



## Ramkrishna Sen

**Professor, Department of Bioscience & Biotechnology; Prof.-in-charge, ALPGE; Former Head, Department of Biotechnology; Ex-Chairperson, School of Bioscience and Central Research Facility (Life Science Div)**  
**Indian Institute of Technology Kharagpur, WB 721302, India**  
**Specialization: Bioprocess Engineering & Technology**  
**Ex-Chairman (GATE-&-JAM); Ex-Manager (R&D-Biotech), Cadila Pharma**



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Publications/Citations: <http://scholar.google.co.in/citations?user=FhCZ9AsAAAAJ>

**Ph.D (Chemical Engineering) : Indian Institute of Technology Madras (1997)**  
**M.Tech (Biotech; Spl.: Biochemical Eng.): Jadavpur University, Calcutta (1992)**  
**B.Tech (Chemical Technology) : Calcutta University (1990)**

- **Total Teaching & Academic Research Experience:** ~ **23 Years** (Post Ph.D)  
 [In: IIT Kharagpur ~ 17 Years; Other institutions ~ 4 Years (Anna Univ; Madras Univ; Pondicherry Univ; BITS Pilani – taught UG & PG level Bioprocess Eng/Technology courses)]
- **Industrial R&D Experience:** ~ **3 years** (Post Ph.D) as **Deputy Manager** & **Manager (R&D – Biotech)**, Cadila Pharma Ltd., Ahmedabad, India.
- **R&D Now** – Biorefinery & Bio-CCS; **Green**; Marine **Blue** & Industrial **White** Biotech
- **Publications:**

<b>Total</b>	–	<b>272 [h-index = 58]</b>
☛ Journal	–	<b>174 [Citations: 13032 as on 31-03-24]</b>
☛ Book chapters	–	<b>22</b>
☛ 1Books/Edited Volumes	–	<b>07 [Springer USA &amp; Singapore; Taylor &amp; Francis]</b>
☛ Conference Proceedings/Others	–	<b>69</b>
- **PATENTS:** Filed: **14 (International: 3)**
- **AWARDS/HONOURS:** Featured in the World Ranking of Top 2% Scientists (Stanford University; 2021, 2022); The Wellcome Trust Institutional Partnership Project Award (Wellcome iTPA; 2019); Shastri Indo-Canadian Institute Grant (2018); Distinguished Alumni Award – Jadavpur University, Kolkata (2017); Fulbright Visiting Faculty – USA (2013–14); National Tech Innovation Award (2012; Govt. of India); UKIERI-British Council Award for Academic Visits (UK) (2007–08)
- **Ph.D Guidance:**

<b>Total</b>	–	<b>44</b>
☛ <b>Awarded/Defended</b>	–	<b>28* (* 2 International)</b>
☛ <b>Thesis Submitted/Evaluated</b>	–	<b>01</b>
☛ <b>In progress</b>	–	<b>15</b>

### Sponsored / Consultancy / Industrial Projects:

- Total No. – **45** {Total GRANT since 2004 in IIT-Kgp}: ~ ₹ **201 Million** [as PI & Co-PI]
- ☛ **Completed: 40** [Sponsored = 37 + Consultancy = 3]; In Progress: **5**
  - **Industrial Projects (Cadila Pharma Ltd.): 3** (Pilot scale – 1; R&D projects – 2)
  - **International Collaborations:** University of California at Berkeley; Columbia University, New York; University of Pennsylvania, Philadelphia, **USA**; U-Padova, **Italy**; TU-Munich – **Germany**; U-Ulster, RHU of London & U-Edinburgh **UK**; UFRJ, Rio-de-Janeiro, **Brazil**; U-Minho, **Portugal**; U-Melbourne & Curtin University, **Australia**; U-Auckland, **New Zealand**; U-Peradeniya, **Sri Lanka**; Queen's University & U-of-Toronto, **Canada**; The UiT, **Norway**; Ghent Univ, **Belgium**;
  - Exchange Program: Indo-UK; Indo-Brazil; Indo-Portugal; Indo-Canada; Indo-USA; Indo-Australia; Indo-EU(Norway+3); Indo-Sri Lanka; Indo-Belgium;
  - Founding member: Biological Engineering Society (India); Global Biorenewables Research Society
  - Life Member: IChE; European & Asian Federations of Biotechnology; Journal Editor/Ed Board Member: **4**
  - Biography published in **Who's who in Science & Eng. (2007) and in the World (2008)**
  - Academic Visits Abroad: Australia; Brazil; Canada; Czech Rep; France; Germany; Italy; Malaysia; Mauritius; Norway; Portugal; Singapore; Sri Lanka; Switzerland; UK & USA

## Snapshot of Academic/R&D Performances (Updated till 31-03-2024):

### Publications:

**Number of Journal Publications: 174 (International: 171; National: 03)**

**Book Chapters: 22**

**Books/Edited Volumes: 07** (Springer, USA; Springer Nature Singapore; Taylor & Francis)

**Conference Proceedings/Others: 69**

**TOTAL: 272**

**Cumulative Impact Factor ~1105; Average Impact Factor: ~7.0; Number of Citations: 13032**  
**h-index: 58** (<http://scholar.google.co.in/citations?user=FhCZ9AsAAAAJ>)

**PATENTS: 14 (International: 3); Ph.D Guidance: 44** [Thesis awarded/defended: 28\*;  
 Thesis Submitted/Evaluated: 01; Thesis in Progress: 15; **Total joint-guidance: 21/43**  
 (\*International: Jointly guided one student registered in the Melbourne University, Australia and  
 another in The University of Auckland, New Zealand. Both received their PhD degrees in 2020)

**Projects: 45 – Sponsored Projects: Completed: 34; In progress: 5; Consultancy Projects:**  
**Completed – 03; On-going: 00; Industrial R&D Projects: Completed – 03 (in Cadila)**

## Snapshot of Administrative Experience (Updated till 31-03-2024):

1. Head, Department of Biotechnology, IIT Kharagpur ~ **3.5 Years**
2. Chairperson, School of Bioscience, IIT Kharagpur ~ **1.5 Years**
3. Chairperson, Central Research Facility (Life Science Division), IIT Kharagpur ~ **1.5 Years**
4. Professor-in-Charge, Advanced Lab for Plant Genetic Engineering ~ **3 Years** (Continuing)
5. Vice Chairman & Chairman, GATE & JAM, IIT Kharagpur – **3 Years**
6. Deputy Manager & Manager (R&D – Biotech), Cadila Pharmaceuticals Ltd. ~ **3 Years**
7. Member Secretary, Institutional Biosafety Committee (IBSC, DBT) ~ **2 Years** (Continuing)
8. Member, Governing Body of the Science & Technology Entrepreneurship Park, IITKgp – **3 Years**
9. Member, Board of Studies, Department of Biotechnology, GITAM University – **2.5 Years** (Cont.)
10. Member, Academic Council, University of Engineering & Management, Kolkata – **3 Years** (Cont.)
11. Member, Governing Body of GMDC Science & Research Centre (GSRC), Gandhinagar, Gujarat

## LIST OF JOURNAL PUBLICATIONS: 174 (TOTAL IMPACT FACTOR ~1105)

Sr. #	INTERNATIONAL JOURNAL PUBLICATIONS	Journal Impact Factor (2/5 Yr)
1.	Kumar RR, Sarkar D & <b>Sen R*</b> (2024) Simultaneously maximizing microalgal biomass and lipid productivities by machine learning driven modelling, global sensitivity analysis and multi-objective optimization for sustainable biodiesel production. <i>Applied Energy</i> , <b>358</b> : 122597.	11.2
2.	Prasad PS, Byram P, Hazra C; Chakravorty N, <b>Sen R</b> , Das S & Das K (2024) Biosurfactant-Assisted Cu Doping of Brushite Coatings: Enhancing Structural, Electrochemical, and Biofunctional Properties. <i>ACS Applied Materials &amp; Interfaces</i> , <b>16</b> : 10601–10622.	9.5
3.	Gupta C, Hazra C, Poddar P, Dhara D, Byram PK, Chakroborty N, <b>Sen R*</b> , Ghosh SK (2024) Development and performance evaluation of self-assembled pH-responsive curcumin-bacterial exopolysaccharide micellar conjugates as bioactive delivery system. <i>International Journal of Biological Macromolecules</i> , <b>263</b> : 130372.	8.2
4.	Dey D, Shafi T, Dubey B, <b>Sen R</b> & Chowdhury S (2024) Progress and perspectives on carbon-based materials for adsorptive removal and photocatalytic degradation of perfluoroalkyl and polyfluoroalkyl substances (PFAS). <i>Chemosphere</i> , <b>351</b> : 141164.	8.8
5.	Mandal S, Hazra C, Joshi N, Jain N, Kumar P, <b>Sen R</b> , Das S & Das K (2024) A comparison of chemical and biogenic surfactant mediated synthesis of ZnO/CuO: Highlighting the antimicrobial activity of the bio-functionalized metal oxide nanoparticles. <i>Colloids &amp; Surfaces A: Physicochemical and Engineering Aspects</i> , <b>690</b> : 133780.	5.2

6.	Ghosh A, Krishna G, Gupta C, Hazra C, Das L, Chakravorty N, ..., Lin C-J, <b>Sen R</b> , Dasgupta N, Ranjan S (2024) Low-temperature single-step synthesis of carbon dots for advanced multiparametric bioimaging probe applications. <i>ACS Applied Bio Materials (In Press)</i> .	4.7
7.	Sinha T, Borah D, Sarad R, Mudliar SN, Chauhan VS, <b>Sen R</b> & Rout J (2024) Nutrient and salinity stress induced biodiesel production from a green alga, <i>Monoraphidium neglectum</i> . <i>Biocatalysis and Agricultural Biotechnology</i> , 57: 103090.	4.0
8.	Das S, Chowdhury C, Pavan Kumar SM, Roy D, Gosavi SW & <b>Sen R</b> (2024) Microbial production of N-acetyl-D-glucosamine (GlcNAc) for versatile applications: Biotechnological strategies for green process development. <i>Carbohydrate Research</i> , 536: 109039.	3.1
9.	Thomas AP, Kasa VP, Dubey BK*, <b>Sen R</b> , Sarmah AK (2023) Synthesis & commercialization of bioplastics: Organic wastes as sustainable feedstock. <i>Sci. of the Tot. Environ.</i> , 904:167243.	9.8
10.	Debnath A, Hazra C & <b>Sen R*</b> (2023) Insight into biomolecular interactions based non-classical crystallization of bacterial biocement. <i>Applied Microbiology &amp; Biotechnology</i> , 107:6683–6701.	5.2
11.	Mandal S, Hazra C, Kumar P, Jena S, <b>Sen R</b> , Das S & Das K (2023) Lipopeptide and glycolipid assisted growth of ZnO micro-/nano-structures: Evaluating the role of chemical and microbial green surfactant. <i>Journal of Industrial and Engineering Chemistry</i> , 129:352-364.	6.1
12.	Mitra R, Dasgupta A, Kumar R & <b>Sen R*</b> (2023) A cleaner and smarter way to achieve high microalgal biomass density coupled with facilitated self-flocculation by utilizing bicarbonate as a source of dissolved carbon dioxide. <i>Journal of Cleaner Production</i> , 391, 136217.	11.1
13.	Prasad, P. S., Hazra, C., Jena, S., Byram, P. K., <b>Sen, R.</b> , Chakravorty, N., Das, S. and Das, K. (2023) Pulse galvanostatic electrodeposition of biosurfactant assisted brushite-hydroxyapatite coatings on 316 L stainless steel with enhanced electrochemical and biological properties. <i>Colloids and Surfaces A: Physicochemical and Engineering Aspects</i> , 671, 131651.	5.2
14.	Dey D, Chowdhury S* & <b>Sen R*</b> (2023) Insight into recent advances on nanotechnology-mediated removal of antibiotic resistant bacteria and genes. <i>J. Water Process Eng.</i> , 52: 103535.	7.0
15.	Sikder A, Mondal S, Rabiya R, Biswas P, Pal S, <b>Sen R</b> & Singh NDP* (2022) β-Carboline-Norfloxacin Nanoconjugates as Antibacterial Nanophotocages for the Delivery of Norfloxacin and Singlet Oxygen. <i>ACS Applied Nano Materials</i> , 5(10):15250–15259.	5.9
16.	Mitra S, Dhar R & <b>Sen R*</b> (2022) Designer bacterial cell factories for improved production of commercially valuable non-ribosomal peptides. <i>Biotechnology Advances</i> , 60:108023.	16.0
17.	Chopra J, Rangarajan V & <b>Sen R*</b> (2022) Recent developments in oleaginous yeast feedstock based biorefinery for production and life cycle assessment of biofuels and value-added products. <i>Sustainable Energy Technologies and Assessments</i> , 53 (Part B): 102621.	8.0
18.	Palai D, Roy T, Prasad, P Hazra C, Dhara S, <b>Sen R</b> , Das S & Das K (2022) Influence of copper on the microstructural, mechanical & biological properties of commercially pure Zn based alloy for a potential biodegradable implant. <i>ACS Biomaterials Sci. &amp; Eng.</i> , 8(4):1443–1463.	5.8
19.	Behera ID, Meikap BC & <b>Sen R*</b> (2022) Strategic implementation of integrated bioaugmentation and biostimulation for efficient mitigation of petroleum hydrocarbon pollutants from terrestrial and aquatic environment. <i>Marine Pollution Bulletin (Elsevier)</i> , 113492.	5.8
20.	Rabiya R and <b>Sen R*</b> (2022) Artificial intelligence driven advanced optimization strategy vis-à-vis response surface optimization of production medium: Bacterial exopolysaccharide (EPS) production as a case-study. <i>Biochemical Engineering Journal</i> , 178: 108271.	3.9
21.	Goldy De Bhowmick, Rowena Briones, Sören Thiele-Bruhn, <b>Ramkrishna Sen</b> & Ajit K Sarmah (2022) Adsorptive removal of metformin on specially designed algae-lignocellulosic biochar mix and techno-economic feasibility assessment. <i>Environmental Pollution</i> , 292: 118256.	8.9
22.	Mohapatra R K, Padhic D, <b>Sen R</b> , Nayak M (2022) Bio-inspired CO <sub>2</sub> capture and utilization by microalgae for bioenergy feedstock production: A greener approach for environmental protection. <i>Bioresource Technology Reports</i> , 19: 101116.	New Journal (Elsevier)
23.	Behera ID, Meikap BC & <b>Sen R*</b> (2021) Enhanced biodegradation of total petroleum hydrocarbons by implementing a novel two-step bioaugmentation strategy using indigenous bacterial consortium. <i>Journal of Environmental Management</i> , 292: 112746.	8.7
24.	Yadav G, Fabiano L, Soh L, Zimmerman J, <b>Sen R</b> & Seider Warren D.* (2021) CO <sub>2</sub> Process Intensification of Algae Oil Extraction to Biodiesel. <i>AIChE Journal</i> , 67:e16992.	3.7
25.	Datta S, Rameshbabu AP, Bankoti K, Jana, S, Roy S, <b>Sen R</b> , Dhara S (2021) Microsphere embedded hydrogel construct binary delivery of alendronate and BMP-2 for superior bone regeneration. <i>Journal of Materials Chemistry B (RSC)</i> , 9:6856.	7.0
26.	Behera ID, Basak G, Kumar R, <b>Sen R</b> & Meikap BC (2021) Treatment of petroleum refinery sludge by petroleum degrading bacterium <i>Stenotrophomonas pavanii</i> IRB19 as an efficient novel	2.3

	technology. <i>Journal of Environmental Science &amp; Health, Part A</i> , <b>56(2)</b> :226-239.	
27.	Datta S, Rameshbabu AP, Bankoti K, Roy M, Gupta C, Jana S, Das AK, <b>Sen R</b> & Dhara S (2021) Decellularized bone matrix/oleoyl chitosan derived supramolecular injectable hydrogel promotes efficient bone integration. <i>Materials Science &amp; Engineering C</i> , <b>119</b> : 111604.	7.3
28.	Remanan S; Padmavathy N; Rabiya R; Ghosh S; Das T; Bose S; <b>Sen R</b> , Das N (2020) Converting polymer trash into treasure: An approach to prepare MoS <sub>2</sub> nanosheets decorated PVDF sponge for oil/water separation and antibacterial applications. <i>Industrial &amp; Engineering Chemistry Research</i> , <b>59(45)</b> :20141–20154.	4.2
29.	Dineshkumar R, Singh Chauhan A & <b>Sen R*</b> (2020) Optimal and strategic delivery of CO <sub>2</sub> for <i>Chlorella minutissima</i> mediated valorization of domestic wastewater with concomitant production of biomass and biofuel. <i>Sustainable Energy &amp; Fuels (RSC)</i> , <b>4</b> :6321–6329.	5.6
30.	S Avancha, AK Behera, <b>R Sen</b> , B Adhikari (2020) Accelerated weathering analysis of jute reinforced cashew-nut shell liquid modified soy based green composite. <i>SPE Polymers</i> , <b>1</b> :81-89.	New Journal (Wiley)
31.	Yadav G, Panda S & <b>Sen R*</b> (2020) Strategies for the effective solid, liquid and gaseous waste valorization by microalgae: A circular bioeconomy perspective. <i>Journal of Environmental Chemical Engineering</i> , <b>8</b> :104518	7.7
32.	Kumar R, Dhanarajan G, Sarkar D & <b>Sen R*</b> (2020) Multi-fold enhancement in sustainable production of biomass, lipid and biodiesel from oleaginous yeast: An artificial neural network – genetic algorithm approach. <i>Sustainable Energy &amp; Fuels (RSC)</i> , <b>4</b> :6075–6084.	5.6
33.	Chopra J; Tiwari BR; Dubey BK & <b>Sen R*</b> (2020) Environmental impact analysis of oleaginous yeast based biodiesel and bio-crude production by LCA. <i>J. Cleaner Production</i> , <b>271</b> :122349.	11.1
34.	Dinesh Kumar R & <b>Sen R*</b> (2020) A sustainable perspective of microalgal biorefinery for co-production and recovery of high-value carotenoid and biofuel with CO <sub>2</sub> valorization. <i>Biofuels Bioproducts &amp; Biorefining</i> , <b>14</b> :879–897.	4.6
35.	Bhaumik M, Dhanarajan G, Kumar R, Chopra J, Hazra C & <b>Sen R*</b> (2020) Production, partial purification and characterization of a proteoglycan bioemulsifier from an oleaginous yeast. <i>Bioprocess &amp; Biosystems Engineering</i> , <b>43</b> :1747–1759.	3.8
36.	Behera AK, <b>Sen R</b> & Adhikari B (2020) Environment-friendly fully biodegradable jute-Poly (vinyl alcohol) modified soy composite development as plastic substitute, <i>Journal of Natural Fibers</i> , DOI: 10.1080/15440478.2020.1764440.	3.7
37.	Singh V, Santoshnambi Y, <b>Sen R</b> , Das D (2020) Concomitant H <sub>2</sub> & butanol production via co-digestion of organic wastewater & nitrogenous residues. <i>Int. J. Hydrogen Energy</i> , <b>45</b> : 24477-90.	7.2
38.	Yadav G, Dubey B & <b>Sen R*</b> (2020) A comparative life cycle assessment of microalgae production by CO <sub>2</sub> sequestration from flue gas in outdoor raceway ponds under batch and semi-continuous regime. <i>Journal of Cleaner Production</i> , <b>258</b> : 120703.	11.1
39.	Yadav G, Sharma I, Ghangrekar MM & <b>Sen R*</b> (2020) A live bio-cathode to enhance power output steered by bacteria-microalgae synergistic metabolism in microbial fuel cell. <i>Journal of Power Sources</i> , <b>449</b> :227560.	9.2
40.	Basak G, Hazra C & <b>Sen R*</b> (2020) Biofunctionalized nanomaterials for <i>in situ</i> clean-up of hydrocarbon contamination: A quantum jump in global bioremediation research. <i>Journal of Environmental Management</i> , <b>256</b> : 109913.	8.7
41.	Yadav G, Meena DK, Sahoo AK, Das BK, <b>Sen R*</b> (2020) Effective valorization of microalgal biomass for the production of nutritional fish-feed supplements. <i>J. Cleaner Prod.</i> , <b>243</b> : 118697.	11.1
42.	Poddar N, <b>Sen R</b> , Greg MJ (2020) Bacterial abundance & diversity in <i>Microchloropsis</i> cultures in response to the presence of ammonium, nitrate & glycerol. <i>J. Appl. Phycology</i> , <b>32</b> :839–850.	3.6
43.	De Bhowmick G, <b>Sen R</b> , Sarmah AK (2019) Consolidated bioprocessing of wastewater cocktail in an algal biorefinery for enhanced biomass, lipid and lutein production coupled with efficient CO <sub>2</sub> capture: An advanced optimization approach. <i>J. Environmental Management</i> , <b>252</b> :109696.	8.7
44.	De Bhowmick G, <b>Sen R*</b> & Sarmah A* (2019) Analysis of growth and intracellular product synthesis dynamics of a microalga cultivated in wastewater cocktail as medium. <i>Biochemical Engineering Journal</i> , <b>149</b> :107253.	3.9
45.	Yadav G, Dash SK & <b>Sen R*</b> (2019) A biorefinery for valorization of industrial waste-water and flue gas by microalgae for waste mitigation, carbon-dioxide sequestration and algal biomass production. <i>Science of the Total Environment</i> , <b>688</b> :129-135.	9.8
46.	Chopra J, Mahesh D, Yerrayya A, Vinu R*, Kumar R & <b>Sen R*</b> (2019) Performance enhancement of hydrothermal liquefaction for strategic and sustainable valorization of de-oiled yeast biomass into green bio-crude. <i>Journal of Cleaner Production</i> , <b>227</b> :292-301.	11.1



47.	Nayak M, Swain D K, <b>Sen R*</b> (2019) Strategic valorization of de-oiled microalgal biomass waste as biofertilizer for sustainable and improved agriculture of rice ( <i>Oryza sativa</i> L.) crop. <i>Science of the Total Environment</i> , <b>682</b> :475-484.	9.8
48.	Banthia S, Hazra C, <b>Sen R</b> , Das S & Das K (2019) Electrodeposited functionally graded coating inhibits Gram-positive and Gram-negative bacteria by a lipid peroxidation mediated membrane damage mechanism. <i>Materials Science &amp; Engineering C</i> , <b>102</b> :623-633.	7.3
49.	De Bhowmick G, Sarmah AK, <b>Sen R</b> (2019) Performance evaluation of an outdoor algal biorefinery for sustainable production of biomass, lipid and lutein valorizing flue-gas carbon dioxide and wastewater cocktail. <i>Bioresource Technology</i> , <b>283</b> : 198-206.	11.4
50.	Geetanjali Yadav, Leonard A. Fabiano, Lindsay Soh, Julie Zimmerman, <b>Ramkrishna Sen</b> and Warren D. Seider (2019) Supercritical CO <sub>2</sub> transesterification of triolein to methyl-oleate in a batch reactor: Experimental and simulation results. <i>Processes</i> , <b>7</b> , 16; doi:10.3390/pr7010016.	3.5
51.	De Bhowmick G, Sarmah AK, <b>Sen R</b> (2019) Zero-waste algal biorefinery for bioenergy and biochar: A green leap towards achieving energy and environmental sustainability. <i>Science of the Total Environment</i> , <b>650</b> : 2467-2482.	9.8
52.	Das S, Roy D & <b>Sen R*</b> (2019) N-acetyl-D-glucosamine production by a chitinase of marine fungal origin: A case study of potential industrial significance for valorization of waste chitins. <i>Applied Biochemistry &amp; Biotechnology</i> , <b>187</b> :407-423.	3.0
53.	Dhanarajana G, Perveen S, Roy A, De S & <b>Sen R*</b> (2018) Performance evaluation of biosurfactant stabilized microbubbles in enhanced oil recovery. <i>bioRxiv</i> , <b>504431</b> .	It is a CSHL Archive
54.	Nayak M, Dhanarajan G, Ramalingam D & <b>Sen R*</b> (2018) Artificial intelligence driven process optimization for cleaner production of biomass with co-valorization of wastewater and flue gas in an algal biorefinery. <i>Journal of Cleaner Production</i> , <b>201</b> :1092-1100.	11.1
55.	De Bhowmick G, Sarmah AK, <b>Sen R</b> (2018) Production and characterization of a value added biochar mix using seaweed, rice husk and pine sawdust: A parametric study. <i>Journal of Cleaner Production</i> , <b>200</b> :641-656.	11.1
56.	Vivek R, Dhanarajan G, Dey P, Chattopadhyay D, <b>Sen R*</b> (2018) <i>Bacillus</i> lipopeptides – Powerful capping & dispersing agents of silver nanoparticles. <i>Appl. Nanoscience</i> , <b>8</b> :1809-1821.	4.6
57.	Poddar N, <b>Sen R</b> & Martin G (2018) Glycerol and nitrate utilization by marine microalgae <i>Nannochloropsis salina</i> and <i>Chlorella</i> sp. and associated bacteria during mixotrophic and heterotrophic growth. <i>Algal Research</i> , <b>33</b> : 298–309.	5.1
58.	Mookherjee A, Dineshkumar R, ... <b>Sen, R</b> , Mitra A, Maiti MK (2018) Quorum sensing inhibitory activity of the metabolome from endophytic <i>Kwoniella</i> sp. PY016: Characterization and hybrid model-based optimization. <i>Applied Microbiology &amp; Biotechnology</i> , <b>102</b> :7389-7406.	5.2
59.	Chopra J & <b>Sen R*</b> (2018) Process optimization involving critical evaluation of oxygen transfer, oxygen uptake and nitrogen limitation for enhanced biomass and lipid production by oleaginous yeast for biofuel application. <i>Bioprocess &amp; Biosystems Engineering</i> , <b>41</b> :1103-1113.	3.8
60.	Dhanarajan G, Patra P, Rangarajan V, Somasundaran P, <b>Sen R*</b> (2018) Modeling and analysis of micellar and microbubble dynamics to derive new insights in molecular interactions impacting the packing behavior of a green surfactant for potential engineering implications. <i>ACS Sustainable Chemistry &amp; Engineering</i> , <b>6</b> :4046–4055.	8.4
61.	De Bhowmick G, Sarmah AK, <b>Sen R</b> (2018) Lignocellulosic biorefinery as a model for sustainable development of biofuels & value-added products. <i>Biores. Technol.</i> , <b>247</b> :1144-1154.	11.4 (Citations > 240)
62.	Dey G, Bharti R, Das AK, <b>Sen R*</b> , Mandal M* (2017) Resensitization of Akt induced Docetaxel resistance in Breast Cancer by Iturin A, a lipopeptide molecule from marine bacterium, <i>Bacillus megaterium</i> . <i>Scientific Reports (A Nature Group Journal)</i> , <b>7</b> :17324.	4.6
63.	Datta S, Rameshbabu AP, Bankoti K, ..... <b>Sen R</b> , Dhara S (2017) Oleoyl chitosan based nanofiber mats impregnated with amniotic membrane derived stem cells for accelerated full-thickness excisional wound healing. <i>ACS Biomaterials Science &amp; Engineering</i> , <b>3</b> (8):1738–49.	5.8
64.	Bhattacharya S, Ramalingam D, Dhanarajan G, <b>Sen R*</b> , Mishra S* (2017) Improvement of ε-polylysine production by marine bacterium <i>B. licheniformis</i> using artificial neural network modeling and particle swarm optimization technique. <i>Biochemical Engineering J.</i> , <b>126</b> :8–15.	3.9
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162.	<b>Sen, R*</b> . (2008) Biotechnology in Enhanced Petroleum Recovery: The MEOR. <i>Prog. Energy Combust. Sci.</i> , <b>34</b> :714–724. (Citations: ~ 650)	<b>29.3</b>
163.	Das P, Mukherjee S, & <b>Sen R*</b> (2008) Improved bioavailability and biodegradation of a model PAH by a biosurfactant producing bacterium of marine origin. <i>Chemosphere</i> , <b>72</b> :1229-1234.	<b>8.8</b>
164.	Das, P., Mukherjee, S., <b>Sen, R*</b> . (2008) Antimicrobial potentials of a lipopeptide biosurfactant derived from a marine <i>Bacillus circulans</i> . <i>J Appl. Microbiol</i> , <b>104</b> :1675–84.	<b>4.0</b>
165.	Vidya Prabhakar Kodali & <b>Ramkrishna Sen*</b> (2008) Antioxidant and free radical scavenging activities of EPS from a probiotic bacterium. <i>Biotechnology Journal</i> , <b>3</b> :245-251	<b>3.9</b>
166.	Das, P., Mukherjee, S., <b>Sen, R.</b> (2008) An insight into the genetics of the biosynthesis of microbial surfactants. <i>Biotechnology &amp; Genetic Engineering Reviews</i> , <b>25</b> :165-186.	<b>4.7</b>
167.	Acharya C., Kumar V, <b>Sen R</b> , Kundu SC (2007) Performance evaluation of a silk protein-based matrix for enzymatic conversion of tyrosine to L-DOPA. <i>Biotechnology Journal</i> , <b>2</b> :226–33	<b>4.7</b>
168.	Mallick, N., Gupta, S., Panda, B., <b>Sen, R</b> (2007) Bioaccumulation and process optimization studies for poly(3hydroxybutyrate-co-3hydroxyvalerate) co-polymer production by <i>N. muscorum</i> . <i>Biochemical Engineering J.</i> , <b>37</b> (2):125–130	<b>3.9</b>
169.	<b>Mukherjee S, Das P, Sen, R*</b> (2006) Towards commercial production of microbial surfactants. <i>Trends in Biotechnology</i> , <b>24</b> :509–515. (Citations ~1025)	<b>17.8</b>
170.	<b>Sen R &amp; Swaminathan T.</b> (2005) Characterization of concentration and purification parameters and optimization of operating conditions for small-scale recovery of surfactin. <i>Process Biochemistry</i> . <b>40</b> , 2953–2958.	<b>4.4</b>
171.	<b>Sen R*</b> & Srinivasa Babu K (2005) Modeling and optimization of the process conditions for biomass production & sporulation of a probiotic culture. <i>Process Biochemistry</i> , <b>40</b> , 2531–2538.	<b>4.4</b>
172.	<b>Sen R &amp; Swaminathan T.</b> (2004) Response surface modeling and optimization to elucidate the effects of inoculum age & size on surfactin production. <i>Biochemical. Engineering J.</i> <b>21</b> ,141–48	<b>3.9</b>
173.	<b>Sen, R.</b> and Swaminathan, T. (1997) Application of response surface methodology to evaluate the optimum environmental conditions for the enhanced production of surfactin. <i>Appl. Microbiol. Biotechnol.</i> <b>47</b> :358-363.	<b>5.2</b>
174.	<b>Sen, R.</b> (1997) Response surface optimization of the critical media components for the production of surfactin. <i>J. Chem. Technol. Biotechnol.</i> , <b>68</b> :263-270.	<b>3.4</b>

## Patents: 14

Sr. #	Patent Title	Status with Application/Grant No.
1.	A biofuel additive for diesel engines	<b>Granted – No. 257942 (2013)</b>
2.	An antihyperglycemic exopolysaccharide (EPS) isolated from <i>B. coagulans</i> RK-02 and a process for the preparation thereof	<b>Filed – Appl. No.: 594/KOL/2009</b>
3.	Durability enhancement of lignocellulosic fibers by vegetable oil treatment	<b>Filed – Appl. No.: 1263/KOL/2009</b>
4.	Natural resins and the use thereof for the production of jute fiber reinforced composites	<b>Filed – Appl. No.: 1136/KOL/2010</b>
5.	Microbial transformation of lignocellulosic fibers for durability enhancement	<b>Filed – Appl. No.: 1062/KOL/2010</b>
6.	Sustained release drug delivery system comprising a sporogenous probiotic bacterium	<b>Granted – No. 519337 (2024)</b> <b>[Application # 1378/KOL/2010]</b>
7.	Continuous process for bio-catalytic production of bio-diesel	<b>Filed – Appl. No.: 404/KOL/2011</b>
8.	Cost-effective natural salt formulations for seawater substitution, mineral fortification and processes thereof	<b>Filed – Appl. No.: 3422/DEL/2011</b>

9.	An efficient, cost-effective, reusable & eco-friendly algal biomass dewatering system and an accelerated adsorption process thereof	Filed – Appl. No.: <b>1253/KOL/2012</b>
10.	Methods for decreasing aqueous halide and organohalide levels using plant biomass	Filed – Appl. No.: <b>731/KOL/2013; US-2014/0374357A1 (25/12/2014)</b>
11.	A process for the preparation of natural salt formulations for seawater substitution, mineral fortification	<b>International: PCT/IN2012/000857 European: 12826682.2-1354</b>
12.	A nutraceutical formulation containing sporogenous probiotic bacterium with high germination efficacy	Filed – Appl. No.: <b>201631006222 (February 23, 2016)</b>
13.	A stimuli-responsive smart sensing and control system for in-line self-monitoring of bioprocess performance	Filed – Appl. No.: <b>201931009577 (March 12, 2019)</b>
14.	Salting out extraction of bioethanol from fermentation broth and carbon dioxide mediated salt recycling	Filed – Appl. No.: <b>201931035637 (September 4, 2019)</b>

### Two articles on our work were published as research highlights by Nature India.

1. Bug makes polymers from jute fibre. doi:10.1038/nindia.2011.180; 12 December, 2011
2. Plastic substitute from Jute and Soy. doi:10.1038/nindia.2012.27; 23 February, 2012.

### Books/Edited Volumes: 07

1. **Sen, R (2010)** *Biosurfactants*, Co-Publishers: Springer & Landes Biosciences, USA, ([www.springer.com/biomed/book/978-1-4419-5978-2](http://www.springer.com/biomed/book/978-1-4419-5978-2); DOI: [10.1007/978-1-4419-5979-9](https://doi.org/10.1007/978-1-4419-5979-9))
2. Jujjavarapu Satya Eswari, Swasti Dhagat & **Ramkrishna Sen (2019)** *Thermophiles for Biotech Industry: A Bioprocess Technology Perspective* (Springer Nature Singapore Pte Ltd.; <https://link.springer.com/book/10.1007%2F978-981-32-9919-1>).
3. **Sen R**, Mukherjee S, Paul R & Narula R (Eds) *Biotechnology & Biological Sciences*; eBook ISBN 9781003001614; DOI: <https://doi.org/10.1201/9781003001614>; CRC Press, Taylor & Francis, London, **2019**.
4. Ghosh, S.K., **Sen, R.**, Chanakya, H.N., Pariatamby, A. (Editors) *Bio-resource Utilization and Bioprocess* (Springer Nature Singapore Pte Ltd.; <https://www.springer.com/gp/book/9789811516061#aboutBook>), Springer, **2020**.
5. Sanket J. Joshi, **Ramkrishna Sen**, Atul Sharma, P. Abdul Salam (Editors) *Status and Future Challenges for Non-conventional Energy Sources Volume 1*, <https://link.springer.com/book/10.1007/978-981-16-4505-1>, Springer, **2022**.
6. Sanket J. Joshi, **Ramkrishna Sen**, Atul Sharma, P. Abdul Salam (Editors) *Status and Future Challenges for Non-conventional Energy Sources Volume 2*, <https://link.springer.com/book/10.1007/978-981-16-4509-9>, Springer, **2022**.
7. **Sen R** & Roy S, *Biofuel Production Biological Technologies and Methodologies*. <https://www.routledge.com/Biofuel-Production-Biological-Technologies-and-Methodologies/Sen-Roy/p/book/9781032124452>, CRC Press, **2022**.

### Book Chapters: 21

- [1] Balaji, T.G., Radhakrishnan, P.N., Krithika, G., **Sen, R\* (2004)** Biochemical approach in process development and optimization for Biodiesel production. In: Biotechnological approaches for sustainable development, Eds. Reddy, MS and Khanna, S. Allied Publishers, New Delhi, India, Pp. 112-118.

- [2] **Sen R (2007)** Metabolic Engineering in the Targeted Improvement of Cellular Properties in Plants vis-à-vis Biopharmaceutical production. In: Enzyme mixtures for complex biosynthesis, Ed. Bhattacharya SK., Landes Biosciences, USA, Pp.: 5–16.
- [3] Das, P., Mukherjee, S., **Sen, R\* (2008)** An insight into the genetics of the biosynthesis of microbial surfactants. In: *Biotechnology & Genetic Eng. Rev.*, Ed.: Harding SE. Nottingham University Press, UK, **25**: 165-186.
- [4] Chattopadhyaya S, Mukerji A, **Sen R\* (2009)** Biofuels In: Biotechnology for agroindustrial residue utilization, Eds.: Singh Nigam P. & Pandey A., Springer, Netherlands, DOI:10.1007/978-1-4020-9942-74, Pp.: 61-76.
- [5] **Sen R\***, Mukherjee S, Das P, Sivapathasekaran C. (2009) Microbial surfactants: commercial & healthcare applications. In: Biotechnological products, Ed.: Mishra CSK & Champagne P, IK International, New Delhi, Pp.: 29-38.
- [6] Das, P., Mukherjee, S., Sivapathasekaran, C. **Sen R\* (2010)** Marine lipopeptide biosurfactants: Potentials & prospects. In: *Biosurfactants* (Ed.: **Ramkrishna Sen**), Landes Biosciences and Springer Science + Business Media LLC. USA, Pp.: 88–100.
- [7] **Sen R (2010)** Surfactin: Biosynthesis, genetics and potential applications. In: *Biosurfactants* (Ed.: **Ramkrishna Sen**), Springer Science+Business Media LLC, USA, Pp.: 316–323.
- [8] **Sen R\***, Mudhoo A, Gunaseelan, D. (2012) Biosurfactants: Synthesis, Properties and Applications in Environmental Bioremediation. In: Bioremediation and Sustainability: Research and Applications (Eds. Mohee, R. and Mudhoo, A.), Scrivener Publishing LLC, Massachusetts, USA, Chapter 4, pp.137–211.
- [9] Banerjee S, **Sen R**, Morone A, Chakrabarti T, Pandey R & Mudliar S (2012) Improved wet air oxidation pretreatment for enhanced enzymatic hydrolysis of rice husk for bioethanol production. *Dynamic Biochemistry, Process Biotechnology and Molecular Biology*, **6** (Spl. Issue #2): 43-45.
- [10] Dhanarajan, G. and **Sen, R\* (2014)** Amphiphilic Molecules of Microbial Origin: Classification, Characteristics, Genetic Regulations and Pathways for Biosynthesis. In: *Green Chemistry and Biosurfactants Research*, Eds.: C.N. Mulligan, S.K. Sharma, A. Mudhoo, CRC Press, USA, Pp.: 31-48.
- [11] Rangarajan, V., Majumder, S. and **Sen R\* (2014)** Biosurfactant-Mediated Nanoparticle Synthesis A Green and Sustainable Approach. In *Green Chemistry and Biosurfactants Research*, Eds.: C.N. Mulligan, S.K. Sharma, A. Mudhoo, CRC Press, USA, Pp.: 221-234.
- [12] Dhanarajan, G & **Sen R\* (2014)** Cost analysis of biosurfactant production from a scientist's perspective. In: Biosurfactants Production and Utilization—Processes, Technologies, & Economics. , Ed. N. Kosaric & FV, Sukan. CRC Press, USA, **Pp.:** 153–162.
- [13] Yadav G, Kumar R, **Sen, R\* (2015)** Fermentation Techniques in Bioenergy Production. In: *Marine Bioenergy: Trends & Developments*, Eds.: Kim S-K & C-G Lee, CRC Press, USA, Chap 6, Pp.: 111–134.
- [14] Karemore A, Dineshkumar R, Yadav G, Subramanian G, **Sen R\* (2015)** Photobioreactors for improved algal biomass production: Analysis & design considerations. In: Algal biorefinery: An integrated approach. Ed.: D. Das, Capital Books, New Delhi, Chap. **5**, Pp: 109–131.
- [15] Das S, Roy D & **Sen R\* (2016)** Utilization of chitinous wastes for the production of chitinase. *Advances in Food & Nutrition Research*, **78**:27-46.
- [16] Yadav G & **Sen R\* (2017)** Sustainability of microalgal bio-refinery: Scope, challenges and opportunities. In: Sustainable Energy: A Transformational Journey. Eds.: *Sudipta De et al.*, Springer, Singapore.
- [17] Banerjee S, Mudliar S & **Sen R\* (2018)** Advancements in the Commercialization of Lignocellulosic Bioethanol. Ed.: V. Mittal, Central West Publishing, Australia, **2018**.
- [18] Chattopadhyaya S & **Sen R (2020)** Materials and methods for biodiesel production. In: Sustainable Agriculture Reviews, Ed.: Eric Lichtfouse, Springer Nature Switzerland AG, Vol. 39, Pp.: 179–204.
- [19] Kumar R, Sadasivuni C, Sarkar D, **Sen R (2023)** Concomitant conversion of glycerol into biomass & lipid by an oleaginous yeast & biodiesel production. *Proceed. Biospectrum*, Nova Pub., USA, Ch 11, Pp.: 137-146.
- [20] Bhaumik M, Chauhan PK & **Sen R (2023)** An assessment of hydrocarbon degradation potential of a yeast isolate. *Proceedings of Biospectrum*, Nova Publishers, USA, Ch 12, Pp. 147-162.
- [21] Mitra R, Bhowmick S, Mukherjee S, Yadav S, Kumar N & **Sen R\* (2024)** Mitigation of industrial flue-gases and wastewaters through algal biomass cultivation: Processes and perspectives. *Handbook of Biorefinery Research and Technology*, Editor: V. S. Bisaria, Springer (**In press**).
- [22] Bhowmick S, Mitra R, Kumar RR, Yadav S, Tripathi S, Mukherjee S & **Sen R (2024)** An Insight into the Recent Developments of Biofuel Production from Microalgae. In: "Biofuels: Scientific Explorations and Technologies for a Sustainable Environment". Eds.: Banik & Bagchi, Chap #16, Pp.: 311-334, CRC Press.

## Completed Sponsored Projects: **34**

- (1) Enhanced production of an antitumor biosurfactant – **ISIRD (IIT-KGP; 2004 – 2007)– PI**



- (2) Bioprocess development, optimization and bioreactors strategies for the enhanced ..... for **Nutraceutical formulations - CSIR Project (2005 - 2009) - PI**
- (3) Extraction, .....optimized production of **Biopigment - DBT project (2006-2009)- [Co-PI]**
- (4) Bioprocess development & optimization for .....**biosurfactant** of marine origin for commercial & health-care applications-**DBT Project (2006 - 2009) - PI**
- (5) Grant for Exchange visits - Under Indo-Brazil cooperation program- **DST-CNPq (2009) - PI**
- (6) P K Sinha Center for Bioenergy - **IIT Foundation -till August, 2011 - [Co-PI]**
- (7) Development of durable water-repellant jute geotextiles .....- **NJB project (2008) [Co-PI]**
- (8) Development of biodegradable rigid jute-based composites -**NJB (2008) [Co-PI]**
- (9) Biofuels from marine microalgae - **CSIR-NMITLI (2010) - PI**
- (10) Biofuel production in a biorefinery concept -**IIT Foundation (Dr. Prabha Kant Sinha) - PI**
- (11) Enhanced production, purification and characterization of marine lipopeptide as potential anticancer agent for breast cancer therapy - **MoES (2010) - PI**
- (12) Medical applications of biosurfactant - **DST Indo-Portugal Cooperation project (2010) - PI**
- (13) Microalgae mediated BioCCS & animal feed application - **DST (Govt. of West Bengal) - PI**
- (14) A green integrated process for bioremediation ..Bio-CCS ....biofertilizer application - **DST- PI**
- (15) Development of fluorescent whole cell biosensor for heavy metal detection - **DBT - Co-PI**
- (16) Remediation of produced water from NE State oil-field by microbial & membrane intervention with modeling of an affluent unit for the recovery of usable water - **DBT (Twining) - PI**
- (17) Value added chemicals from low grade coal - **TATA Steel Ltd. - PI**
- (18) Process development for the concomitant production of bioemulsifier, lipid, biodiesel, glycerol and biomass ...using industrial waste in a renewable yeast ..... biorefinery model (**DBT**) - **PI**
- (19) Algae Bio-refinery for Biofuels & Bio-products - Shastri Indo-Canadian Institute - **PI**
- (20) Application of yeast biosurfactant based nanoremediation for the cleanup of hydrocarbon pollutants present in Assam oil field produced water - **SERB (DST)-PI [Co-PI: Dr. G.Basak]**
- (21) Genetic engineering of algae for enhanced oil production - PAN-IIT (**DBT**) - **Co-PI**
- (22) Biopolymers/Biosurfactants-based Delivery Micro-/Nano-Vehicles for Safe Delivery of Food Bioactives and Nutraceuticals - **SERB (DST) - PI (Indo-Sri Lanka)**
- (23) Development of drug delivery vehicles using marine microbial green surfactants: Molecular self-assembly leading to polymer-surfactant nanostructures -**SERB; PI [Co-PI: Dr. C. Hazra]**
- (24) Biodiesel production using indigenous microalgae of N-E India (**DBT**) - **PI** (with Silchar Uni)
- (25) Liquefaction susceptibility of weakly cemented sand - **SERB (DST) - Co-PI** (with Civil Eng.)
- (26) Development of an Advanced Microbial Enhanced Oil Recovery (MEOR) Technology using Green Surfactant Stabilized Microbubbles - **IIT KHARAGPUR Challenge Grant**
- (27) Biosynthesis, Production and Formulation of Larvicidal Bio-surfactants for Controlling Mosquito and Housefly Growth (Biosurfinet) - **DST, SEED Division - PI** (Co-PI: Dr. C. Hazra)
- (28) An integrated biorefinery approach for sustainable biofuel and bioproducts from microalgae combined with wastewater treatment and flue gas CO<sub>2</sub> fixation-**PI** (Co-PI: Dr. M. Nayak)
- (29) Sustainable resource recovery through optimal treatment and use of petroleum industry wastewater in Algal-bacterial Biorefinery Model (SUR3ESCOPE) **DST - PI** (with IITD & HPL)
- (30) Strategic enhancement of microalgal biomass production in high rate algal pond integrated with bubble column that is sourced with flue-gas CO<sub>2</sub> (**IMPRINT-2**) - **PI** [Industry partner: **HPCL**]
- (31) Indo-USA (with University of Pennsylvania, USA) under SPARC - **PI**
- (32) Indo-Canada/USA (with U-Toronto & Stanford University) under SPARC - **PI**
- (33) Indo-Australia (with Curtin University) under SPARC as **PI**
- (34) Indo-Australia (with U-Melbourne) under SPARC as **Co-PI**

### **Ongoing/Sanctioned Sponsored projects: 05**

1. Development, evaluation, demonstration of biosurfactant-based fruits/vegetables sanitizer formulation for food safety, security of Indian farmers-**PI** (Co-PI: Dr. Debasree Kundu, DST Women Scientist)
2. New Generation Multifunctional Green Nanocomposite Coatings for the Control of Biodeterioration of Cultural Heritages - **DST** under “**SHRI**” scheme - as Co-PI [With Dept of Metallurgy & Mat Eng]

3. Rural Drinking Water Treatment & Health – **Wellcome Trust – Co-PI** (with Univ. of Edinburgh, UK)
4. **EU-India HORIZON-2020 (SPRING) – PI (IIT-Kgp)** with Norway, Hungary, Portugal & Finland
5. Enhanced lipid production by genetically engineered algal strain: Scale up cultivation and engineering for co-production of value-added compounds – as **Co-PI**, DBT PAN IIT Program for Bioenergy

### Consultancy Projects: 03

1. Continuous production of biodiesel. – **Pfp Technology LLC, Houston, USA (2008–2009) – Completed**
2. Validation trial for bioethanol production in bioreactor– **DSS Corp., Kolkata (2013) – Completed**
3. Study of Pollution Caused by Coal Based Thermal Power Plant (CBTPP) in Janjgir - Champa Region M/s **Chhattisgarh Environment Conservation Board (CECB) – (2017–2020) – Completed**

### **RESEARCH & PROFESSIONAL EXPERIENCES IN VARIOUS INSTITUTIONS**

Organization	Designation	From	To	Duration	Nature of Experience
IIT Kharagpur	Professor	Feb., 2015	Till Date	> Nine Years	Teaching, R&D, Administration as Vice Chairman & Chairman (GATE & JAM), Ex-Head – BT, Ex-Chairperson – BS and CRF (LSD), Prof.-in-Charge – ALPGE
IIT Kharagpur	Associate Professor	June, 2010	Feb., 2015	Four Years Seven Months	Teaching, R&D and Prof-in-charge: Industrial Training & Placement
IIT Kharagpur	Assistant Professor	Aug., 2004	June, 2010	~ Six Years	Teaching, R&D and In-charge: Industrial Training & Placement
B.I.T.S., PILANI	Assistant Professor	Dec., 2001	July, 2004	Two and a half Years	Teaching, Research and Admin (as Co-opted Senate member)
CADILA Pharma Ltd.	Dy. Manager & Manager-R&D	Feb., 1999	Dec., 2001	Three Years	R&D and Administration ( <b>Deputy Manager &amp; Manager – R&amp;D</b> )
CBT, Anna University	Visiting Faculty	Jan., 1998	Feb., 1999	One Year	Teaching and Research
Madras University	Guest Faculty	Jan., 1998	Feb., 1999	One Year	Teaching (I designed and taught two courses)
Pondicherry University	Guest Faculty	July, 1997	Dec., 1997	Six Months	Teaching (designed and taught one course)
CIC&SR, IIT Madras	Project Associate (DBT)	July, 1997	Dec., 1997	Six Months	Research (worked in DBT project) + Assistant Warden
IIT Madras	Ph.D Scholar & Teaching Asstt.	Aug., 1992	July, 1997	Five Years	Doctoral Research & Teaching Assistance

### **RESEARCH GUIDANCE:**

	<b>Number Completed</b>	<b>Number in Progress</b>
<b>Guidance at Doctoral Level (Ph.D)</b>	<b>28*</b> <b>*1 in Melbourne Univ., AUS &amp; 1 in Auckland Univ., NZ</b>	<b>Thesis Submitted/Evaluated – 01</b> <b>Work in progress – 15</b>
<b>Guidance at UG/PG Level</b> B.Tech; M.Tech; M.S. (By Research) and M.Sc (Hons.)	<b>Thesis – 66 (IIT) – 7 (BITS Pilani)</b>	<b>M.Tech/MS Theses – 05 (IIT-KGP)</b>

### **List of the Ph.D Students Awarded (with thesis title & year of award): 28**

Sr. #	Name of the Student	Title of the Ph.D Thesis	Year	Supervisors(s)
1	Vidya Prabhakar Kodali (BT – IIT Kharagpur)	Isolation, purification & characterization of an Exopolysaccharide from a probiotic bacterium, <i>Bacillus coagulans</i> RK-02	2009	Prof. R. Sen
2	Palashpriya Das	Environmental and therapeutic application potentials of a biosurfactant of marine origin	2009	Prof. R. Sen

	(BT – IIT Kharagpur)			
3	Soumen Mukherjee (BT – IIT Kharagpur)	Lipopeptide biosurfactants from marine <i>B. Megaterium</i> : Purification, characterization & evaluation of unconventional raw materials as substrates	2010	Prof. R. Sen
4	C. Sivapathasekaran (BT – IIT Kharagpur)	Bioprocess development & optimization for enhanced production and recovery of lipopeptide biosurfactants	2012	Prof. R. Sen
5	Soham Chatterjee (BT – IIT Kharagpur)	Continuous biocatalytic production & characterization of biodiesel using a renewable vegetable oil as a model feedstock	2013	Prof. R. Sen
6	Mousumi Biswas (BT – IIT Kharagpur)	Betalain production in vitro and DOPA 4,5-dioxygenase mediated biotransformation in <i>A. tricolor</i>	2012	Prof S. Dey (BT) & Prof. R. Sen
7	Saumita Banerjee (BT – IIT Kharagpur)	Improved pre-treatment for enhanced enzymatic saccharification and bioethanol production from rice husk as a model lignocellulosic feedstock	2012	Prof. R. Sen
8	Subhasish Das (BT – IIT Kharagpur)	Kinetic modelling & optimization of probiotic spore & lipase production & development of probiotic spore based formulations	2011	Prof. R. Sen
9	Sancharini Das (BT & Civil Eng. – IIT-Kgp)	Purification and characterization of chitinase of marine fungal origin for its potential application in bioconversion of waste chitin	2014	Prof. R. Sen & Prof. D. Roy(CE)
10	Sougata Roychowdhury (BT & Mat Sc IIT-Kgp)	Exopolysaccharide of riverine-silt bacterial origin: Bio-synthesis, characterization & evaluation of therapeutic potential	2013	Prof. B. Adhikary & Prof. R. Sen
11	Ajaya Behera (BT & Mat-Sci IIT-Kgp)	Reinforcing behavior of jute in soy and modified soy resin based composites	2013	Prof. B Adhikary & Prof. R. Sen
12	Sridevi Avancha (BT & Mat-Sci IIT-Kgp)	Jute reinforced soy resin based biodegradable composites	2014	Prof. B.Adhikary & Prof. R. Sen
13	Vivek Rangarajan (BT – IIT Kharagpur)	Process intensification for production & purification of marine bacterial lipopeptide & its application in nanoparticle synthesis	2015	Prof. R. Sen
14	Ankush Karemore (BT – IIT Kharagpur)	Microalgae mediated waste mitigation vis-a-vis biomass, lipid & sugar production for potential biofuel application in biorefinery	2016	Prof. R. Sen
15	Gunaseelan Dhanarajan (IIT Kharagpur)	Enhanced production & purification of marine bacterial lipopeptides for stable microbubble generation: Strategic process design & optimization	2017	Prof. R. Sen
16	Ganeshan Subramaniam (BT – IIT Kharagpur)	Algae-based CO <sub>2</sub> capture and recycle as a novel strategy for reducing fossil fuel dependence of thermal power plants through modeling and performance evaluation of photobioreactors	2017	Prof. R. Sen
17	Dinesh Ramalingam (BT – IIT Kharagpur)	Development of microalgae feedstock-based biorefinery for co-production of lutein & biodiesel with simultaneous CO <sub>2</sub> capture	2017	Prof. R. Sen
18	Goutam Dey (SMST & BT – IIT-Kgp)	Therapeutic potential and pre-clinical risk assessment of bacterial lipopeptide ‘Iturin A’ in breast cancer	2017	Prof. M. Mandal & Prof. R. Sen
19	Sinu Kumari (PKSCB – IIT Kgp)	Improvement of gaseous energy recovery from lignocellulosic wastes	2018	Prof. D. Das & Prof. R. Sen
20	Sayanti Datta (SMST & BT – IIT-Kgp)	Oleoyl Chitosan derived Nanofibrillar Functional Hybrid for Tissue Engineering	2019	Prof. S. Dhara & Prof. R. Sen
21	Nature Poddar (The University of Melbourne, Australia)	Utilization of Glycerol as a Carbon Source for Growth and Lipid Accumulation in Marine Microalgae	2020	Dr. Greg Martin (Chemical Eng.) & Prof. R. Sen
22	Goldy De Bhowmick (The University of Auckland, New Zealand)	Process integration to co-produce biodiesel, biochar and lutein from wastewater grown microalgal feedstock: A biorefinery concept	2020	Prof. AK Sarmah (Civil Eng.) & Prof. R. Sen
23	Geetanjali Yadav (BT & Mechanical Eng. – IIT-Kgp)	Development and performance assessment of a microalgal biorefinery for carbon-dioxide capture: Life-cycle and techno-economic analysis	2020	Prof. R. Sen & Prof. S. K. Dash (Mechanical Eng)
24	Jayita Chopra (BT – IIT Kharagpur)	Process integration & Life cycle assessment for biodiesel production from oleaginous yeast & strategic valorization of de-oiled biomass into biocrude	2020	Prof. R. Sen
25	Vaishali Singh (SESE – IIT-Kgp)	Fermentative hydrogen and n-butanol production by <i>Clostridium saccharoperbutylacetonicum</i> DSM 14923	2021	Retd-Prof D. Das & Prof. R. Sen
26	Ipsita Dipamitra Behera (Chem Eng. – IITKgp)	Biodegradation of petroleum sludge by indigenously developed bacterial Consortium	2022	Prof. BC Meikap & Prof. R. Sen
27	Moumita Bhaumik (BT – IIT Kharagpur)	Development and characterization of a potentially novel biopolymeric conjugate as functionally active nanogels	2023	Prof. R. Sen

28	Rabiya (BT – IIT Kharagpur)	Enhanced production and purification of exopolysaccharide from a thermophilic bacterium, Bacillus licheniformis and its application in nanoparticle synthesis: Strategic process design and optimization	2023	Prof. R. Sen
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### **Scholarships/Fellowships/Awards/Honours/Travel Grant:**

<b>Awarded / Honoured</b>	<b>Agency</b>
1. National Merit Scholarship 2. National Loan Scholarship 3. DBT Scholarship for M.Tech 4. Institute Fellowship for Ph.D 5. Project Associateship (DBT) 6. CSIR Research Associateship 7. PDF (KOSEF), South Korea  8. DST travel grant for attending an international conference in Malaysia 9. UKIERI award for exchange visits (Indo–UK) 10. Exchange visit grant, 2009, for formulating international projects 11. Exchange visit grant, 2010, for joint projects 12. Runner up award of the 3 <sup>rd</sup> National Awards for Technology Innovation in Petrochemicals and Downstream Plastics Processing Industry (2012) 13. Fulbright Visiting Faculty Fellowship (2013–14) 14. Distinguished Alumni Award (2017) 15. Recognized by the Institute as the Best Teacher for the course ‘Aspects of Biochemical Engineering’ 16. Shastri Indo-Canadian Institute Award (2018) 17. The Wellcome iTPA Award (2019) 18. Featured in the World Ranking of Top 2% Scientists in the World (2020, 2021, 2023) – World Rank 69 in BT	Government of India Government of West Bengal, India Department of Biotechnology, Government of India Indian Institute of Technology (IIT), Madras, Govt. of India CICSR, IIT, Madras in DBT sponsored project Council of Scientific & Industrial Research, Govt. of India Korean Science & Engineering Foundation (KOSEF) & Indian National Science Academy (INSA) – could not join DST, Government of India  <b>British Council (UKIERI; Indo – UK)</b> DST (Under <b>Indo–Brazil</b> cooperation program)  DST (Under <b>Indo–Portugal</b> cooperation program)  <b>Ministry of Chemicals and Fertilizers, Govt. of India</b>  <b>Fulbright Foreign Scholarship Board, USA and USIEF</b> <b>Jadavpur University, Kolkata</b> <b>IIT Kharagpur</b>  <b>Shastri Indo-Canadian Institute</b> <b>The Wellcome Trust, London, UK</b> <b>Stanford University, USA</b>

### **Member of Scientific Society / Body:**

- (i) Founding Member, Biological Engineering Society (India)
- (ii) Life Member, Indian Institute of Chemical Engineers
- (iii) Member, European Federation of Biotechnology
- (iv) Member, Asian Federation of Biotechnology

**Foreign Collaboration/Connection with:** (1) Columbia University, New York, USA; (2) University of California, Berkeley, USA (3) University of Pennsylvania, USA; (4) University of Melbourne, Australia; (5) The University of Auckland, New Zealand; (6) University of Minho, Portugal; (7) Federal University of Rio de Janeiro, Brazil; (8) Royal Holloway University of London, UK; (9) University of Ulster, Ireland, UK; (10) University of Padova, Venice, Italy; (11) Technical University Munich, Germany; (12) Leibniz University of Hannover, Germany; (13) University of Hoheinheim, Stuttgart, Germany; (14) University of Peradeniya, Sri Lanka; (15) Stellenbosch University, South Africa; (16) Queen’s University, Ontario, Canada; (17) Curtin University, Australia; (18) The Arctic University of Norway, Norway



### **Editor & Editorial Board Member:**

1. **Phytomedicine (Elsevier) – Associate Editor [Impact factor: 7.9]**
2. **Scientific Reports (Springer Nature) – Editorial Board Member (Biotechnology) [IF:4.997]**
3. **Phytomedicine Plus (Elsevier) – Editorial Board Member**
4. **Biomed Research International–Biotech (Hindawi) – Editorial Board Member**

### **Conferences/Workshops Organized:**

1. Indo–US joint Workshop under SPARC program (24–02–2023) – **Coordinator**
2. Indo–Canada joint Workshop under SPARC & SICI (Shastri Indo-Canadian Institute) Workshop Programs (25–02–23) – **Coordinator**
3. Indo–Australia Joint Workshop under SPARC Program (26–02–2023) – **Coordinator**
4. 4th Biological Engineering Society Conference 2022 (BESCON 2022, 4–6 November, 2022, Bose Institute, Kolkata) – **Organizing Secretary/Convener**
5. Indo–US joint Workshop under SPARC Program (2–3 January, 2020) – **Coordinator**
6. Indo–Australia joint Workshop under SPARC Program (4–5 January, 2020) – **Coordinator**
7. 7<sup>th</sup> Int. Conf. on Solid Waste Management (IConSWM-2017), Hyderabad – **Jt. Secretary**

### **Academic Visits Abroad:**

- (1) **MALAYSIA** - Universiti Malaysia Sabah (**2003**); Bioprocess Eng. Conference, Sponsor – DST & BITS Pilani
- (2) **CZECH REPUBLIC** – University of Ostrava, Czech Republic (**2006**); Sponsor – IIT-KGP & Univ. of Ostrava
- (3) **UNITED KINGDOM** – Royal Holloway University of London, University of London and University of Ulster, N. Ireland (**2007**); Under UKIERI Research Exchange Grant; British Council
- (4) **CZECH REPUBLIC** – University of Ostrava, Czech Republic (**2007**); Sponsor: IIT-KGP & Univ. of Ostrava
- (5) **USA** – Las Vegas (USA) for International Conference and Houston (USA) for Industry visit (PfP Technology LLC) on invitation (**2008**); Sponsors: IIT-KGP and PfP Technology LLC, Houston, USA
- (6) **USA** – ZS-Associates CEO, Dr. P K Sinha (Chicago); UC Berkeley, UC Davis, U-Purdue (**2009**); For P K Sinha Center for Bioenergy; Sponsor: Dr. P K Sinha (IIT Foundation), ZS Associates, Chicago, USA
- (7) **PORTUGAL** (**2009**) GBR Society launch at Lisbon, Portugal; Sponsor: Dr. PK Sinha, Chicago, USA (IITF)
- (8) **BRAZIL** – Federal University of Rio de Janeiro, Brazil (**2009**); Under Indo-Brazil program (DST-CNPq)
- (9) **BRAZIL** – University of Sao Paulo, Brazil (**2009**); GBR Society meeting; Sponsor: GBR Society
- (10) **AUSTRALIA** – Sydney Convention Center (**2009**), Australia; International conference; Sponsor: IIT-KGP
- (11) **MAURITIUS** – University of Mauritius (**2010**); Sponsor: IIT-KGP
- (12) **PORTUGAL** – University of Minho, Braga (**2012**), Under DST Indo-Portugal Collaboration project
- (13) **PORTUGAL** – University of Minho, Braga (**2013**), DST Under Indo-Portugal Collaboration project
- (14) **FRANCE** – **Paris** (**2013**) Invited to attend the 4<sup>th</sup> EU – India STI Cooperation Meeting – Sponsor: IIT-Kgp
- (15) **SINGAPORE** (**2013**) – Invited to attend a workshop in Agilent Technol Lte (and to visit the NUS); Agilent
- (16) **USA** – **New York** (**2013–2014**) **Fulbright** Visiting Faculty at the Columbia University in the City of New York; Sponsor: USIEF, New Delhi & Fulbright Foreign Scholarship Board, USA
- (17) **AUSTRALIA** – **Melbourne** (**2016**) for attending the Registration/Confirmation Seminar of a jointly guided Ph.D student at the University of Melbourne, Sponsor: IIT Kharagpur & University of Melbourne
- (18) **ITALY** – **Venice and Rome** (**2016**) – Invited to speak in the 6<sup>th</sup> International Conference of Bioenergy from Biomass and Wastes and visit a Solid Waste Management Industry; Sponsor: IIT Kharagpur

- (19) CANADA – Kingston (Queen’s University) & Toronto (2018)** – by Shastri Indo-Canadian Institute Grant
- (20) SRI LANKA (2018) – Colombo, Peradeniya/Kandy & Negombo** – Visited under DST Indo–SL project
- (21) GERMANY & SWITZERLAND (2019)** – Visited Hohenheim University, Stuttgart and ETH Zurich
- (22) AUSTRALIA – Melbourne (2019)** for attending MIPP/A Conference & Workshop–University of Melbourne
- (23) NORWAY (2023) – Oslo & Narvik** – Invited to deliver lectures in a Workshop-cum-Summer School in the Arctic University of Norway, Narvik, Sponsor – Norwegian Research Council

Place: IIT Kharagpur

Date: March 31, 2024

[Ramkrishna Sen]