile Organic Compounds (VOCs) for Biomedical Applications" in "Frontier in Chemistry"***

b). Special Issue *"**Chemoresistive gas sensors based on low dimensional semiconducting nano-structures" in "SENSORS"***

c**)** Special Issue on *"**Inorganic Organic Nanostructure" Journal of Modern Nanotechnology***

Academic activities:

1). Ph. D. Thesis examiner.
2) Ph. D. Thesis Interview expert for conducting viva-vocie.
3) S.R.F. selection committee external expert.
4) External examiner B. Sc. (practical).
5) External examiner (practical) of M. Tech.
6) External Question paper setter of various Universities.
7) Organised several conference /seminars in various capacity.

Reviewer:

Dr. Pal is the honorary reviewer of several prestigious international journals. Some of those are mentioned below ….

1. J. Mater. Chem. C
2. Reviewer of various Govt. sponsored Projects.
3. ACS Applied Materials and Interface
4. J. Mater. Chem. A
5. Materials Horizon
6. Sensor actuator B.
7. Chemical Engineering Journal

Miscellaneous:

Deliver popular science lectures on different relevant issues in order to motivate University, College and School students.

Delivered lectures for beginners (Ph.D.) in various workshops.

Reviewing Officer of several junior staffs.

Served as Court member of The University of Burdwan.