Curriculum Vitae

***Riyanka Das***

***DST-INSPIRE Fellow (*Govt. of India)**

**PhD in Chemical Sciences (AcSIR & CSIR-CMERI, India)**

**Thesis Title: *Synthesis and detailed characterization of redox non-innocent sensory receptors via C-N bond formation reaction and their versatile real-field sensing applications* (Supervisor: *Dr Priyabrata Banerjee, FRSC* (Professor, AcSIR and Senior Principal Scientist) (CSIR-RRF and top 2% scientist), Co-Supervisor: *Dr Naresh Chandra Murmu* (Director, CSIR-CMERI) (Alexander von Humboldt fellow, CSIR-RRF, FNSc., FNAE)**

**Current Affiliation:**

***WPI-SKCM2 Post-Doctoral Fellow******(Hiroshima University, Japan)***

**International Institute for Sustainability with Knotted Chiral Meta Matter (WPI-SKCM2), Hiroshima University 2-313 Kagamiyama, Higashi-Hiroshima, Hiroshima, 739-8527, Japan.**

**(Mentor: *Prof. Takeharu Haino* (Professor, HU, Japan)**

SCI Journals: **25 |** 1st Authorship: **12 |** Patent: **01 |** Total impact factor: **131.3 |** citation: **605 |** h-index: **13 |** i10-index: **15 |** Book Chapters: **3 |** Magazine: **1**

|  |  |
| --- | --- |
| **Contact details** | **Website** |
| [riyanka.cmeri18a@acsir.res.in](mailto:riyanka.cmeri18a@acsir.res.in)  [riyankadas.cmeri@gmailcom](mailto:riyankadas.cmeri@gmailcom)  riyankadas.chem@gmail.com [riyankadas434@gmail.com](mailto:riyankadas434@gmail.com|) | [https://scholar.google.co.in/citations?user=3ydAG0MAAAAJ&hl=en/](https://scholar.google.co.in/citations?user=3ydAG0MAAAAJ&hl=en/%20)  <https://orcid.org/0000-0002-0089-4281/>  <https://www.researchgate.net/profile/Riyanka-Das> |
| Receiver +91 7908570885 | **Date of Birth:** 31st July, 1994 |

## Academic Qualifications:

* + **WPI-SKCM2 Post-Doctoral Fellow** **|** 2024-Present **| Hiroshima University, Japan**
  + **PhD |** 2018-2023 **| CSIR-Central Mechanical Engineering Research Institute, Durgapur & AcSIR, Ghaziabad, India (CGPA: 9.1)**
  + **M. Sc.|** 2015-2017 **| Presidency University**, Kolkata, India **(1st class second, 80.2%)**
  + **B. Sc. |** 2012-2015 **| Bankura Christian College, Burdwan University**, India **(1st class, 63.8%)**

## Awards and Distinctions:

* **WPI-SKCM2 start-up research fund** in 2024 by WPI, Hiroshima University, Japan.
* **Hiroshima University Encouraging Female Researcher Award** in 2024 by Hiroshima University, Japan.
* **WPI-SKCM2 Post-Doctoral Fellowship** in 2024 by WPI, Hiroshima University, Japan.
* Selected for **International Excellence Fellowship of KIT** and **Karlsruhe House of Young Scientists (KHYS) Aspirant Grant** in 2023 byKarlsruhe Institute of Technology (KIT), Germany.
* **Secured second position** in*International Conference on Convergence of Interdisciplinary Science* 2023 (ic2IS -2023) Organized by Science Dialectica and supported by SRF (Online poster presentation) (25th-26th Feb’23).
* **Best Poster Award** in *International Conference on Recent Trends in Chemical Sciences* 2022 (RTCS-2022) Organized by Indian Chemical Society, Kolkata and hosted by IIT (ISM), Dhanbad (16th-18th Dec’22).
* **Young Achiever Award** given by **Institute of Scholars**, Indiain 2021.
* **DST-INSPIRE Fellowship** in2018-2023 (Ph. D) by Govt. of West Bengal, India.
* **DST-INSPIRE Scholarship** in2013-2017 (Top 1% in India) (UG & PG) by Govt. of India.
* **West Bengal Govt. Merit-Cum-means Scholarship** in 2010-2012 (Class XI-XII) by Govt. of West Bengal, India.
* **West Bengal Govt. Merit-Cum-means Scholarship** in 2009 (Class IX) by Govt. of West Bengal, India.
* **West Bengal Govt. Scholarship** in 2004 (Class IV) by Govt. of West Bengal, India.

# PhD Research Expertise

* Premeditated synthesis of azomethine, phenazine and azophenine based smart, multi-tasker, cost effective and versatile by either catalyst-free or low catalyst load pathway for expeditious discerning of lethal cations, anions and volatile compounds from aqueous as well as target-specific biological matrices with low detection threshold.
* Utilization of column chromatographic technique as well as thin layer chromatographic technique for separation of more than one new chemosensors derived from a single-step C-N bond fusion reaction.
* Full-fledged characterization of the judiciously designed chemosensors via several sophisticated analytical instrumentations, like SC-XRD, ESI-MS, HR-MS, UV-Vis, fluorescence, FT-IR, EPR, 1H NMR, 13C NMR, cyclic voltammetry, etc.
* Detailed theoretical insight of the plausible sensing mechanistic pathway via density functional theory (DFT) study by analyzing the kinetic and potential energy values along with highest occupied molecular orbital (HOMO) and lowest unoccupied molecular orbital (LUMO) energy values.
* Selective and trace level recognition of lethal cations, anions and volatile compounds preferably from aqueous medium and other environmental (different real field water samples, like river water, tap water, sewage water, etc. and different food samples, like bitter almonds, sprouted potato) and physiological specimens, like bovine serum, blood plasma, human urine, etc.
* Development of cellulose paper based or TLC strip based contact mode analysis to validate on-site detection capability of the designed chemosensors.
* Analysis of the targeted analytes by smartphone assisted RGB APP along with fabrication of a user-friendly RGB based portable opto-electronic device by proper synchronization and interfacing of the chemically determined optical outputs with suitable electronic circuitry for accelerating the on-site detection capability of the targeted analytes, particularly in the remote areas.

# Post-Doctoral Research Expertise

* Multi-step organic synthesis of hitherto less explored unprotected as well as protected Trisresorcinarene based supramolecular host materials.
* Purification of each intermediate by gradient flash column chromatographic technique, TLC, Gel permeation chromatography (GPC) and medium pressure liquid chromatographic technique.
* Characterization of the desired compounds and the intermediate compounds by NMR spectroscopy.
* Extensive study of lipophilic macrocyclic host-guest chemistry with spectroscopic analyses in the domain of supramolecular chemistry.

# Hand on Expertise

* Gel permeation chromatography (GPC)
* medium pressure liquid chromatography (MPLC)
* Differential scanning calorimetry (DSC)
* UV-Vis spectroscopy
* Fluorescence Spectroscopy
* Magnetic Susceptibility Balance
* Ion selective electrodes/ pH meter
* FT-IR
* NMR Spectroscopy
* Cyclic Voltammetry
* Optical microscope
* Theoretical DFT

# Peer Reviewed Journals

**25.** M. Mondal, **R. Das**,R. Pal, S. Nag and Priyabrata Banerjee, Design and application of rhodamine derivatives in redox biology: a roadmap of the last decade towards artificial intelligence, ***J. Mater. Chem. A***, **2024**, 12, 21626-21676. (IF 10.7)

**24.** R. Pal, **R. Das**, A. Pal, B. S. Kapoor, K. Kundu, A. Thakur, S. S. Mukhopadhyay, P. Banerjee,Real time monitoring of heavy metal adulteration in biodiesel using Arduino UNO platform@A promising multi-purpose stimuli-responsive azomethine based chemoreceptor for hierarchical tri-ionic sensing, ***Microchem. J.***, 207, **2024**, 111739 (I.F. 4.9).

**23.** S. Bej, **R. Das**, R. Pal, and P. Banerjee, Conjoining the benefits of an additional phenyl ring in a simple Benzophenone hydrazone-based platform @discriminatory recognition of F- over CN- with quantitation of aqueous Cu2+: New tricks for an old dog, ***J. Mol. Liq.***, 411, **2024**, 125781. (IF 5.3)

**22.** A. Mondal#, M. Mondal#, **R. Das**#, M. Ghosh, A. Bhowmik, B. Biswas, P. Banerjee, A homobimetallic Nickel(II) complex for discriminative chromogenic recognition of aqueous Cyanide and Silver(I) from medicinal products: Role of end-on thiocyanate bridging, ***Inorganica Chim. Acta***, 573, **2024**, 122322. (I.F. 2.7) (***Invited Article***) (#Equal contribution).

**21.** S. Bhattacharjee#, **R. Das#**, T. Chakraborty, S. Bera, S. Ghosh, R. Bal, P. Banerjee, A. Bhaumik,A 2D pillared-layer co-based MOF as a “two-in-one” chemosensor for S2- with meticulous chemodosimetric screening of HSO4- in absolute aqueous medium and photo-induced CO2 conversion, ***Chem. Eng. J*., 2023,** 145238 (#Equal contribution) (IF 13.4).

**20. R. Das**, P. Banerjee, Engineering a *Two-in-one* Ni(II)-azophenine switch: Intelligent *Lab-on a-box* device for decentralized recognition event, ***Colloids Surf. A Physicochem. Eng. Asp.***, 677, **2023**, 132407. (IF 4.9)

**19.** A. Mondal#, **R. Das**#, A. Bhowmik, M. Ghosh, B. Biswas\*, P. Banerjee\*, Mutually independent pathways for one-to-two chemodosimetric recognition of Zn2+ and F- by a dimeric Nickel(II) complex: A potential biomarker sensor for copper deficiency myelopathy, ***J. Photochem. Photobiol. A***, **2023**, 441, 114748. (#Equal contribution) (IF 4.1).

**18.** N. R. Pandit,¥ S. Bej,¥ **R. Das,¥** N. Ghosal, A. Mondal, R. Pal, M. Ghosh, P. Banerjee and B. Biswas, Anion directed structural tuning of azomethine derived two Zn2+-complexes with optoelectronic recognition of Cu2+ from aqueous medium with Anti-cancer activities: Expedition from micromolar to femtomolar sensitivity with DFT revelation, ***Dalton trans.*** **2023**,52, 11130-11142. (¥Equal contribution) (IF 3.5).

**17.** S. Bej, **R. Das**, D. Kundu, T. K. Pal, P. Banerjee\*, *De novo* strategy with development of ZnII-organic framework based luminescent “switch-on” assay for size-exclusive sensitization of Oxidised form of Glutathione (GSSG) over Reduced form (GSH) : Insight into sensing mechanism through DFT, ***CrystEngComm***, **2023**, 25, 1626-1636. (I.F. 2.6) (***Invited Article***)

**16.** **R. Das**, M. Mondal, S. Paul, A. Pan and P. Banerjee\*, An Easy-to-use phosphate triggered Zinc-Azophenine Complex assisted metal extrusion assay @A diagnostic approach for chronic kidney disease and *in silico* docking studies, ***Inorganica Chim. Acta***, **2023**, 548, 121364. (I.F. 2.7) (***Invited Article***)

**15.** **R. Das**, S. Nag and P. Banerjee\*, Electrochemical Nanosensors for Sensitization of Sweat Metabolites: From Concept Mapping to Personalized Health Monitoring, ***Molecules* 2023**, 28, 1259. (I.F. 4.2) (***Invited Article***)

1. S. Bhattacharjee, S. Bera,¥ **R. Das**,¥ D. Chakraborty, A. Basu, P. Banerjee,\* S. Ghosh,\* and A.Bhaumik\*, A Ni(II) Metal−Organic Framework with Mixed Carboxylate and Bipyridine Ligands for Ultrafast and Selective Sensing of Explosives and Photoelectrochemical Hydrogen Evolution, ***ACS Appl. Mater. Interfaces*** **2022**, 14, 18, 20907–20918. (I.F. 8.5) (¥ Equal Contribution)
2. **R. Das,** S. Bej,N. C. Murmu; and P. Banerjee\*,Selective recognition of ammonia and aliphatic amines by C-N fused phenazine derivative: A hydrogel based Smartphone assisted ‘*opto-electronic nose*’ for food spoilage evaluation with potent anti-counterfeiting activity and a potential prostate cancer biomarker sensor, ***Analytica chimica Acta*, 2022**, 1202, 339597. (I.F. 5.7)
3. **R. Das,** S. Paul, S. Bej, M. Ghosh, J. C Bose. K, P. Banerjee\*, Selective colorimetric detection of Cyanide from Agro products and blood plasma by a bio-active Cu(II) complex of azophenine derivative: A potential tool for autopsy investigation, ***Colloids Surf. A Physicochem. Eng. Asp.***, 653, **2022**, 130022. (I.F. 4.9)
4. S. Bej, **R. Das**, A. Mondal, R. Saha, K. Sarkar, P. Banerjee\*, Knoevenagel condensation triggered synthesis of dual-channel oxene based chemosensor: Discriminative spectrophotometric recognition of F-, CN- and HSO4- with breast cancer cell imaging, real sample analysis and molecular Keypad lock applications. ***Spectrochim. Acta A Mol. Biomol. Spectrosc.*, 2022,** 273, 120989. (I.F. 4.3)
5. **R. Das,** R. Pal, S. Bej, M. Mondal, K. Kundu, P. Banerjee,Recent progress of 0D optical Nanoprobes for Application in Sensing of (Bio)analytes in the Prospect of Global Health Monitoring with Detailed Mechanistic Insights, ***Mater. Ad*v., 2022**, 3, 4421-4459. (I.F. 5.2)
6. S. Yashmin, S. Mondal, **R. Das,** P. Banerjee, A. T. Khan, Regioselective synthetic approach for key precursors of 6-arylbenzo[c]phenanthridin-10-ol derivatives: A useful compound for selective chromogenic recognition of fluoride, ***Org. Biomol. Chem*., 2022**, 20, 7302-7315. (I.F. 2.9)
7. S. Paul, **R. Das** and P. Banerjee\*,Recent endeavours in the development of organo chromo-fluorogenic probes towards targeted detection of toxic industrial pollutants Cu2+ and CN-: Recognition to implementation in sensory device, ***Mater. Chem. Front***., **2022**, 6, 2561-2595. (I.F. 6.0)
8. S. Bej, M. Ghosh#, **R. Das**# and P. Banerjee\*, Nanomaterials-grafted enzymes for decontamination of waste water: Need of the hour with proposed IoT synchronized nanosensor fit sustainable clean water technology in en masse, ***J. Indian Chem.***, 99, 5, **2022**, 100429. (I.F. 3.2) (# Equal Contribution)
9. **R. Das**, S. Bej, D. Ghosh, N. C. Murmu, H. Hirani and P. Banerjee\*, Stimuli-responsive discriminative ‘naked-eye’ detection of Cu2+ and Hg2+ with sequential sensing of S2- from aqueous medium by C-N fused amine functionalized hydrogel assay @a step closer to track Wilson’s disease. ***Sens. Actuators B Chem*. 2021**, 341, 129925. (I.F. 8.0)
10. **R. Das,** S. Bej,H. Hirani and P. Banerjee\*, Trace-Level Humidity Sensing from Commercial Organic Solvents and Food Products by an AIE/ESIPT-Triggered Piezochromic Luminogen and ppb-Level “OFF–ON–OFF” Sensing of Cu2+: A Combined Experimental and Theoretical Outcome. ***ACS Omega*, 2021**, 6, 22, 14104–14121**.** (I.F. 3.7)
11. S. Paul, **R. Das**, M. Seth, H. Hirani, N. C. Murmu, P. Banerjee, A Urea-Functionalized Chemoreceptor for Expeditious Chromogenic Recognition of Toxic Industrial Pollutants Cu2+ and CN– from Real Water Sources and Biofluids: Diagnosis of Wilson’s disease from Human Urine, ***Ind. Eng. Chem. Res***. **2020**, 59, 43, 19077–19092. (I.F. 3.8)
12. S. Bej, **R. Das**, N. C. Murmu and P. Banerjee, Selective identification and encapsulation of biohazardous m-xylene among a pool of its other constitutional C8 alkyl-isomers by luminescent d10 MOFs: a combined theoretical and experimental study. ***Inorg. Chem* 2020**, 59, 7, 4366–4376. (I.F. 4.3)
13. S. Bej, A. Hazra, **R. Das**, S.K. Saha, M. Corbella, and P. Banerjee\*, Exploratory studies of a multidimensionally talented simple MnII-based porous network: selective “turn-on” recognition @ cysteine over homocysteine with an indication of cystinuria and renal dysfunction, ***New J. Chem***., **2020**, 44, 14712-14722. (I.F. 2.7)
14. S. Bej, **R. Das**, H. Hirani, S. Ghosh and P. Banerjee\*, “Naked-eye” detection of CN− from aqueous phase and other extracellular matrices: an experimental and theoretical approach mimicking the logic gate concept, ***New J. Chem***., **2019**,43, 18098-18109. (I.F. 2.7)

# Patent

“**Mitigation of toxic contaminants from effluent water bodies employing integrated community level waste water treatment plant**” Authors: Priyabrata Banerjee, **Riyanka Das**, Sourav Bej, Asit Kumar Batabyal, Harish Hirani. (Ref. No.: 202011049587)

# Magazine

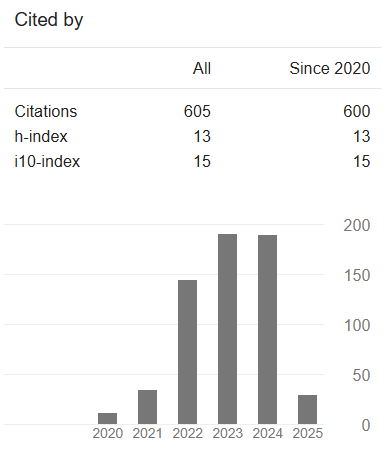
**Recognizing Presence of Fluoride through Nanoparticles**. A. Mondal, **R. Das** and [P. Banerjee](https://pubs.rsc.org/en/results?searchtext=Author%3APriyabrata%20Banerjee)\*. ***Nano Digest***, Vol: 10, Issue:6, November 2018.

# Book Chapters

1. **R. Das**, M. Mondal, S. Bej, P. Banerjee\*, Strategic advancement of exploiting metal organic frameworks for chromo-fluorogenic detection and detoxification of neurotoxic nerve agents via catalytic hydrolysis @ Sustainable Technology of the National Interest, ***Comprehensive Materials Processing***, Second Edition, Elsevier, ***2023***, <https://doi.org/10.1016/B978-0-323-96020-5.00105-9>.
2. S. Paul#, **R. Das**#, R. Pal#, P. Banerjee\*, Current endeavours in the construction of organo chromo-fluorogenic probes for ultrasensitive monitoring of toxic environmental carcinogen As(III): A “preventive sword” towards nascent stage cancer remediation, ***Comprehensive Materials Processing***, Second Edition, Elsevier, ***2023***, <https://doi.org/10.1016/B978-0-323-96020-5.00095-9>. (# Equal Contribution)

**1. R. Das**, R. Pal, S. Bej, M. Mondal, P. Banerjee\*, Application of Optical Nanoprobes for Supramolecular Biosensing: Recent Trends and Future Perspectives***, Biosensors Nanotechnology***, ***Wiley Scrivener Publishing, USA, 2023,*** Chapter 13, <https://doi.org/10.1002/9781394167135.ch13>.

## State total citation record and h-index:

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| **Citation Indices** | **All** | **Since 2020** |
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| **h-index** | **13** | **13** |
| **i10-index** | **15** | **15** |

**Year wise citation**

# Referees

1. **Dr Priyabrata Banerjee**

Principal Scientist & Associate Professor (AcSIR), Electric Mobility & Tribology Research Group, CSIR-CMERI (Govt. of India), M. G Avenue, Durgapur-713209, West Bengal, India,

Tel: +91-8777821091; Fax: +91-343-2546745

Webpage: [www.cmeri.res.in](http://www.cmeri.res.in) and [www.priyabratabanerjee.in](http://www.priyabratabanerjee.in)

Email: [pr\_banerjee@cmeri.res.in](mailto:pr_banerjee@cmeri.res.in); [priyabratabanerjee.chem@gmail.com](mailto:priyabratabanerjee.chem@gmail.com)

Google Scholar: <https://scholar.google.com/citations?user=HMnyvA8AAAAJ&hl=en>

1. **Dr Biplab Biswas**

Assistant Professor,

Department of Chemistry, Presidency University,

86, 1, College St, Calcutta University, College Square, Kolkata, West Bengal 700073

Tel: +91- 9734246721

Email: [biplab.chem@presiuniv.ac.in](mailto:biplab.chem@presiuniv.ac.in)

Google Scholar: <https://scholar.google.com/citations?hl=en&user=-kGwmKoAAAAJ>

1. **Prof. Asim Bhaumik**  
   Senior Professor, School of Materials Sciences  
   Indian Association for the Cultivation of Science  
   2A & 2B Raja S. C. Mullick Road, Jadavpur, Kolkata - 700 032, India  
   Tel. +91-33-2473-4971 (Ext. 1207), Fax: +91-33-2473-2805  
   E-mail: [msab@iacs.res.in](mailto:msab@iacs.res.in), [abhaumik68@yahoo.co.in](mailto:abhaumik68@yahoo.co.in)  
   URL: <http://iacs.res.in/faculty-profile.html?id=43>  
   Google Scholar: <http://scholar.google.com/citations?hl=en&user=l1XNgxoAAAAJ>

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