**Dr. (Mrs.) Partima Solanki**

Assistant Professor

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Residence: 593, D Block, Multistory, JNU Campus, New Delhi, India

**Field of Expertise: Nanobiosensors and Nanobiointeraction**

**Research and Teaching Experience: Nanobiosciences, Nanobiosensor, Nanobio-interaction.**

**Profile**

With string focus on applied research for diagnosis, I have been able to develop 6 technologies, which are at different stages of development. For effective dissemination and further commercialization, it is pertinent that generated knowledge be embodied in the form of patents, publication. We have aggressively published the research articles. I am co-author of more than **200** publications in reputed international and national scientific journals (**8492 citations; h-index 51 according to Google scholar**) and have sixteen patents; coordinator of research grand received from DST and DBT, India. I have supervised 9 Ph.D. and 4 are presently working and several graduated students.

**Educational Qualification**

Ph.D. (2000) Ph.D in Biosciences from Department of Biosciences, Maharshi Dayanand University (M.D.U.), Rohtak-Haryana

M.Sc. (1995) M.Sc.in Zoology from Department of Biosciences, M.D.U., Rohtak-Haryana

B.Sc. (1993) B.Sc.in Life sciences from Hindu Girls College, Sonipat, M.D.U., Rohtak-Haryana

**I established startup LLP (3K NANO LLP;** [**www.3knano.com**](http://www.3knano.com)**) under AIC-JNU-FI, New Delhi**

**Shipra Hostel Wardenship: May 2013 to May 2022**

**Co-coordinator of Scientific Research Issues:**

* Associate Editor of IET Nano-biotechnology (Wiley publisher)
* Associate Editor of Applied Research (Wiley publisher); <https://onlinelibrary.wiley.com/page/journal/>27024 288/homepage/editorial-board
* Associate Editor of ECS Sensor plus (IOP publisher)
* Associate Editor of Journal of Electrochemical Society (IOP publisher)
* Guest Editor: Focus issue on Women in Electrochemistry (Journal of the electrochemical Society); <https://www.electrochem.org/ecs-blog/focus-issue-on-women-in-electrochemistry/>
* Topic Editor of Women in Nanomedicine; https://www.frontiersin.org/research-topics/25756/women-in-nanomedicine
* Special Issue in Honor of Professor Bansi D. Malhotra—From Nanosystems to a Biosensing Prototype for an Efficient Diagnostic" to be published MPDI- Biosensors Journal.
https://www. mdpi. com/journal//special\_issues/honor\_prof\_BDM\_nano\_bio\_diag
* Associate Editor - Biomedical Nanotechnology; Frontier in Nanotechnology: [https://www.frontiersin.org/ journals/ nanotechnology/sections/biomedical-nanotechnology # editorial-board](https://www.frontiersin.org/%20journals/%20nanotechnology/sections/biomedical-nanotechnology%20# editorial-board)).

**List of Patents**

|  |  |  |  |  |  |
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| **S.****No.** | **Title** | **Country** | **Filed on (Date)** | **Granted on (Date)** | **Name of inventors** |
| **Patent Granted**  |
|  | Lead and Chromium Adsorption from Water using L-Cysteine Functionalized Magnetite (Fe3O4) Nanoparticles  | **India** | *Application no.* 201611044533; 30.12.2016 |  **Granted** | **Pratima R. Solanki**, Yana Bagbi |
|  | Nanofibres of antibiotic for inhibiting formation of biofilm | **India** | *201911048193* 06.12.2019 |  **Granted** | Zeenat Iqbal, Manvi Singh**, Partima Solanki,** Mohd Aqil, Deepika Chauhan, Mohd Aamir Mirza |
| **Patents Filed**  |
|  | A novel electrochemical detection platform for cancer biomarker: Sp17. | **India** | Application. No. 202211005455; February 01, 2022 |  | **Pratima R. Solanki,** Amit Kumar Yadav, Renu Sharma |
|  | Gut microbiota derived Indoxyl Sulphate (IS) detection through molecularly imprinted polymer based sensor  | **India** | Application. No. 202111006093 filed on 12.02.2021   |  | Nishu Dalal, Tarun Kumar Dhiman, GBVS Lakshmi, Sanjay Kumar Gupta, Rajeev Singh, **Partima Solanki**, Anil Kumar |
|  | Nanomaterials based biosensor device for Vitamin D detection  | **India** | Application. No. 202011037663; dated 01 September 2020 |  | **Pratima Solanki,** Deepika Chauhan and Anil Kumar |
|  | Novel optical sensor for Antibiotic detection | **India** | Application no. 202011030135 filed on July 15, 2020) |  | **Pratima R. Solanki,** Reena Sajwan, Anil Kumar |
|  | A Novel capacitive Nanobiosensor for the non-enzymatic detection of glucose and its method thereof  | **India** | *202011019119* *dt. 05.05.2020* |  | **Pratima R. Solanki,** Lakshmi GBVS, Tarun Kumar, Rahul Kumar |
|  | A Novel Detection Method for Trimethyl N- Oxide | **India** | *(201911044566 filed on November 04, 2019* |  | **Solanki P, Lakshmi GBVS, Kumar A** |
|  | A fluorescence based toggle optical sensor | **India** | *Indian patent application no. 201911042412 dated* 18.10.2019 |  | **Pratima R Solanki,** Smriti Sri, GBVS Lakshmi, Anil Kumar |
|  | A method for augmenting bacteria | **India** | *Application no. 201911010966,* 20.03.2018 |  | Anil Kumar, Nishu Dalal **Pratima R Solanki** |
|  | A novel method to detect IL-8 using electrochemical sensing platform  | **India** | *Application no. 201711038137;* 27.10.2017 |  | **Pratima R Solanki** |
|  | A novel method to detect IL-8 using electrochemical sensing platform  | **India** | *Application no. 201711038138;* 24.09.2017 |  | **Pratima R. Solanki** and K. Dave; Amit Dinda |
|  | Electrochemical Immunosensor for Cytokeratin Fragment-21-1 Detection | **India** | *Application no.* 201611032666; 24.09.2016 |  | **P.R. Solanki**, Sachchidan and Tiwari |
|  | Enzyme free strip sensor for estimation of ascorbic acid  | **India** | *Application no.* 3741/DEL/2014; 17.12.2014 |  | H.B. Bohidar, **P.R. Solanki**, Kamla Rawat, Anshu Sharma |
|  | Biocompatible Clay Ionogel based Non-enzymatic Oxalic acid sensor | **India** | *Application no. 201611025920;* 28.07.2016 |  | H.B. Bohidar, K. Rawat, **P.R. Solanki**, Nidhi Joshi |
|  | Self-healing and recovery of Gelatin-Ionic Liquid, Ionogel | **India** | *Application no.* 1990/Del/2015; 01.07.2015 |  | H.B. Bohidar, **P.R. Solanki**, Kamla Rawat, Anshu Sharma |
|  | Sensitive and specific immunosensor for the *Vibrio cholerae* detection | **India** | *Application no. 3964/DEL/2012;* 26.09.2014 |  | **P.R. Solanki**, Tinku Basu |

**Research Projects**

**Project Investigator in Research Projects**

 **On-going Research Projects**

1. Towards nanomaterials based biosensor device for measuring 25-hydroxy Vitamin D, BIRAC-BIG, just sanctioned (2021-2023). Budget Sanctioned: 50 Lakhs **P. R. Solanki (PI).**
2. Development of Point of Care Device for Identification of Specific Oral Cancer, BDTD Programme, DST, (2022-2024) Budget Sanctioned: 30.74 Lakhs **P. R. Solanki (PI).**
3. Towards design and development of biosensors for detection of gut bacteria and metabolites, ICMR (2019-2022). Budget Sanctioned: 30.00 Lakhs **P. R. Solanki (PI)** and Dr. Anil Kumar (Co-PI).
4. Detection of gut microbiota-derived metabolites Colibactin,4-ethylphenyl sulfate and p-Cresyl Sulfate through molecularly imprinted polymer based electrochemical sensor development. Budget Sanctioned: 25,51787 **P. R. Solanki (**Co-PI) (2022-2025) Department of Health Research (DHR).

 **Completed Projects**

1. **Indo-Russia project** “Rapid detection of bacterial resistance to antibiotics based on changing optical properties of nanosized labels”; DBT, India (2017-2021); Budget Sanctioned: 137.922 Lakhs; **P.R. Solanki (PI)** and Dr. Anil Kumar (Co-PI), India and Prof. Prof. E. Sergei, Prof. Boris Dzantiev.
2. Design and Development of Nanomaterials based Point of Care Device for Head and Neck Cancer Biomarkers Detection under Biomedical Device and Technology Development Programme, DST 2019-2020; 25 Lakhs. **P. R. Solanki (PI)** and Dr. Amit Dinda, Alok Thakar, Dr. Rinu Sharma and Dr. Mukul Sarkar are as Co-PI.
3. Effect of ion-radiation on biopolymer-metal oxide nanocomposite for removal of water pollutants. IUAC (2017- April 2020); 10 Lakhs; **P. R. Solanki (PI)**
4. Electrochemical Microfluidic based nanobiochip for mycotoxins detection; DBT, India (Dec 2015-14th March 2019); Rs. 64.21Lakhs, **P. R. Solanki (PI)**
5. Development of Nanobiosensors for Imaging of Cancer Cells and Multi analyte Detection: UPOE-II (JNU), UGC-India (2014-March 2019); Rs. 60 Lakhs, **P. R. Solanki (PI).**
6. Development of nanobiochip for oral cancer detection: Nanomission DST, India (Dec. 2014- March 2018); Rs. 66 Lakhs: **P. R. Solanki (PI)** and Prof. Amita Dinda.
7. Development of Nanomaterials based biosensor for microorganisms detection in water samples: UGC Start-up grant (2014): Rs. 6 Lakhs **P. R. Solanki (PI)**
8. Development of Biosensors for detection of pathogens (PI**)**20th May 2009-20th Nov. 2012; DST, New Delhi DST Fast Track; 18.00 Lakhs, **P. R. Solanki (PI)**
9. **P. R. Solanki;** Received Full Foreign Travel Grant from Council of Scientific and Industrial Research for Singapore visit in International conference on biomedical and pharmaceutical engineering 2006 Dec. 11-14, 2006.
10. **P. R. Solanki;** Received Full Foreign Travel Grant from DST for Shanghai, China visit in International conference on Biosensors and Bioelectronics, 2006 funds.

**List of publications**

**Total number of publications: >200 (National and International Journals) + (Conference Proceedings:10)**

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| --- | --- | --- | --- | --- |
| S.No. | **Title of research article / paper(s)** | **Name of journal** | **Whether Sole Author /Co-author** | **Month & year, vol. no. & page nos.** |
|  | Molecularly Imprinted Polymer-based Nanodiagnostics for Clinically pertinent Bacteria and Virus Detection for Future Pandemics |  Biosensors and Bioelectronics: X | Amit K. Yadav, Damini |  |
|  |  |  EC | Damini, Reena | *Under Revision*  |
|  |  | *Materials Today Chemistry* | Nishu | *Under Revision*  |
|  | Recent Advances in Copper and Copper-Derived Materials for Antimicrobial Resistance and Infection Control |  *Current Opinion in Biomedical Engineering* |  | *Accepted* |
|  | Environmental friendly Polyacrylonitrile nanofiber mats encapsulated and coated with green algae mediated Titanium oxide nanoparticles for efficient oil spill adsorption |  Marine Pollution Bulletin  |  Mrinal Poddar, GBVS Lakshmi, Mahima Sharma, Navneet Chaudhary, Subhasha Nigam, Monika Joshi, Pratima R Solanki | [Volume 182](https://www.sciencedirect.com/journal/marine-pollution-bulletin/vol/182/suppl/C), September 2022, 113971 |
|  |  Determination of ciprofloxacin using the Ziziphus mauritania derived fluorescent carbon dots based optical sensor |  *Environmental Science and Pollution Research* | Navneet Chaudhry, Damini Verma, Amit K Yadav,Jai Gopal Sharma, Pratima R. Solanki | *Revision Submitted*  |
|  |  Bioinspired synthesis of hematite nanoparticles-reduced graphene oxide composite for application in BPA detection: a new in-sight  | *Biosensors and Bioelectronics: X* |  Damini Verma, Kumar Rakesh Ranjan, Maumita Das Mukherjee, **Pratima R Solanki** | *Accepted* |
|  |  Gold-Ceria nanocomposite based highly sensitive and selective aptasensing platform for the detection of the Chlorpyrifos in Solanum tuberosum |  *Colloids and Surfaces A: Physicochemical and Engineering Aspects* | G.B.V.S. Lakshmi, Mrinal Poddar, Tarun K. Dhiman, Avinash Kumar Singh, **Pratima R. Solanki** | *Accepted* |
|  |  Study of pH-dependent fluorescent properties of Fluoroquinolones Antibiotics |  *Applied Research* | Reena, G.B.V.S. Lakshmi, Avinash Kumar Singh, **Pratima R. Solanki** | *Accepted* |
|  |  Fast tracking of adulterants and bacterial contamination in food *via* Raman and infrared spectroscopies: paving the way for a healthy and safe world |  *Sensors & Diagnostics* |  Raj Kumar Sen, K. Karthikeyan, Priyanka Prabhakar, Jeet Vishwakarma, Gaurav Gupta, S. N. Mishra, Alka Mishra, J. P. Chaurasia, S. A. R. Hashmi, D. P. Mondal, Pratima R. Solanki, A. K. Srivastava, Chetna Dhand and Neeraj Dwivedi |  2022, **1**, 673-685 |
|  | Internet of things (IoT) in nano-integrated wearable biosensor devices for healthcare applications |  *Biosensors and Bioelectronics: X* | [D.Verma,](https://www.sciencedirect.com/science/article/pii/S2590137022000486%22%20%5Cl%20%22%21)[K. R B Singh,](https://www.sciencedirect.com/science/article/pii/S2590137022000486%22%20%5Cl%20%22%21)[Amit K.Yadav,](https://www.sciencedirect.com/science/article/pii/S2590137022000486%22%20%5Cl%20%22%21) [Vanya Nayak,](https://www.sciencedirect.com/science/article/pii/S2590137022000486#!)[Jay Singh,](https://www.sciencedirect.com/science/article/pii/S2590137022000486%22%20%5Cl%20%22%21) [Pratima R. Solanki,](https://www.sciencedirect.com/science/article/pii/S2590137022000486#!) [R.P.Singh](https://www.sciencedirect.com/science/article/pii/S2590137022000486#!) | [Volume 11](https://www.sciencedirect.com/journal/biosensors-and-bioelectronics-x/vol/11/suppl/C), Sept. 2022, 100153 |
|  | Interleukins Profiling for Biosensing Applications: Possibilities and the Future of Disease Detection |  *ECS Sensors Plus* | Shashank Shekhar, Amit K. Yadav, Ajit Khosla, Partima R Solanki | *Revision submitted* |
|  | Highly sensitive optical approach towards Cu (II) ions detection in water sample using Thioglycolic acid capped vanadium disulfide-based Dichalcogenide Quantum Dots |  *RSC Advances* |  Rahul Kumar, Tarun K. Dhiman, Virendra Kumar, GBVS Lakshmi, **Pratima R. Solanki**, Kedar Singh | *In press* |
|  |  Transition Metal and Rare‑Earth Metal Doping in SnO2 Nanoparticles |  *Journal of Superconductivity and Novel Magnetism* | Divya Rehani, Manish Saxena, **Pratima R. Solanki**, Shailesh Narain Sharma | https:// doi.org/10.1007/s10948-022-06283-9 |
|  |  Polypyrrole Based Molecularly Imprinted Polymer Platform for *Klebsiella pneumoniae* Detection |  *ECS Sensor Plus* | R Sharma, G LAKSHMI, A Kumar, **PR Solanki** | 2022; 1 (1), 010603 |
|  |  Fabrication of alkoxysilane substituted polymer-modified disposable biosensing platform: Toward sperm protein 17 sensing as a new cancer biomarker |  *Talanta*  |  AK Yadav, P Gulati, R Sharma, A Thakkar, **PR Solanki** |  Volume 243, 1 June 2022, 123376 |
|  |  Rapid and label-free detection of Aflatoxin-B1 via microfluidic electrochemical biosensor based on manganese (III) oxide (Mn3O4) synthesized by co-precipitation route at room … |  *Nanotechnology* | AK Singh, T Dhiman, G Lakshmi, R Raj, S Jha, **PR Solanki** | *2022,* *33, 28* |
|  |  Amine Functionalized Noble Metal: Metal Oxide Nanohybrid for Efficient Electrochemical Determination of 25-Hydroxy Vitamin-D3 in Human Serum |  *Journal of Electrochemical Society* | Deepika Chauhan, Pramod Kumar Gupta, **PR Solanki** | 2021,168 117508 |
|  | Prospects of Nanomaterial-Based Biosensors: A Smart Approach for Bisphenol-A Detection in Dental Sealants |  *Journal of Electrochemical Society* |  D Verma, A Kumar, G Rathee, K Dhingra, MD Mukherjee, **PR Solanki** | 2022, 169 027516 |
|  | Graphene Quantum Dots based Optical Sensing Platform for Aflatoxin B1 detection via Resonance Energy Transfer Phenomenon"Author(s):  |  ACS Applied Bio Materials |   Avinash K Singh; Smriti Sri, Garimella, Lakshmi, Tarun Dhiman, Sobhan Sen; **Pratima Solanki**  | *2022, 5, 3, 1179–1186*  |
|  |  2D Materials-Based Aptamer Biosensors: Present Status and Way Forward.  | *Current medicinal chemistry* |  Sen, R.K., Prabhakar, P., Bisht, N., Patel, M., Mishra, S.,  Yadav, A.K., Venu, D.V., Gupta, G.K., **Solanki, P.R.**, Ramakrishnan, S. and Mondal D.  | 2021 |
|  |  MoS2 nanoflower based electrochemical biosensor for TNF alpha detection in cancer patients |  *Electrochimica Acta* | Smriti Sri; Deepika Chauhan, G.B.V. S. Lakshmi; Alok Thakkar, **Pratima R. Solanki** | *2022,* *405, 139736* |
|  | Influence of pH, β-cyclodextrin and metal ions on the solubility and stability of medicinally competent Isoxazole derivative of curcumin: A Photophysical study |  *ACS Applied Bio Materials* | Manisha Sharma, Mamta Kumari, Swati Rani, Amit Yadav; Pratima **Solanki,**  Mozumdar, Subho | *2021, 4 (12), 8407-8423* |
|  |  Synthesis, characterization, and interaction studies of uncapped, PVP, and CTAB capped CuO nanorods with aldicarb and chlorpyrifos |  *International Journal of Nanoparticles*  *(Inderscience publishers)* | Tarun K. Dhiman, Avinash K. Singh, Rahul Singh, GBVS Lakshmi, Yashi Punia, Pramod Kumar and **Pratima R. Solanki** | *In press* |
|  | Recent advances in understanding SARS-CoV-2 infection and updates on potential diagnostic and therapeutics for COVID-19 |  *Journal of Coronaviruses* |  Damini Verma, Amit K. Yadav, Pramod Kumar, M.D.Mukherjee, **Pratima R** **Solanki,** Anil Kumar | *In press* |
|  |  **A Novel Nanocomposite Platform of Mercaptopropionic acid stabilized CdSe quantum dots-Graphene for Impedimetric Detection of Low Density Lipoprotein** |  *Materials Letters*  | Drishti Khandelwal, Disha Jain, **Pratima R. Solanki**, Kumar Rakesh Ranjan, and Maumita Das Mukherjee. | 2021, 131236 |
|  |  Designing and characterization of a highly sensitive and selective biosensing platform for ciprofloxacin detection utilizing lanthanum oxide nanoparticles  |  *Journal of Environmental Chemical Engineering* | Navneet Chaudhary, Amit K. Yadav, Jai Gopal Sharma, **Pratima R. Solanki** | 2021, 106771 |
|  | Amine Functionalized Noble Metal: Metal Oxide Nanohybrid for Efficient Electrochemical Determination of 25-hydroxy Vitamin-D3 in Human Serum | *Journal of The Electrochemical Society* | Deepika Chauhan, Pramod K. Gupta, **Pratima R. Solanki** | 2021, 168(11):117508. |
|  | Aptamer Based Switches: A Futuristic Approach in *H.pylori* Detection  |  *Materials Letters* | Amit K. Yadav, Damini Verma, Navneet Chaudhary, Anil Kumar, **Pratima R. Solanki** | 2021,131239 |
|  | A Novel Bioinspired Carbon Quantum Dots based Optical Sensor for Ciprofloxacin Detection |  *Materials Letters* |  Navneet Chaudhry, Damini Verma, Jai Gopal Sharma, **Pratima R. Solanki** | 2022,*308*, 131090. |
|  | A hybrid optical strategy based on graphene quantum dots and gold nanoparticles for selective determination of gentamicin in a milk sample  |  *Food Chemistry*  |  Reena K. Sajwan and **Pratima R. Solanki** | 2022,370,131312 |
|  | Mercaptopropionic acid capped Cadmium Selenide Quantum Dots based Urea Sensor  |  *Materials Letters*  | Reena K Sajwan, Purnima Sharma, GBVS Lakshmi, **Pratima R Solanki** | *2021, 305, 15, 2, 130794* |
|  | Photocatalytic and optoelectronic properties of Microwave synthesized carbon quantum dots |  *Materials Letters* | Amit Ahlawat, Pawan S. Rana, **Partima R. Solanki** | *2021, 305, 130830* |
|  | Emerging Role of TMAO in Colorectal Cancer  |  *Applied Microbiology and Biotechnology* | Rekha Jalandra, Nishu Dalal, Amit K. Yadav, Damini Verma, Minakshi Sharma, Rajeev Singh, Ajit Khosla, Anil Kumar, **Pratima R. Solanki** | **105**, 7651–7660 (2021) |
|  | Electrophoretically Deposited Green Synthesized Silver Nanoparticles Anchored Reduced Graphene Oxide Composite Based Electrochemical Sensor for detection of Bisphenol A |  *Journal of The Electrochemical Society* |  Damini Verma, Tarun Dhiman, Maumita Das Mukherjee, **Pratima R. Solanki** | 2021, 168, 097504 |
|  | Electrophoretically deposited L-cysteine functionalized MoS2@ MWCNT nanocomposite platform: a smart approach towards highly sensitive and label-free detection of Gentamicin |  *Materials Today Chemistry* |  Amit K.Yadav, Damini Verma, **Pratima R. Solanki** | *2021, 22, December, 100567* |
|  |  A simple detection platform based on molecularly imprinted polymer for AFB1 and FuB1 mycotoxins |  *Microchemical Journal* |  Avinash K.Singh, G. B.V.S. Lakshmi, Manuel Fernandes, Tanushri Sarkar, Payal Gulati, Ravindra Pratap Singh, **Pratima R. Solanki** | 2021, [171](https://www.sciencedirect.com/science/journal/0026265X/171/supp/C), 106730 |
|  | Ignition of photoluminescent intensity of quenched MoS2 quantum dots tetracycline mixture by levofloxacin *via* Photoinduced electron transfer |  *Journal of Colloid and Interface Science Open* | Smriti Sri, Udisha Singh, Rahul Kumar, G.B.V.S. Lakshmi, **Pratima R.Solanki** | *2021,3, 100021(1-8)*  |
|  | Simple and facile Carbon dots based electrochemical biosensor for TNF-α targeting in cancer patient’s sample  |  *Analytica Chimica Acta*  |  Smriti Sri; G.B.V. S. Lakshmi; Payal Gulati; Deepika Chauhan; Alok Thakkar, **Pratima R. Solanki** | *2021,1182,* *16,338909* |
|  |  Polyhydroxy butyrate-based nanocomposites for bone tissue engineering |  *Pharmaceuticals* |  Anand Mohan, Madhuri Girdhar, Raj Kumar, Harshil S Chaturvedi, Agrataben Vadhel, Pratima Solanki, Anil Kumar, Deepak Kumar, Narsimha Mamidi | 2021,14, (11), 1163 |
|  | Assessment of cytotoxicity profile of gadolinium oxide nanorods and the analogous surface-functionalized nanorods |  *Nanofuture* |  Deepika Chauhan, Smriti Sri, Robin Kumar, A. Panda, **Pratima R. Solanki** | 2021,5(4),045001. |
|  | Enhanced fluorescence of mercaptopropionic acid capped zinc sulfide quantum dots with moxifloxacin in food and water samples via reductive photoinduced electron transfer | *Environmental Science: Nano* |  Reena Sajwan, Tarun K, Dhiman, RahulKumar, Eremin Sergei, **Pratima R Solanki** | 2021,8 (9), 2693-2705 |
|  | Gut microbiota-derived metabolites in CRC progression and Causation | *Journal of Cancer Research and Clinical Oncology* | Nishu Dalal, Rekha Jalandra, Nitin Bayal, Amit K. Yadav, Harshulika, Minakshi Sharma, Govind K Makharia, Pramod Kumar, Rajeev Singh, **P.R Solanki** and Anil Kumar | <https://doi>.org/10.1007/s00432-021-03729-w |
|  | Rapid, and label-free electrochemical detection of Fumonisin-B1 using microfluidic biosensing platform based on Ag-CeO2 nanocomposite | *Journal of The Electrochemical Society* | Tarun K. Dhiman, GBVS Lakshmi, Kashyap Dave, Appan Roychoudhury, Nishu Dalal, Sandeep K. Jha, Anil Kumar, Ki-Ho Han, and **Pratima R. Solanki** | *2021, 168, 077510* |
|  | Non-enzymatic and rapid detection of glucose on PVA-CuO thin film using ARDUINO UNO based capacitance measurement unit | *Biomedical Microdevices* | Tarun K. Dhiman, Mrinal Poddar, GBVS Lakshmi, Rahul Kumar, **Pratima R. Solanki** | 23,36 (2021) |
|  | Fabrication of label-free and ultrasensitive electrochemical immunosensor based on molybdenum disulfide nanoparticles modified disposable ITO: An analytical platform for antibiotic detection in food samples | *Food Chemistry* | Amit K. Yadav, Damini Verma, GBVS LakshmiSergei Eremin, Pratima Solanki | *363,30,2021,130245* |
|  | Emerging Multimodel Zirconia Nanosystems for High-Performance Biomedical Applications  | *Adv. NanoBiomed Res.*  | Garima Rathee, Gaurav Bartwal, Jyotsna Rathee, Yogendra K. Mishra, Ajeet Kaushik, and Pratima R. Solanki | 2021, 2100039 (1-45) |
|  | Evaluation of size, shape, and charge effect on the biological interaction and cellular uptake of cerium oxide nanostructures | *Nanotechnology* | Chauhan, Deepika; Sri, Smriti; Kumar, Robin; Panda, Amulya; **Solanki, Pratima** | *2021 Jun 11;32(35)* |
|  | Fabrication of a sensitive electrochemical sensor platform using reduced graphene oxide-molybdenum trioxide nanocomposite for BPA detection: an endocrine disruptor | *Journal of Environmental Chemical Engineering* | Damini Verma, Amit K. Yadav, Maumita Das Mukherjee**, Pratima R. Solanki** | [*Vol.9, 4*](https://www.sciencedirect.com/science/journal/22133437/9/4)*, August 2021,* *105504* |
|  | Highly sensitive an amoxicillin immunosensor based on aqueous vanadium disulphide quantum dots | *J. Elcetro- analytical Chemistry* | Rahul Kumar, G.B.V.S. Lakshmi,T.K. Dhiman, Kedar Singh, **Pratima R. Solanki** | [892](https://www.sciencedirect.com/science/journal/15726657/892/supp/C),1 July 2021, 115266 |
|  | Mechanism of action and cellular responses of HEK293 cells on challenge with Zwitterionic carbon dots | *Colloids and Surfaces B: Biointerfaces* | VP. Sangeetha, Sri Smriti, **R.S. Pratima**, PV. Mohanan | *202, June 2021,* *111698* |
|  | Carbon cloth-based immunosensor for detection of 25-hydroxy vitamin D3 | *Microchimica Acta*  | Deepika Chauhan, AmitK. Arya, **Pratima R. Solanki** | 2021,188, 145,1-11   |
|  | 3D Printed Microfluidics and Potential Biomedical Applications  | *Frontiers in Nanotechnology* | C Dhand, P Prabhakaran, R Kumar, N Dwivedi, **P Solanki,** AK Srivastava | 2021, 3, 6 |
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|  | Introduction to Numerous Diseases of the Livestock.  | **Elsevier** [***Under Revision***]. | **Yadav, A.K.,** Verma, D., Solanki, P.R. | 2022Submitted |
|  | Prospects of nanobio-technological applications for the livestock industry.  | **Elsevier** [***Under Revision***]. | Verma, D., **Yadav, A.K.,** Singh, Harshlluika., Solanki, P.R. | 2022Submitted |
|  | Chapter 12: Nanobiosensor for mycotoxin detection in foodstuff | Nanobiosensors for Environmental Monitoring : Fundamentals and Application Edited by: *Ravindra Pratap Singh, Kingsley Eghonghon Ukhurebor, Jay Singh, Charles Oluwaseun Adetunji, Kshitij RB Singh* | Garima Rathee, Gaurav Bartwal, Jyotsna Rathee, Anil Kumar, and Pratima R. Solanki | Submitted2022 |
|  | Enzymatic bio-sensing platforms for gut diseases | Enzyme based biosensors: Recent Advances and applications in Health care” to be published by Springer Nature in the year 2022Editor: *Sanjukta Patra, Debasree Kundu, Manashjit Gogoi* | Damini Verma, Amit K.Yadav, **Partima R.Solanki** | Under review |
|  | Chapter-6: 3D-Printed Microfluidic Device with Integrated Biosensors for Biomedical Applications | Advanced Microfluidics-Based Point-of-Care DiagnosticsEditor: Raju Khan, Chetna Dhand, S. K. Sanghi, Shabi Thankaraj Salammal, A.B.P. MishraEdition CRC PressPages 20eBook ISBN9781003033479 | Priyanka Prabhakar, Raj Kumar Sen, Neeraj Dwivedi, Raju Khan, Pratima R. Solanki, Satanand Mishra, Avanish Kumar Srivastava, Chetna Dhand | 2022Published |
|  | Iron oxide nanoparticles and nano-composites: Efficient tools for outstanding sensing applications (Chapter 3) |  Iron oxide nanoparticles and their applications. Patricia Villegas (Editor)Nova Science Publisher, New York, USA | Garima Rathee, Gaurav Bartwal, Jyotsna Rathee, **Pratima R. Solanki** | 2021Publish-ed  |
|  | 3D printed organ for healthcare applications | Biomedical Product and Materials Evaluation: Standards and Ethics. Woodhead Publishing Series in Biomaterials.2022, Pages 151-177. Editor: PV Mohanan  Elsevier Publisher | Gaurav Bartwal, Garima Rathee, Jyotsna Rathee, Pramod Kumar,**Pratima R. Solanki** | 2021 (in press) |
|  | An overview of the legal and regulatory challenges of the biological products | Biomedical Product and Materials Evaluation: Standards and Ethics. Editor: PV Mohanan Elsevier Publisher | Manvi Singh **and Pratima R. Solanki** | 2021(in press) |
|  | Coronavirus Disease 2019 (COVID-19) Origin, impact and drug development | Origin and Impact of COVID-19 Pandemic Originating From SARS-CoV-2 Infection Across the Globe. doi: 10.5772/ intechopen.98358 | Amaresh Mishra, Nisha Nair, Amit K. Yadav, **Pratima Solanki**, Jaseela Majeed and Vishwas Tripathi | 2021Publish-ed |
|  | Introduction toNanomaterialsAn Overview towardBroad-Spectrum Applications | Nanomaterials in Bionano -technology: Fundamentals and Applications. Edited By Ravindra Pratap Singh, Kshitij RB Singh [4:39 PM, 6/6/2021]; ISBN 9780367689445, August 18, 2021 by CRC Press | Kshitij RB Singh**Pratima R. Solanki**B.D. MalhotraAvinash C. PandeyRavindra Pratap Singh | 2021Publish-ed |
|  | Carbon Based Tumor Targeting Systems | New materials and techniques for cancer targeted systemSpringer  | Smriti Sri, Shweta Panwar and **Pratima R. Solanki** | 2020Publish-ed |
|  | Advances in Mycotoxins detection | Pesticides and PestCambridge Scholars PublishingISBN (10): 1-5275-3803-6ISBN (13): 978-1-5275-3803-0 | **Pratima R. Solanki** | **2019**Publish-ed |
|  | Hydrogel for sensing application Chapter 5th | Book Title: Intelligent Hydrogels in Diagnostic and Therapeutics. CRC publisher | Tamal Sarkar and  **Pratima R. Solanki** | **2018**Publish-ed |
|  | Fundamentals of SERS | SERS-Methods, Analysis and Research. Nova Science Publishers | GBVS Laxmi, Vinay Bhardwaj and **Pratima R. Solanki** | **2018**Publish-ed |
|  | On Microfluidics Devices for Clinical Biosensor | Encyclopedia of Continuum Mechanics Springer, Berlin, Heidelberg. Editors: Altenbach, Holm, Öchsner, Andreas (Eds.).ISBN 978-3-662-55770-9 | Tarun Kumar Dhiman, G. B. V. S. Lakshmi, and **Pratima R. Solanki** | **2018**Publish-ed |
|  | Electrospun Nanofibrous Filtration Membranes for Heavy metals and dyes removal (Chapter 15) | Nanoscale Materials in Water PurificationSabu Thomas, Daniel Pasquini, Sau-Yuan Leu, Deepu A. Gopakumar (Eds.), DOI 10.1016/B978-0-12-813926-4.00015-X, ISBN 978-0-12-813926-, pp. 275-288, Elsevier 2019. | Yana Bagbi, Arvind Pandey, **Pratima R. Solanki** | **2018**Publish-ed |
|  | Prospects of Nanostructured Zirconia as a point of care Diagnostics | RECENT TRENDS IN NANOMATERIALS" 1st ed. 2017, Series: Advanced Structured Materials, Vol. 83, Z.H. Khan (Ed.) and published by Springer | Pramod K. Gupta, Z.H.Khan, **Pratima R. Solanki** | 2017Publish-ed |
|  | Role of Nanostructured Materials towards Remediation of Heavy metals/Metalloids Chapter 3 (pages 73-95)  | Nanomaterials and their applications. Khan (Ed.) and published by Springer, 2018 | Yana Bagbi, Arvind Pandey, **Pratima R. Solanki** | 2018Publish-ed |
|  | Nanomaterials‐Based Immunosensors for Clinical Diagnostics Applications | Nanobiotechnology forSensing ApplicationsFrom Lab to Field | Manoj Kumar Patel and **Pratima Solanki** | 2015 Publish-ed |
|  | Recent trends in Gelatin Nanoparticles in Biomedical Applications | Advances in NanomaterialsEditors: **Husain,** Mushahid, **Khan**, Zishan Husain (Eds.) | Prem Prakash Sharma, Anshu Sharma and **Pratima R. Solanki** | 2015 Publish-ed |
|  | Curcuminoid-loaded poly methyl methacrylate nanoparticles: In vitro effect on Squamous cell carinoma | NanotechnologyNovel Perspectives and Prospects | Abhispa Sahu, Samer Singh, **Pratima R. Solanki**, Susmita Mitra | 2015(881-886)Publish-ed |
|  | Recent Advances in Nano-Structrured Metal Oxides Based Electrochemical Biosensors for Clinical Diagnostics"  | "Nanostructured Materials for Electrochemical Biosensors" (Edited by U. Yogeswaran; S. Kumar; S. Chen), NOVA publishers, NY, USA pp. 213. | Anees A. Ansari, **Pratima R. Solanki**, Ajeet Kaushik & B D Malhotra  | (2009)Publish-ed |

**Invited Lectures in International conferences**

|  |  |  |  |  |  |
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| **S.****No.** | **Talk** | **Conference** | **Venue** | **Date** | **Title** |
|  |  |  |  |  |  |
|  | Invited talk | Albertian Knowledge Summit 2022An International Conference on Multidisciplinary Research Organized by | Department of Chemistry and Research Centre St. Albert’s CollegeEmakulam, Kerala, India | 21st March, 2022 (Monday) | Potential of Carbon based Nanomaterials for Biomedical Applications |
|  | Talk | India-Japan Workshop on Biomolecular Electronics and Organic Nanotechnology for Environment Preservation (IJWBME 2020) *Nagoya University, Nagoya, Japan, and online (Zoom)*  | *Nagoya University, Nagoya, Japan, and online (Zoom)**December 9-10, 2021* | *December 9-10, 2021* | Fluorescent Nanomaterials Based Smart Sensors for Food Safety Applications |
|  | Keynote speaker | Recent advances in Biotechnology”    | Precious Cornerstone University in Ibadan, Nigeria  | October, 4th -6th , 2021 | Nanomaterials based Optical sensors for the detection of antibiotics |
|  |  | *International Webinar Series* | Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum | November 26-28, 2020 | *‘Food, Chemical and Nanomaterials Toxicity’*  |
|  | Invited talk | 2nd World Conference on Cancer | Sri Ram Cancer & Super Speciality Centre Mahatama Gandhi University of Medical Sciences and Technology, Jaipur | 3-5 February 2020  | Potential of Nanomaterials for Cancer Biomarkers detection  |
|  | Invited talk |  |  | 27-29  Nov. 2019  | Nanostructured based Biosensing platforms for Vitamin-D detection |
|  | Invited talk | International Conference on Applied Nanoscience and Nanotechnology (ICANN-2019) | Department of Science and Technology, Alagappa University, Karaikudi, Tamil Nadu | 18-19 March 2019 | Nanomaterials and their biomedical applications |
|  | Invited talk | at 6th World Congress on Nanomedical Sciences [Annual conference on the International Society of Nanomedical Sciences (ISNS) Chemistry Biology Interface: Synergistics New Frontiers and Science and Technology for the Future of mankind | Vigyan Bhawan | *7-9  January 2019* | Fluorescence and functionalized carbon dots for nanomedicine applications |
|  | Invited talk | 2nd International Conference on Nano biotechnology for agriculture | TERI-Deakin Nanobiotechnology Centre, Gwal Pahri, Gurugram, Haryana | *13-14 December 2018* | Nanostructured Materials for point of care diagnosis |
|  | Invited talk | India -Japan Workshop on Biomolecular Electronics and Organics Nanotechnology for Environment Preservation -2018 | *National Physical Laboratory, New Delhi-110012* | *6-9 December 2018* | Biosensing platform for non-invasive detection of cancer biomarkers |
|  | Invited talk | International Conference on materials for energy applications | *S.S. Jain Subodh P.G. College, Jaipur* | *6-8 December 2018* | Carbon dots and their biomedical applications |
|  | Invited talk | Biotechnology: state of the art and perspectives. Life Sciences.” in the forum and make a presentation at the forum session Biosensorics: challenges and solutions | Gostiny Dvor, ul. Ilyinka, Moscow | *23 - 25 May 2018* | Prospects of Nanostructured Materials for Clinical Diagnostics |
|  | Invited talk | 9th International C+NANO Convergence Technology Symposium (10th ICTS) | Department of Nanoscience and Engineering, *Inje University, South Korea* | *16-17 January 2018* | Potential of Nanostructured Materials for Biomedical Applications |
|  | Invited talk | International conference on Nano-biotechnology | *Jamia Millia Islamia, New Delhi* | *5-6 February2018* | Functionalized nanostructured materials and their biomedical application |
|  | Invited talk | *International conference on Advances in Applied Sciences, Engineering and Technology* | School of Basic and Applied Sciences and School of Engineering and Technology *at K.R.Manglam University, Gurugram* | *2017* | Application of Nanomaterials for water remediation |
|  | Invited talk | Third International  Conference on  Nanotechnology for Better Living | *National Institute of  Technology, Srinagar* | *25-29 May 2016* | Prospects of Nanotechnology for detection of Water borne Pathogen |
|  | Invited talk | International Conference on Interdisciplinary aspects of nanotechnology and biological sciences “NanoBioInterface | *SBT, JNU, New Delhi* | *18-20March 2016* | Functionalization of iron oxide nanoparticles as a biosensing platform |
|  | Invited talk | 56th Annual Conference of Association of Microbiologist of India (AMI-2015) and International Symposium on Emerging Discoveries in Microbiology | *SLS, JNU, New Delhi* | *7-10 December 2015* | Nanobiointerface based biosensor for detection of Water borne pathogens |
|  | Invited talk | 3rd International Conference on Nanostructured Materials and Nanocomposites (ICNM) | Hindustan College of Science and Technology,*Farah, Mathura (U.P), India* | *12-14December 2015* | Biocompatible functionalized nanostructured materials for *Vibrio cholerae* detection |
|  | Invited talk | Second International Conference on Nanostructured Materials and Nanocomposites (ICNM 2014) | *Mahatma Gandhi University, Kottayam, Kerala, India* | *19-21 December 2014* | Metal oxide based biosensors for pathogen detection |
|  | Invited talk | 1st International conference on Emerging Trends of Nanotechnology in drug delivery | Sri Venkateswara College &*at Dept of Biochemistry University of Delhi South campus* India | *26-27 May 2014* | Nanostructure materials based Biosensors |
|  | Invited talk | India-Japan workshop on Biomolecular electronics and organic nanotechnology for environment Preservation (IJWBME-2013) | Delhi Technology University, Delhi and Kyushu Institute of Technology, *Japan* | *13-15 December 2013* | Response of Gelatin Modified Electrode towards Sensing of Different Metabolites |
|  | Invited talk | The International Conference on Biomedical and Pharmaceutical Engineering | *Singapore* | *11-13December 2006* | Oral Presentation on Application of self-assembled monolayer of Carboxy-1-Decanthiol for cholesterol biosensor |

**Invited Lectures in National Conferences**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Invited talk | Kalindi College, Delhi University, New Delhi under  | RASAYANIKA’22 | 21th April 2022 | Paradigm shifts towards women Entrepreneurship |
|  |  | National Science Day-2022Integrated Approach in Science and Technology for Sustainable Future  | *Periyar University, Salam,* *Tamil Nadu*  | 28th February, 2022 (Monday) | Prospects of Nanotechnology for Biomedical Applications |
|  |  | DBT Star College Scheme | Kirori Mal College, Delhi University, New Delhi  | 29th September 2021 | Nanoparticle-Based Sensors for Pathogen Detection: From Bench-side to Field Ready Application |
|  | Invited talk | Nanotechnology for Better Living | NIT SRINAGAR  | 7-11, September 2021 | Fluorometric Nanosensors for the detection of antibiotics in food samples |
|  | Invited talk | Next generation proteome mining and Nano-bio interactions for better plant growth | Department of Botany, University of Delhi  | December 27-29, 2021 | Nanomaterials based Smart sensor for soil nutrients monitoring |
|  | Invited talk | Environmental Science  | Refresher Course, HRDC, JNU  | 1 October 2021 5th | Carbon dot a based sensors for environmental Monitoring |
|  | Invited talk | Faculty Training Program (from June 7-12, 2021)  Recent Trends in Physics of Engineering Material (RTPEM-2021)   | Department of Physics, DCRUST, Murthal, Sonepat, Haryana | 9th June, 2021 (Wednesday) | Prospects of Nanomaterials for biomedical Applications |
|  | Invited talk | Indian Woman Scientists Association (IWSA)- Delhi | CSIR-National Physical Laboratory, New Delhi | 23 March 2021 | Societal Impact of Nanotechnology |
|  | Invited talk | Innovations in Material Science for Biomedical Applications. | CSIR-Advanced Materials and Processes Research Institute, Bhopal | 24-25 February, 2021 | Carbon dots as emerging nanomaterials for biomedical applications |
|  | Invited talk | International Webinar on “Emerging Materials and Technology for Water Purification | Jawaharlal Nehru College, Pasighat, Arunachal Pradesh | 12 August 2020 | Optical Nanosensor for Metal ions Detection |
|  | Invited talk | *A Three day National Webinar on Scientific Research and Technological Perspective during Covid-19 Pandemic* | *SHoDH Gujrat* Webinar | *24-26 July, 2020* | *Nanomaterials for Point of Care Diagnosis devices* |
|  | Invited talk | *Biosensor Society of India (BSI), Covid Webinar* | *IIT Bombay* | *2 July, 2020* | *Advances in Molecular Imprinting Polymer Technology for Virus detection : Corona* |
|  | Invited talk | Webinar on Perspectives of Nanosciece and Nanotechnology in the Present Scenario" on  | *School of Physical Sciences, JNU*  | 9th -10th June 2020 | *Functionalized nanostructured materials for potential biomarkers detection* |
| 1. 2.
 | Invited talk | *The occasion of Prof. A.N Maitra Memorial Seminar* | *Delhi University, New Delhi* | *9th February, 2019* | Functionalized nanostructured materials |
| 1. 2
 | Invited talk | *Workshop on Emerging Sensor Technologies – NEST 2019* | Department of Nanoscience and Technology, Bharathiar University, Coimbatore - 641 046, India | *7-8 January 2019* | Nanobiosensor for Cancer biomarkers detection |
| 1. 3
 | Invited talk | 111th Orientation Programme | UGC-HRDC, JNU | *8 October – 2 November 2018* | Nanotechnology for the Environment |
| 1. 4
 | Invited talk | 16th Refresher Course in Physical Science/Nano Science | UGC-HRDC, JNU | *27 August – 20September, 2018* | Nanostructured materials for Biomedical Application |
| 1. 5
 | Invited talk | SYSCON 2017-2018, Bridging the Gap: Basic and clinical research from Bench to Bedside | The society of Young Scientists, AIIMS, New Delhi | *11-12January 2018* | Potential of Nanomaterials towards Clinical Diagnostics |
| 1. 7
 | Invited talk | BioTikos, 2017 National conference, trends in Nanobiotechnology | Teri University, Delhi | *28-29 September 2017* | Functionalized Nanostructured Materials and their Applications |
|  | Invited talk | 86thAnnual conference of Society of Biological Chemists (SBC-2017)on Emerging discoveries in Health and agricultural Sciences | School of life sciences, JNU, New Delhi | *16-19November 2017* | Surface chemistry of Nanostructured Materials and their Applications |
| 1. 8
 | Invited talk | National Science Day-2017 | JNU, Delhi | *28th Feb 2017* | Nanobiosensors for Clinical Diagnosis |
| 1. 9
 | Invited talk | NCNNAM-2016 | BIT, Mesra, Ranchi | *26-27 September 2016* | Role of Iron Nanoparticles for Water Treatments |
| 1. 10
 | Invited talk | Workshop on Micro/nano Device Characterization & RFIC/MMIC Design | Keysight/Agilent at SCNS, JNU | *28 July 2016* | Microfluidics based Electrochemical Biosensor |
| 1. 11
 | Invited talk | Innovative Lecture Series | Department of Applied Sciences & Humanities, Jamia Millia Islamia, New Delhi | *7 April 2016* | Introductory talk on Nanobiotechnology |
| 1. 12
 | Invited talk | Poly-2016 | JNU | *9-10, March 2016* | Nano-structured Polyaniline based Biosensing Platform |
| 1. 13
 | Invited talk | National Seminar on Nanotechnology | Civil Engineering Department of ITM Universe, Vadodara | *11-12 March 2016.* | Applications of Nanostructured Materials for Immunosensor for Pathogen detection |
| 1. 14
 | Invited talk | National Workshop on “Nanotechnology for Biologist” | Department of Zoology, School of Life Sciences, PERIYAR UNIVERSITY | *6- 8 January2016* | Nanostructured materials for biosensors applications |
| 1. 15
 | Invited talk | Recent Trends in Nanobio Interface  | JNU. | *18 December 2015* | Nanostructured Materials based enzymatic biosensor for clinical diagnosis” |
| 1. 16
 | Invited talk | ”National Conference on Carbon Materials | Indian Carbon Society and NPL, New Delhi | *26-28 November 2015* | Oral Presentation on “Graphene based composite  for  biosensors  Application” |
| 1. 17
 | Invited talk | National Symposium on Agrochemicals for Food and Environment Safety | *IARI, New Delhi* | *28-30 January 2015* | Nanostructured material based biosensor for mycotoxins detection |
| 1. 18
 | Invited talk | National  Conference on Applied Physics and Material Science | Maharshi Dayanand University,  MDU, Rohtak | *5-6 February 2015* | Nanostructured Materials based Enzymatic Biosensors |
| 1. 19
 | Invited talk | The *Academic Staff College, Jamia Millia Islamia in Refresher Course* (4th 3-week) in Basic Sciences (Interdisciplinary) | *Jamia Millia Islamia,Delhi* | *12 May -02 June 2014* | Nanotechnology Application in Environment and Medical |
| 1. 20
 | Invited talk | 13th Refresher Course in Physics, Sept 2013 | *UGC, Academy staff college, JNU* | *3 Oct 2013* | Application of Biosensors for clinical Diagnosis |
| 1. 21
 | Invited talk | National Conference/ workshop on synthesis characterization and application of advanced nanomaterials 2014 | Hindustan college of science and Technology, Farah, Mathura (U.P) | *17-19th  Jan. 2014* | Electrochemical studies of gelatine-zinc oxide based nanocomposite for biosensor application |
| 1. 22
 | Invited talk | National Conference on Biomedical Science and Technology, 2013 | *National Physical Laboratory, New Delhi* | *21-22nd Nov 2013* | - |
| 1. 23
 | Invited talk | Jamia Milia Ishlamia conference | Jamia Milia Ishlamia,Delhi | *13th March 2013* | - |
| 1. 24
 | Invited talk | National Symposium on Nanobiotechnology (NSNT-2012) & Exhibition | IIT, Mandi, HP | *2 June 2012* | Nanostructured Nickel oxide Biowires for Bacterial Detection |
| 1. 25
 | Invited talk | Nano Sensors 2008 (National Workshop on Nanosensors and Devices) | Deptt. of *Physics IIT Delhi* | *22-3rd  Dec 2008* | Nanostructured zinc oxide plateform for cholesterol sensor |
| 1. 26
 | Invited talk | National workshop on Immobilized Enzyme Technology for Sensors | Department of Biosciences, *Maharshi Dayanand University, Rohtak* | *24thAug-2nd Sept, 2007* | Conducting polymer based biosensors |
| 1. 27
 | Invited talk | *DST sponsored work shop* | *Jodhpur, India* |  | Application of electrochemically prepared poly N-methyl pyrrole-PVS films to cholesterol biosensor |
| 1. 28
 | Invited talk | *Science and Technology of Sensors Based On NanoMaterials* | *JNV University, Jodhpur* | *30 Aug. 2005* | Expert Lecture delivered on Cholesterol Biosensor.  |

**Poster/oral or participation in conferences/Seminars**

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| --- | --- | --- | --- | --- | --- |
| **S.No** | **Lecture** | **Conference** | **Venue** | ***Date*** | **Title** |
| 1 | Poster Presentation | 2nd Annual Conference of Indian Society of Nanomedicine (ISNM) | IISER Thiruvananthapuram in the partner with AIIMS, New Delhi | *6-8 December, 2017* | Cystein capped gold nanoparticles based biosensing platform for invasive IL-8 detection |
| 2 | Poster Presentation | International symposium on cancer prevention and treatment |  Cancer Research and Care Academy, SLS, JNU | *February 9-10, 2018* | Prospect of Cancer Biomarkers detection using Electrochemical Technique |
| 3 | Participation | NanoIndia-2017 | Indian Institute of Technology, Delhi | *15-16 March 2017* |  |
| 4 | Participation | ICRANN-2016 | JNU, New Delhi | *19-20 December 2016* |  |
| 5 | Participation | Nanoboteck -2016 | AIIMS, New Delhi | *24-26 November* |  |
| 6 | Participation | Dr. (Maj) S K Lal Centenary Symposium |  | *14-15 November 2016* |  |
| 7 | Participation | National Programme for training of Scientist and Technology working in the Govt.  |  Baroda | *9-13 January, 2017* | Training program on “The Science of Living” |
| 8 | Participation | 7th Symposium on Frontier in Molecular Medicine | JNU, New Delhi | *23-24 March 2017* |  |
| 9 | Poster presentation  | Workshop on Nanoengineering in Medicine | AIIMS, New Delhi | *17th- 19th December 2014* | Electrochemical response of Agar Ionogels towards glucose detection |
| 10 | Oral presentation | National Symposium/workshop on new trends of biosensor technology | Hindustan College of Science and Technology, Farah, Mathura | *17-19th Jan 2009* | **i)** Application of self-assembled monolayers for ochratoxin detection. **ii)** Amperometric molecular biosensor for diagnosis of infectious diseases Meningitis.  |
| 11 | Poster Presentation |  | Institute of Physics, Bhuvneshwar | *19-22th Feb 2008* | ***Electrochemical entrapment of horseradish peroxidase onto polyaniline film*** for biosensing application |
| 12 | Participation | 18th Annual General Meeting MRSI | National  Physical Laboratory, New Delhi | *12-14th Feb 2007* |  |
| 13 | Poster Presentation | National Seminar on Multifunctional Nanomaterials Nanostructures and Applications (MNNA-2006) | Department of Physics and Astrophysics, University of Delhi  |  *22-23rd December 2006.* | *Surface Plasma Resonance based Peptide Nucleic acid Biosensor for detection of M. Tuberculosis.* |
| 14 | Poster Presentation | Role of electrochemistry in biosensors nanomaterials fuel cells and ionic liquids (DM-BNFL-2006) | Bhabha Atomic Research Centre, Trombey, Mumbai | *23-25th September 2006* | *Surface Plasma Reso61nance based Nucleic Acid Biosensor for detection of M. Tuberculosis.*  |
| 15 | Participation | Brain Storming Work Shop sponsored by the Department of Biotechnology (DBT), organized by Dr. B.D. Malhotra | National Physical Laboratory, New Delhi | *27th -28th April 2005* |  |
| 16 | Poster Presentation | Ist Annual Symposium in Biochemical Sciences | Hall Dr. BR Ambedkar Centre for Biochemical Research, University of Delhi | *13-14th April, 2001* | BOD biosensor- A step ahead for rapid assessment of BOD load |
| 17 | Poster Presentation | India-Japan Workshop on New Advanced materials in Molecular Electronics | National Physical Laboratory, Delhi | *10-11 Dec 2001* | BOD analysis of industrial effluents: 5 days to 5 minutes |
| 18 | Oral Presentation |  | Maharishi Dayanand University, Rohtak | *23-24 Mar. 2000* | Lavania maryda chater me matasya palan. Rastriya sangosthi me lavania maryda ka jalkrishi hetu upyog |
| 19 | Oral Presentation | Regional conference on the strengthening scientific and technological self reliance with focus on Agriculture | CCS Haryana Agriculture University, Hissar | *28 –30 Apr 2000* | Keeping our sources of drinking water clean and protected |
| 20 | Oral Presentation | 21st Annual session of The Academy of Environmental Biology & National symposium on “Eco-physiological Consequences of Environmental Pollution” | Dept. of Fisheries, Narendra Dev University of Agriculture & Technology, Kumarganj, Faizabad U.P | *6-8 Nov. 2000* | Effect of toxicants on the intestine transport in fishes |
| 21 | Oral Presentation | 20th annual session of the academy of Environmental Biology | Visakhapatnam University | *2-4 Dec.1999* | Interaction between copper and cadmium in *Channa punctatus* exposed to sublithal concentration of two metals |
| 22 | Oral Presentation |  | Maharishi Dayanand University, Rohtak  | *18 Dec 1999* | State of drinking water supply in Haryana-Its problem and solutions keep our Environment clean and green |
| 23 | Oral Presentation | Annual session of the academy of Environmental Biology | Department of Zoology, Barelly | *14-16 Nov.1998* | Ground water quality in rural areas of Rohtak District |
| 24 | Oral Presentation | All India Symposium on Environment and Health | Ch. Charan Singh University Meerut | *19-21 Oct.1997* | Quality of water supply by municipality of village Chahara District. Rohtak (Haryana) |
| 25 | Oral Presentation | Woman and Environment National Symposium on public   participation in Environment protection | Jodhpur University, Jodhpur | *22-23 Dec 1997* | Women and health |
| 26 | Oral Presentation | Workshop of development of intensive aquaculture in fresh and saline water in Haryana | CCS Haryana Agricultural University (H.A.U., Hissar) | *25-27 Sept.  1997* | Characteristics of water resources in relation to their suitability for drinking at village Chahara Distt. Rohtak (Haryana) |

**RESEARCH STUDENTS GUIDED FOR Ph.D**

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| --- | --- | --- | --- | --- |
| **Sr.****No.**  | **Name**  | **Year** | **University/Institute** | **Title of thesis** |
|  | Archana  | 2022 | Special Centre for Nanosciences, JNU, New Delhi | SCNS student |
|  | Amit Kumar Yadav |  Pursuing | Special Centre for Nanosciences, JNU, New Delhi | SCNS student |
|  | Reena Sajwan |  Pursuing | Special Centre for Nanosciences, JNU, New Delhi | SCNS student |
|  | Navneet Chaudhary  |  Pursuing | Delhi Technological University, New Delhi | (Co-supervise) |
|  | Amit Ahlawat |  Pursuing | DCRUST | (Co-supervise) |
|  | Damini Verma |  Submitted December2021 | Amity University, Noida | (Co-supervise) |
|  | Ms. Smriti Sri |  Awarded September 2021 | Special Centre for Nanosciences, JNU, New Delhi | Tentative title: Synthesis of Carbon Dots (CDs) and their application in oral cancer detection |
|  | Rahul Kumar |  Awarded March 2022 | School of Physical Science/ Special Centre for Nanosciences, JNU, New Delhi (Co-supervise) | Studies on functionalized Vanadium disulphide Quantum dots for optical and electrochemical sensor applications |
|  | Avinash Kumar Singh |  Awarded December 2021 | School of Physical Science/ Special Centre for Nanosciences, JNU, New Delhi(Co-supervise) | Development of Nanomaterial based Sensors for Mycotoxins Detection using Opticaland Electrochemical Techniques |
|  | Manvi Singh |  Awarded June 2021 | Jamia Humdard/ Special Centre for Nanosciences, JNU, New Delhi (Co-supervise) | Exploration of Nanotherapeutic Interventionfor Biofilm Disruption of Enterococcusspecies |
|  | Ms. Deepika Chauhan |  Awarded June 2021 | Special Centre for Nanosciences, JNU, New Delhi | Design, Development, and characterization of different nanostructures for biomedical applications |
|  | Mr. Tamal Sarkar  |  2019 Awarded | Special Centre for Nanosciences, JNU, New Delhi | Kinetics of Nanocomposites Gels and Electrochemical biosensing based on Carbon dots and magnetite nanoparticles |
|  | Mr. Pramod K. Gupta | 2019Awarded | Department of Applied Sciences and Humanities, Faculty of Engineering and Technology, Jamia Milia Islamia/ Special Centre for Nanosciences, JNU, New Delhi(Co-supervise) | Studies on Nano-Biosensors |
|  | Mr. Yana Bagbi | January 2019Awarded | North eastern Regional Institute of Science and Technology, Nirjuli, Arunachal Pradesh/ Special Centre for Nanosciences, JNU, New Delhi(Co-supervise) | Engineered Nanomaterials for the application in remediation of heavy metal ions (Pb2+& Cr6+) from water |
|  | Mrs. Anshu Sharma | 2016Awarded | Special Centre for Nanosciences/School of Physical Sciences, JNU, New Delhi(Co-supervise) | Internal Structure, Thermo-viscoelastic and electrochemical properties of ionogels, Organogels and nanocomposites |

**Honors/Awards/Recognitions**

1. Recipient of Visitor Award 2019 given by Honorable President of India.
2. Young Scientist Award from Department of Science and Technology (DST): June 2009- 12 Sept 2012.
3. Senior Research Associate (SRA)/Pool Scientist (CSIR): 09 June 2006 to 2009.
4. Best poster award in “Biomaterials and Implants: Prospects and possibilities in the new millennium” organized by Bioceramics and Coating Division, Central Glass and Ceramic Research Institute, Kolkata during July 21-23, 2011.
5. Outstanding Paper Award in International Conference on Biomedical and Pharmaceutical Engineering during 11-13 December 2006, Department of Biomedical Engineering, Nanyang University, Singapore.
6. Best Poster Presentation Award in International Conference Asian Pacific Conference of Clinical Biochemistry, New Delhi 09-14 March, 2002.
7. Best presentation of Paper Medal (BRPM) in Conference of Academy of Environmental Biology, Department of Zoology, Andhra University, Visakhapatnam in 2-4 December 1999.
8. University Research Fellowship (URF), Maharishi Dayanand University, Rohtak, during 1996-2000.

**Foreign Visits/Deputations**

1. Prospects of Nanostructured Materials for Clinical Danostics"in Biotechnology: state of the art and perspectives. Life Sciences.” the forum session Biosensorics: challenges and solutions” Forum held in Moscow, May 23 - 25, 2018 in Gostiny Dvor, ul. Ilyinka,
2. 9th International C+NANO Convergence Technology Symposium (10th ICTS) organized by Department of Nanoscience and Engineering, Inje University, South Korea during 16-17 January 2018.
3. Tokyo Institute of Technology (TIT), Tokyo, Japan: Worked on organic properties of monolayers and their application for biosensors in the COE program under the supervision of Prof. M. Iwamoto during October 2005 to Jan 2006.
4. International Conference on Biomedical and Pharmaceutical Engineering, 11-13 December 2006, Department of Biomedical Engineering, Nanyang University, Singapore.
5. Conventional International Centre, Shanghai, China: participated Biosensor 2008 during 14-16 May 2008.

**ECS-JNU Student Chapter**

* ECS Board of Directors approved our application as the Jawaharlal Nehru University Student Chapter on Friday, October 22, 2021, during the 240th ECS Meeting.

***Activities: -***

1. The ECS- Jawaharlal Nehru University Student Chapter organized 1st webinar on “Gut Microbiota-derived Metabolites as Potential Biomarkers” (Online) at Special Centre for Nanoscience, JNU on 13th January, 2022.
2. The ECS- Jawaharlal Nehru University Student Chapter organized 2nd One Day Symposium “Sensors for Society”, (Offline) at Convention Centre, JNU on 27th April, 2022.

**Membership of Professional Societies**

1. Member of Electrochemical Society, 2021-2023; ID: 480629
2. American Chemical Society (ACS) Membership, 2019
3. Life member of Indraprastha Vigyan Bharti, Delhi Chapter of Vijana Bharti, MI 7457
4. Founder members of Indian Society of Nanomedicine, AIIMS
5. Founder members of Nano and Molecular Society, India.
6. Life membership of Indian Carbon Society
7. Materials Research Society of India, IISc. Campus, Bangalore.
8. Indian Science Congress Association, Calcutta.
9. Indian Woman Scientist’s Association (IWSA).
10. Swadeshi Science Moment, Delhi.
11. Biosensor Society (India).
12. Academy of Environmental Biology (AEB, Lucknow)

**National and International Collaborators:**

* Prof. E. Sergei, Prof. Prof. Boris Dzantiev, A.N. Bakh Institute of Biochemistry, Research Centre of Biotechnology of Russian Academy of Science, Moscow, Russia
* Prof. Seeram Ramakrishna, Dr. Chetna Dhand, National University of Singapore, Singapore
* Dr. Ajeek Kaushik, [Florida International University](https://www.researchgate.net/institution/Florida_International_University), Miami, United States
* Prof. Ki-Ho Han, Inje University, South Korea
* Prof. M. Iwamoto, Prof. Takaaki Manaka, Tokyo Institute of Technology, Japan
* Prof. B.D.Malhotra, Delhi Technological University/National Physical Laboratory, New Delhi
* Dr. Amulya Panda, Dr. Anil Kumar, National Institute of Immunology, New Delhi, India
* Prof. Amit Dinda, Prof. Alok Thakar, AIIMS, New Delhi, India
* Dr. Rinu Sharma, Guru Gobind Singh Indraprastha University (GGSIP), New Delhi
* Dr. Sandeep Jha, Dr. Mukul Sarkar, IIT, Delhi, India
* Dr. R.K. Kotnala, Dr. Ved Varun, National Physical Laboratory, New Delhi, India

**Research student’s guidance:**

**M.Sc. and M. Tech Student Training @ SCNS 2013 onwards:**

1. Prachi Sharma, Special Centre for Nanoscience, Jawaharlal Nehru University, New Delhi, India
2. Awedesh K.Verma, Special Centre for Nanoscience, Jawaharlal Nehru University, New Delhi, India
3. Roshni, Special Centre for Nanoscience, Jawaharlal Nehru University, New Delhi, India
4. Tanushri Sarkar, Indira Gandhi National Tribal University, Amarkantak, M.P (13 Jan-30 May 2020; 5 months)
5. Manual Fermandes, Indira Gandhi National Tribal University, Amarkantak, M.P (13 Jan-30 May 2020; 5 months)
6. Ms.Shailja, IP University (Jan –June 2020, 6 months)
7. Marinal Poddar, Amity University, (Jan -May 2020, 6 Months)
8. Ms. Neha Mehlawat, Fellowship Training, Amity University, Noida (May –July 2019, 2 months)
9. Ms.Shailja , IP University (May –July 2019, 2 months)
10. Mr. Sidharth, AINT, Amity, Noida (Six Month).
11. Ms. Kanika Kamboj, DU, Currently pursuing M. Sc. (Chemistry) at University of Chemistry, South Campus, Delhi.
12. Ms. Apoorva-Currently pursuing her Ph. D. at University of Mississippi, Oxford-Mississippi, USA.
13. Mr. Chandrashekar- M. Tech (Nano Science & Technology), IP University.
14. Ms. Udisha Singh- M. Tech (Nano Science & Technology)-Currently pursuing her Ph. D. at Indian Institute of Technology, Gandhinagar.
15. Ms. Prarthana Khurana-, TERI, M.Sc. (Plant Biotechnology), (six month).
16. Mr.Anuj Soni-M.Sc.(Bio Technology)-Currently working at Lupin Pharmaceuticals Limited.
17. Mr. Suryansh Saxena-Currently doing his Integrated M.Sc. (Chemistry) at Integrated Science Education and Research Center, Visva Bharati University, West Bengal.
18. Ms. Purnima-M. Tech, IP University (Nano Science & Technology)-(2+ 6 month) currently doing job in private sector.
19. Ms. Reena, M. Tech, IP University (Nano Science & Technology, (2+ 6 month)
20. Dr. Neethu Narayanan, Scientist, IARI, New Delhi (three month training)
21. Ms. Disha Jain, M. Sc. Applied Chemistry, Amity University, January - 29th June, 2015.
22. Ms. Drishti Khandelwal, M. Sc. Applied Chemistry, Amity University, January – 29th June, 2015.
23. Ms. Ashutosh Kumar, M. Tech, Centre for Nanotechnology, Central University of Jharkhand August, 2015 to June, 2016.
24. Ms. Anuradha Rajput, M.Sc., SPS, JNU, New Delhi (Six month), January2016-May 2016.
25. Mr. Dinesh Boral, M.Sc. SPS, JNU, New Delhi (Six month)
26. Ms. Yana Bagbi, M.Sc. SPS, JNU, New Delhi (Six month)
27. Ms. Monika Chaudhary, M.Sc., Amity University of Nanotechnology (Six month)

**At NPL**

1. Mr. Akhlesh K. Gupta, M.Tech., Tejpur University,(one year; June 2009-May 2010)
2. Ms. Shilpa, M.Tech., Guru Jambheshwar University of Science and Technology, Hisar (9 Months; Sep.2007- May 2008).
3. M. Gauthaam, PSG college of technology, Coimbatore, Tamil Nadu (May –July 2011;3 Month)
4. M. Jhol, B.Tech., Maharishi Arvind Institute of Eng. Tech. Jaipur (Aug-Sept 2008; 2 Month)
5. Ms. Priyanka Mehta, B.Tech.,IP university, New Delhi (June-July 2007; 2 Months)

**Member of Committee/Conference Organized/co-ordinator**

1. Partima Solanki Refresher Course Co-coordinator : 20th Refresher Course in Physical Sciences Nano Sciences [July 11- 23 , 2022]
2. Partima Solanki Refresher Course Co-coordinator : 19th Refresher Course in Physical Sciences Nano Sciences [January 10- 22 , 2022]
3. Partima Solanki Refresher Course Co-coordinator : 18th Refresher Course in Physical Sciences Nano Sciences [16th November – 28th November, 2020]
4. NEP
5. SCNS programme
6. Coordinator of refresher course on 18th Refresher Course in Physical Sciences & Nano Sciences, HRDC, JNU from 16 -28 November 2020
7. Webinar organized (team member) on Recent Advances in Nanoscience and It’s Applications, 27th - 28th July, 2020.
8. Coordinated orientation course of "116th Orientation Programme beginning from January 6th to 25th, 2020 at the UGC-HRDC, JNU
9. Conference chair of National conference on “Nano/Biotechnology”, jointly organized by JNU and NII, New Delhi 19 – 21 December, 2019
10. Advisory Committee member of Technology development programme at DST, 2019
11. Organizing committee member of National Science day 2018, JNU.
12. Organizing committee member of 2nd Convocation of JNU, 2018, JNU.
13. Organizing committee member of National Science day 2017, JNU.
14. Advisory member of National Conference on Trends in Nanobiotechnology during 29-30 November 2016 at CCS HAU, Hisar.
15. Centre representative for organizer in Jan-Jan JNU open day 2016.
16. Member of organizing ICARAN-2016, December at SCNS, JNU
17. Member of organizing ICARAN-2014, 19-20 December.
18. Organized a one-day seminar at SCNS, JNU (Recent Trends in Nano-bio interface 18 December 2015) -30
19. As a co-chair of3rd International Conference on Nanostructured Materials and Nanocomposites (ICNM), organized by Hindustan College of Science and Technology, Farah, Mathura (U.P), India. 12-14th December 2015.
20. Nominated by VC “Selection Committee for recruitment to the post of Jr. Assistant-cum-Typist on 24th September 2014.
21. In Advisory Committee of “1st International conference on Emerging Trends of Nanotechnology in drug delivery” held on 26-27 May 2014 jointly organized by Sri Venkateswara College & at Dept of Biochemistry University of Delhi South campus India with Centro de Quimica da Madeira University of Madeira PORTUGAL.
22. Local Organizing committee of “ India-Japan Workshop on Bio molecular Electronics & Organic Nanotechnology for Environment Preservation (IJWBME-2013) conducted at Delhi Technological University on **December 13-15, 2013.**
23. As a member of Conference Local Organizing committee **“**India-Japan workshop on Biomolecular electronics and organic nanotechnology for environment Preservation hold at Delhi Technology University, Delhi during 13-15th Dec. 2013.
24. Member of Academy of human excellence, science of living 9-13 Jan, 2017 at Baroda.
25. Local Organizing committee of “ India-Japan Workshop on Bio molecular Electronics & Organic Nanotechnology for Environment Preservation (IJWBME-2009) conducted at National Physical Laboratory, New Delhi.
26. Member of a special committee at SCNS from 2013 to till date
27. Examiner of Ph.D and M.Tech students at SCNS from 2013 to till date
28. I have actively participated in the development and establishment of lab infrastructure at SCNS

**Research and Teaching Experience**

**Present Position:** Assistant Professor, (14 March 2013) Special Centre for Nano Sciences, Jawaharlal Nehru University, New Delh-110067

**Teaching Experience:**

Assistant Professor: Amity Institute of Nanotechnology, Noida, UP. (12 Sept.- 13 March 2013)

**Positions Held**

|  |  |  |  |
| --- | --- | --- | --- |
| **Post** | **Organization** | **Dates** | **Nature of Work** |
| Fast Track, Young Scientist (DST) | CSIR-National Physical Laboratory (NPL), New Delhi | 09.06.2009-12 Sept. 2012 | Development of Biosensors for Detection of Pathogens |
| Senior Research Associate (SRA) | CSIR-NPL, New Delhi | 09.06.06-09.06.09 | Technical Development of cholesterol biosensors. |
| Research Associate (RA) | CSIR-NPL, New Delhi | 13.01.06- 27.05.06 | Development of DNA biosensor |
| COE, Research Scientist | Tokyo Institute of Technology (TIT), Japan | 15.10.05- 12.01.06 | Preparation and characterization of self-assembled monolayers |
| Research Associate (RA) | CSIR-NPL, New Delhi | 27.11.03- 26.09.05 | Development of cholesterol biosensor |
| Research Associate (RA) | CSIR-Institute of Genomics and Integrative Biology (IGIB), Delhi | 09.10.2000–30.11.2001 | Development of BOD biosensor |

**Others**

**Course Co-coordinator and Teaching**

* NS 615 Bio-nanosciences, Ph.D course,SCNS
* NS 622 Research Methodology III (Application of Nanomaterials in Biology), Ph.D course, SCNS
* Nanobiosciences (M.Tech., Nanoscience and Nanotechnology)
* Nano Biosensor and Microfluidics (M.Tech., Nanoscience and Nanotechnology)
* Bioelectronics Devices (B.Tech. course, JNU), School of Engineering, JNU
* Nanotechnology in Auyurveda (M.Sc, 8th Semester course), School of Auyurveda, JNU

**Courses attended**

* **Orientation Course**: Participate in 89th Orientation Course organized by Academy staff College, JNU during 10 Feb 2014-7 March 2014.
* **Refresher Course: Participate in 1st Refresher Course in Life Sciences and Biotechnology organized from 20 July -14 August 2015 at** Academy staff College, JNU.
* Contribution to course developments: Pre –Ph.D course Bionanosciences to be implementing at SCNS, JNU.

**Reviewer**, (i) *Chemical Review*; (America Chemical Society) (ii) *Micro Chima Acta (Springer)*; (iii) *Sensor Letter (*American Scientific Publishers); (iv) *Material Letter (Elsevier)*; (v) *African J Pharmacy and Pharmacology (Academic Journals,’ Open Access Journal )*; (vi) *J Experimental Science*; (vii) International Journal of Water Resources and Environmental Engineering *(O*pen access journal) (viii) The Institute of Electronics *Information and Communication Engineers (*GREEN publisher) (ix) *Sensors (O*pen access journal); Materials Chemistry and Physics (Elsevier), Scientific report, Biosensors and Bioelectronics (Elsevier),