Dr. Srinivasan Balachandran
Associate Professor
Department of Environmental Studies Institute of Science, Visva-Bharati,
Santiniketan 731236, West Bengal, India, Tel:+91-90021-89061; +91-95315-35710
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Date of Birth: 17th January 1971

Academic Qualification

- B.Sc. (Botany): St. Joseph's College, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India, 1991
- M.Sc. (Environmental Sciences): Jawaharlal Nehru University, New Delhi, India, 1993
- M.Phil. (Environmental Sciences): Jawaharlal Nehru University, New Delhi, India, 1996. Title: "Influence of atmospheric pollutants on wet deposition in Delhi". Supervisor: Prof. P.S.Khillare
- Ph.D. (Environmental Sciences): Jawaharlal Nehru University, New Delhi, India, 2002. Title: "Profiles of Respirable and Non-Respirable particulate Polycyclic Aromatic Hydrocarbons in the vehicular exhaust and urban atmosphere of Delhi". Supervisor: Prof. P.S.Khillare

Professional Career

Associate Professor (2015- to present)
Department for Environmental Studies, Siksha-Bhavana, Visva-Bharati, Santiniketan, West Bengal, India. Teaching Environmental Chemistry, Environmental Analytical techniques, Water pollution, Soil Science, Soil pollution and solid waste management, Environmental Toxicology, Biodiversity and conservation for M.Sc. I and II year

Assistant Professor: (2004 – Present)
Department for Environmental Studies, Siksha-Bhavana, Visva-Bharati, Santiniketan, West Bengal, India. Teaching Environmental Chemistry, Environmental Analytical techniques, Water pollution, Soil Science, Soil pollution and solid waste management, Environmental Toxicology, Biodiversity and conservation for M.Sc. I and II year

Research Associate: 2003-2004.
School of Environmental Sciences, Jawaharlal Nehru University, New Delhi, 110067, INDIA. Worked as a Post-Doctoral Fellow awarded by Council of Scientific and Industrial Research (CSIR), Govt. of India (**Research Associate**). Title: Profile of Polycyclic Aromatic Hydrocarbons in soils and atmospheric dust of Delhi. Project Investigator: Prof. PS Khillare

Extended-Senior research Fellow: 2002-2003.
School of Environmental Sciences, Jawaharlal Nehru University, New Delhi, 110067, INDIA. Worked as an Extended-Senior research Fellow awarded by Council of Scientific and Industrial Research (CSIR), Govt. of India (Extended-Senior Research Fellow). Title: Profile of Polycyclic Aromatic Hydrocarbons in Urban street dust and their source materials in Delhi. Project Investigator: Prof. PS Khillare

List of Publications:

1. S**. Balachandran**, Bharat Raj Meena and P. S. Khillare **(2000)** Particle size distribution and its elemental composition in the ambient air of Delhi, *Environmental International*, 26, 49-54
2. **S. Balachandran** and P. S. Khillare **(2001)** Occurrence of acid rain over Delhi, *Environmental Monitoring and Assessment* **71:** 165–176, 2001.
3. P. S. Khillare., Rajni Pandey and **S. Balachandran** (2004) Characterisation of Indoor PM_{10} in Residential Areas of Delhi, *Indoor Built Environ* 2004;13:139–147
4. P. S. Khillare, **S. Balachandran** and Bharat Raj Meena **(2001)** Spatial and temporal variation of heavy metals in atmospheric aerosol of Delhi**,** *Environmental Monitoring and Assessment* **90:** 1–21, 2004
5. P. S. Khillare, **S. Balachandran** and Raza Rafiqul Hoque, (2005) Profile of PAHs in the diesel vehicle exhaust in Delhi, *Environmental Monitoring and Assessment* (2005) **105:** 411–417
6. P. S. Khillare, **S. Balachandran** and Raza Rafiqul Hoque, (2005) Profile of PAH in the exhaust of gasoline driven Vehicles in Delhi**,** *Environmental Monitoring and Assessment* (2005) **110:** 217–225
7. P.S. Khillare, Raza Rafiqul Hoque, Vijay Shridhar, Tripti Agarwal, **S. Balachandran** (2008) Temporal variability of benzene concentration in the ambient air of Delhi: A comparative assessment of pre- and post-CNG periods, *Journal of Hazardous Materials* 154 (2008) 1013–1018
8. R.R.Hoque, P.S. Khillare, T. Agarwal, V. Shridhar, **S. Balachandran** (2008) Spatial and temporal variation of BTEX in the urban atmosphere of Delhi, India, Science of the Total Environment, 392, 30 – 40
9. M. Senthil Kumar, Shibani Chaudhury and **S. Balachandran** ***(2009)*** *In Vitro* Micropropagation Of *Oxystelma esculentum* R. Br. – A Medicinal Herb., *International Journal of Biotechnology and Biochemistry*, Volume 5 Number 2 (2009) pp. 147–156
10. Sulata Maity, **S. Balachandran**, Shibani Chaudhury, (2010). Interdependency of Macrophytes and avian diversity in the wetlands of Ballavpur Wildlife Sanctuary, Santiniketan. *Science & Culture* 76 (5-6), 180-184
11. Muthusamy Senthil Kumar, **Srinivasan Balachandran** and Shibani Chaudhury - Influence of Incubation Temperatures on Total Phenolic, Flavonoids Content and Free Radical Scavenging Activity of Callus from *Heliotropium indicum* L. *Asian J. Pharm. Res.* 2012; Vol. 2: Issue 4, Pg 148-152
12. Debopriya Bhattacharyya, **S. Balachandran** & Shibani Chaudhury (2014): Chemical speciation and mobility of some trace elements in vermicomposted fly ash, Soil and Sediment Contamination: An International Journal, 23:8, 917-931
13. Muthusamy Senthil Kumar, **Srinivasan Balachandran** and Shibani Chaudhury (2014) In Vitro Callus Culture of *Heliotropium indicum* Linn. for Assessment of Total Phenolic and Flavonoid Content and Antioxidant Activity, Appl Biochem Biotechnol (2014) 174:2897–2909
14. Mathew AK, Goswami R, Banerjee SN, Shome A, Chakraborthy AK, **Balachandran S**, Chaudhury, S. (2015) Biogas production from locally available aquatic weeds of Santiniketan through anaerobic digestion, Clean Technology and Environmental Policy, 17:1681–1688
15. Hussain K, **Balachandran S**., Hoque RR (2015) Sources of polycyclic aromatic hydrocarbons in sediments of the Bharalu River, a tributary of the River Brahmaputra in Guwahati, India, Ecotoxicology and Environmental Safety 122 (2015) 61–67
16. Manash Gope, Raza Rafiqul Hoque, and **S. Balachandran** (2015) Chemical Speciation Of Zn In Roadside Deposited Dust Of Asansol, West Bengal, India, International

Journal Of Bio-Resource, Environment And Agricultural Sciences (IJBEAS), Vol. 1(4):192-198, 2015

17. Basu, M., Mayana, K., S.Xavier, **Balachandran, S**, Mishra, N., (2016) Effect of Scopoletin on monoamine oxidases and brain amines, Neurochemistry International, *93*, 113-117.
18. Tanmay Laha, Manash Gope, R. E. Masto, Sreemanta Datta, **Srinivasan Balachandran** (2016) Assessment of some PTES (CO, FE, AND MN) and their bioavailability in playground soils Khagra, West Bengal, India, International Journal of Bio-Resource, Environment And Agricultural Sciences (IJBEAS) Vol. 2(3):345-358, 2016
19. Tanmay Laha, Manash Gope, R. E. Masto, Sreemanta Datta, **Srinivasan Balachandran** (2016) Influence Of Bell-Metal Industry On The Concentration And Speciation Of Lead (Pb) In The Playground Soil Of Khagra, West Bengal, International Journal of Bio-Resource, Environment And Agricultural Sciences (IJBEAS) Vol. 2(3):333-344, 2016
20. Goswami R, Mukherjee S, Chakraborty AK, **Balachandran** S, Sinha Babu SP, Chaudhury S, Optimization of growth determinants of a potent cellulolytic bacterium isolated from lignocellulosic biomass for enhancing biogas production, Clean Techn Environ Policy (2016) 18: 1565-83. https://doi.org/10.1007/s10098-016-1141-z
21. Manash Gope, Reginald Ebhin Masto, Joshy George, Raza Rafiqul Hoque, **Srinivasan Balachandran** (2017) Bioavailability and health risk of some potentially toxic elements (Cd, Cu, Pb and Zn) in street dust of Asansol, India, Ecotoxicology and Environmental Safety 138, 231–241
22. Pranamika Bhuyan, Pratibha Deka, Amit Prakash, **Balachandran S.**, Raza Rafiqul Hoque (2018) Chemical characterization and source apportionment of aerosol over mid Brahmaputra Valley, India, Environmental Pollution 234 (2018) 997-1010
23. Manash Gope, Reginald Masto, Joshy George, **S. Balachandran** (2018) Exposure and cancer risk assessment of polycyclic aromatic hydrocarbons (PAHs) in the street dust of Asansol city, India, Sustainable Cities and Society, 38, 616-626
24. Manash Gope, Reginald E Masto, Joshy George, **Srinivasan Balachandran** (2018) racing source, distribution and health risk of potentially harmful elements (PHEs) in street dust of Durgapur, India, Ecotoxicology and Environmental Safety, 154, 280-293
25. Parveen Kumar, Manju Rawat Ranjan, Ashutosh Tripathi, **S. Balachandran** and Prateek Srivastava (2018) Heavy metal pollution assessment around Kota super thermal power plant, Poll Res. 37 (3): 145-153
26. Parveen Kumar, Manju Rawat Ranjan, Ashutosh Tripathi, Prateek Srivastava and **S. Balachandran** (2018) Assessment of the level and impact of selected physiochemical parameters of Kota super thermal power plant's effluent on Chambal River, Kota, Rajasthan India, International Journal of Current Advanced Research Volume 7; Issue 1(E), 9021-9024 DOI: http://dx.doi.org/10.24327/ijcar.2018
27. Indranil Bhui, Anil Kuruvilla Mathew, Shibani Chaudhury, **Srinivasan Balachandran** (2018) Influence of volatile fatty acids in different inoculum to substrate ratio and enhancement of biogas production using water hyacinth and Salvinia, Bioresource Technology 270, 409–415
28. Manash Gope, Reginald Ebhin Masto, Aman Basu, Debopriya Bhattacharyya, Rajnarayan Saha, Raza Rafiqul Hoque, P.S. Khillare, **Srinivasan Balachandran**, (2020) Elucidating the distribution and sources of street dust bound PAHs in Durgapur, India: A probabilistic health risk assessment study by Monte-Carlo simulation, Environmental Pollution, Volume 267, 2020, 115669, https://doi.org/10.1016/j.envpol.2020.115669.

29. Laha, T., Gope, M., Datta, S. Mato R.E., **Balachandran S.** (2020) Oral bioaccessibility of potentially toxic elements (PTEs) and related health risk in urban playground soil from a medieval bell metal industrial town Khagra, India. *Environ Geochem Health* (2020). https://doi.org/10.1007/s10653-020-00715-y
30. Parveen Kumar, Manju Rawat Ranjan, Ashutosh Tripathi and **S. Balachandran** (2020) Assessment of bioassay test of the effluent and impact of selected physiochemical parameters of Kota super thermal power plant's effluent on Kota barrage lake water, Kota Rajasthan, India, *Plant Archives* Vol. 20 Supplement 1, 2020 pp. 983-987
31. Pal M., Gope M., Basu A., Laha T., Masto R. E., Labar R., Kundu T. K., Hoque R. R., Khillare P. S. and **Balachandran S.** (2021) Indoor Quality of Residential Homes and Schools of an Industrial Area in Asansol: Characterization, Bioaccessibility and Health Risk Assessment of Potentially Toxic Elements, Nature Environment and Pollution Technology, *An International Quarterly Scientific Journal*, 2021, Vol (20) pp. 13-28, https://doi.org/10.46488/NEPT.2021.v20i01.002
32. Basu, A., Hazra, A.K., Chaudhury, S., Ross, A.B., **Balachandran, S.** (2021) State of the Art Research on Sustainable Use of Water Hyacinth: A Bibliometric and Text Mining Analysis. Informatics **2021**, 8, 38. https://doi.org/10.3390/informatics8020038

Books and Chapters:

1. Shibani Chaudhury, Amit Kumar Hazra and Srinivasan Balachandran (2016) Green Energy and Sustainable Environment, Aksahar Prakashini Publication, Bolpur. ISBN: 978-81-922916-6-6
2. Debashree Sinha, Ramansu Goswami, Indranil Bhui, Amit K Chakraborty, Sambu Nath Banerjee, S. Balachandran, Shibani Chaudhury (2016) Isolation and characterization of cellulolytic fungi from active anaerobic digesters In book Ed by Shibani Chaudhury, Amit Kumar Hazra and Srinivasan Balachandran (2016) Green Energy and Sustainable Environment, Aksahar Prakashini Publication, Bolpur. ISBN: 978-81-922916-6-6, PP-28-35
3. S.N. Banerjee, NG Roy, S. Balachandran, AK Hazra and S. Chaudhury (2016) Role of innovative design on the use of renewable energy for awareness generation and knowledge extension of the tribal communities in a village of Santiniketan. In Book Ed. By Shibani Chaudhury, Amit Kumar Hazra and Srinivasan Balachandran (2016) Green Energy and Sustainable Environment, Aksahar Prakashini Publication, Bolpur. ISBN: 978-81-922916-6-6, PP- 172-179 Srinivasan Balachandran (2016) Pesticides residues in food – A Review, In Environment and Development: The changes of the millennium, Ed. Manjari Sarkar (Basu)Avenel Press, **ISBN: 978-93-80736-09-9**
4. Tanmay Laha, Riddhi Chattopadhyaya, Mansh Gope, Srinivasan Balachandran (2016) Levels of Potential Toxic Elements in playgrounds of Murshidabad: Human Health risk assessment, In Environment and Development: The changes of the millennium, Ed. Manjari Sarkar (Basu)Avenel Press, **ISBN: 978-93-80736-09-9**
5. Indranil Bhui, Anil Kr. Mathew, Sambhu Nath Banerjee, Shibani Chaudhury and Srinivasan Balachandran (2016) Biogas Production from Locally Available Aquatic Weed (Water Hyacinth and Salvinia) in Santiniketan Using Cow Dung as an Inoculum In Human Development and Sustainability- Challenges and Strategies, Ed. Asok Kumar Sarkar Prasanta Kumar Ghosh, Atlantic Publisher and Distributors, New Delhi, ISBN-13: 9788126923076
6. Amit K. Chakraborty, Ramansu Goswami, Debasree Sinha, Sambhu N. Banerjee, S. Balachandran and Shibani Chaudhury Biogas: Viable Green Energy for the Rural Indian Population, In Human Development and Sustainability- Challenges and Strategies, Ed. Asok Kumar Sarkar Prasanta Kumar Ghosh, Atlantic Publisher and

Distributors, New Delhi, ISBN-13: 9788126923076

7. S. Balachandran and Shibani Chaudhury (2017) Indian Energy Scenarios (Prospects and Constraints), in, India's Development Juggernaut, Ed. Naresh Chaturvedi, Sahitya Sangam, Allahabad pp: 342-362 (ISBN: 978-81-88494-97-2)
8. Karishma Hussain, Raza R. Hoque, **Srinivasan Balachandran**, Subhash Medhi, Mohammad Ghaznavi Idris, Mirzanur Rahman, and Farhaz Liaquat Hussain (2018) Monitoring and Risk Analysis of PAHs in the Environment, C. M. Hussain (ed.), Handbook of Environmental Materials Management, Springer International Publishing AG 2018, https://doi.org/10.1007/978-3-319-58538-3_29-1
9. Mahua Basu, **S Balachandran**, Xavier Savarimuthu, Arijit Basu, Nibha Mishra, (2017) Enzymatic targets for drug discovery against Alzheimer disease, Ed. Satya P Gupta, In advances in studies on enzyme inhibition of drugs, vol 2, ISBN 978-1-53610-505-6, Nova Science publication

List of publications in Seminar and Conferences.

1. Mallick T K, Sarmah N, Banerjee S N, Micheli L, Reddy K S, Ghosh PC, Walker G, Choudhury S, Pourkashanian M, Hamilton J, Giddings D, Walker M, Manickam K, Hazara A, Balachandran S, Lokeswaran S, Grant D, Nimmo W, Mathew A K (2013) Design concept and configuration of a hybrid renewable energy system for rural electrification in India through BioCPV project, *International Conference on Advanced Energy Research*, 10-12 December 2013, Indian Institute of Technology, Mumbai, ISBN: 978-81-928795-0-5.
2. Anil K Mathew, Ramansu Goswami, Sambhu N Banerjee, Amit K Chakraborty, Arunima Shome, S. Balachandran, Shibani Chaudhury (2013) Comparison of Biogas Production from Water Hyacinth (*Eichhornia crassipes*) and Salvinia (*Salvinia cucullata*), *International Conference on Advanced Energy Research*, 10-12 December 2013, Indian Institute of Technology, Mumbai, ISBN: 978-81-928795-0-5.
3. Manash Gope, Debopriya Bhattacharyya and Dr. S. Balachandran (2014) Speciation of Cd in roadside dust of Asansol, West Bengal, India, International Conference on Advances in Sustainability of materials and Environment (ICASME '14), St. Xavier's Catholic College of Engineering, Nagercoil, Tamil Nadu, ISBN 978-81-910747-8-9
4. Amit Chakraborty, Sambu Nath Banerjee, Shibani Chaudhury, Srinivasan Balachandran (2014) Microbial activity and biochemical mechanism inside an anaerobic digester: A review, International Conference on Mother Earth: Save it to Achieve sustainable future to all (ICME II 2014), University of Burdwan, December 10-12 2014, ISBN: 978-93-84106-14-0
5. Bhui, I, Mathew AK, Banerjee SN., Balachandran, S and Chaudhury S, Biogas production from Water hyacinth and Salvinia in Santiniketan using gut microflora, In Environica, Volume 1, Dec. 2014 (Proceeding volume of International Conference on Mother Earth: Save it to achieve sustainable future for all, 10-12 December 2014, ISBN: 978-93-84106-14-0), pg. 121-127, published jointly by Department of Environmental Science, The University of Burdwan and Levant Books, Kolkata.
6. Amit Chakraborty, Sambu Nath Banerjee, Shibani Chaudhury, Srinivasan Balachandran (2015) Biogas production from water hyacinth and Salvinia in Santiniketan using gut microflora, International Conference on Mother Earth: Save it to Achieve sustainable future to all (ICME II 2014), University of Burdwan, December 10-12 2014, ISBN: 978-93-84106-14-0
7. S. Balachandran (2015) Enhancement of Biogas yield by various physico-chemical and biological pre-treatment techniques – A review International Conference on

Renewable Energy and Sustainable Environment – Dr.Mahalingam College of Engineering and Technology, Pollachi-642003, India. August 10-13, 2015, ISBN: 978-93-5235-155-8

8. Indranil Bhui, Sambu Nath Banerjee, Shibani Chaudhury, Srinivasan Balachandran (2015) Biogas production by co-digestion of locally available aquatic weeds (*Eichornia crassipes* and *Salvinia cucullata*) with kitchen waste, International Conference on Renewable Energy and Sustainable Environment – Dr.Mahalingam College of Engineering and Technology, Pollachi-642003, India. August 10-13, 2015, ISBN: 978-93-5235-155-8
9. Debopriya Bhattacharyya, Manash Gope, S. Balachandran and Shibani Chaudhury (2015) Fly ash Vermicomposting as a Waste Management Tool: An Approach to Study the Chemical Fractionation of Potentially Toxic Elements, International Conference on Renewable Energy and Sustainable Environment – Dr.Mahalingam College of Engineering and Technology, Pollachi-642003, India. August 10-13, 2015, ISBN: 978-93-5235-155-8

List of Seminar and Conference Participated and Paper Presented.

1. A. Shome, AK Chakraborty, AK Mathew, R. Goswami, SN Banerjee, **S. Balachandran**, S. Chaudhury – Role of some microorganisms in biogas production and their molecular detection: A review, Paper presented in the "National Seminar on Echoes of Silent Spring: Human Impact on Environment", Organized by Department of Environmental Studies, Visva-Bharati, Santiniketan on 9th March 2013.
2. AK Chakraborty, A. Shome, AK Mathew, R. Goswami, SN Banerjee, **S. Balachandran**, S. Chaudhury – Utilisation of water hyacinth (*Eichhornia crassipies*) for biogas production: A brief review. Paper presented in the "National Seminar on Echoes of Silent Spring: Human Impact on Environment", Organized by Department of Environmental Studies, Visva-Bharati, Santiniketan on 9th March 2013.
3. SN Banerjee, **S. Balachandran**, S. Chaudhury – Sustainable environment for future generation- a reality or myth? Paper presented in the "National Seminar on Echoes of Silent Spring: Human Impact on Environment", Organized by Department of Environmental Studies, Visva-Bharati, Santiniketan on 9th March 2013.
4. Mathew AK, Goswami R**,** Banerjee SN, Shome A, Chakraborthy AK, **Balachandran** S, Chaudhury, S. Biogas Production from Aquatic Biomass Present in and around Santiniketan, ***National Seminar on Environment: Pollution and Protection,*** January 30 – February 1, 2014, National Institute of Technology, Durgapur.
5. Arunima Shome, Ramansu Goswami, Anil K. Mathew, Sambhu N. Banerjee, Amit Kumar Chakraborty, **S. Balachandran**, Shibani Chaudhury Role of Microbes In Biogas Production, ***National Seminar on Environment: Pollution and Protection,*** January 30 – February 1, 2014, National Institute of Technology, Durgapur.
6. Mousumi Pal, Raza Rafiqul Hoque, **Srinivasan Balachandran** "Bioavailable fraction of Zinc and its associated human health risk assessment in the indoor dust of Durgapur, West Bengal" IST International Conference On Resource, Environment And Agricultural Sciences (ICBEAS)" February 4-6, 2017, Organised by Palli Siksha Bhavana (Institute Of Agriculture), Visva-Bharati Sriniketan, West Bengal, India And Society Of Bio-Resource, Environment And Agricultural Research, Santiniketan
7. Manohar TM and **S. Balachandran** "Effects of fluoride on bones, skeletal system – A pilot study at fluoride affected endemic district Dharmapuri district" Paper presented in International Symposium On Bioscience Research For Present And Future

Biomillennium' 17, 7th & 8th March 2017, Vivekanandha College Of Arts And Sciences For Women (Autonomous) & College Of Engineering For Women (Autonomous) Elayampalayam-637 205, Tiruchengode, Namakkal, Tamilnadu,

8. Ramesh K and **S Balachandran**, "Traditional knowledge in management of water bodies and ecosystem maintenance in Perambalur district of Tamil Nadu", Paper presented in International Symposium On Bioscience Research For Present And Future Biomillennium' 17, 7th & 8th March 2017, Vivekanandha College Of Arts And Sciences For Women (Autonomous) & College Of Engineering For Women (Autonomous) Elayampalayam-637 205, Tiruchengode, Namakkal, Tamilnadu,
9. Manash Gope and **S. Balachandran** "Levels and Risk Assessment of Manganese (Mn) in road dust of Asansol, West Bengal" in the national seminar "1 st Regional Science and Technology Congress" held in Bankura Christian College (Bardhaman Division) organized by the Department of Science and Technology, Govt. of West Bengal on 7th – 8th November 2016.
10. Manash Gope and **S. Balachandran** "Solid Phase Distribution and Health risk of Lead and Cadmium in roadside Deposited Dust of Asansol, West Bengal, India" in the "International Conference on Contaminated Site Remediation (CleanUp 2016) held at Coimbatore, Tamil Nadu Agricultural University in association with CRC CARE, Australia during 13^{th} – 15^{th} December 2016.
11. Tanmay Laha and **S. Balachandran** "Health Risk Of Selected Heavy Metals In The Playground Soils At Durgapur, West Bengal, India", in the "International Conference on Contaminated Site Remediation (CleanUp 2016) held at Coimbatore, Tamil Nadu Agricultural University in association with CRC CARE, Australia during 13th – 15th December 2016.

List of PhD scholars

1. Influence of abiotic stress on callus culture of *Heliotropium indicum* L for assessment of flavonoids and phenolic contents – M. Senthil Kumar – awarded (2013)
2. Risk assessment of potentially toxic elements and Polycyclic aromatic hydrocarbons in the street dust (<53µM) of Asansol and Durgapur, West Bengal, India- Manash Gope- Awarded. (2017)
3. Mobility and bioavailability of potentially toxic elements (PTEs) in playground soils of Khagra, Murshidabad district, West Bengal – Tanmay Laha- awarded (2018)
4. Modulating neurotoxic effects of Chlorpyrifos by a naturally occurring Coumarin Scopoletin- Mahua Basu- awarded (2018)
5. Enhancing biogas production by co-digestion – Indranil Bhui - awarded (2018)
6. Potential Toxic Elements in indoor dust of Durgapur and Asansol Industrial area: Associated Health Risk Assessment- Mousumi Pal – awarded (2020)

Area of Interest:

- Soil pollution;
- Chemical speciation and bioavailability of potentially toxic elements;
- Polycyclic aromatic hydrocarbons and their degradation;
- Biogas and renewable energy;

List of completed Projects

a) Name of the project: "**A Comparative ethnobotanical investigation: The Santal tribes of major populated districts in West Bengal, India**", (Jan 2010 to Jan 2013)
Sponsoring agency: UGC. (extended for six months and submitted in July 2013)

Amount sanctioned: Rs.8,28,300/-

Abstract: Three districts (Bankura, Dakshin Dinajpur and Puruliya) from West Bengal, where the Santal tribes are densely populated, were chosen for a comparative ethnobotanical investigation. A questionnaire survey was conducted to document the ethnomedicinal plants from the traditional knowledge of the Santal tribe from the villages of the selected blocks of Puruliya, Bankura and Dakshin Dinajpur.

b) Name of the Project: **Development and Integration of Biomass and Concentrating Photovoltaic System for the Rural and the urban Energy Bridge: BioCPV.**

A research project under the Indo-UK Collaborative Research Initiative on *Bridging the Urban and the Rural Divide (BURD).*

Sponsoring agency: DST, New Delhi (Indian Side) (2012-2015) extended upto 2017

Amount Sanctioned: Rs.5,57,17,125/- of which amount for Visva-Bharati is Rs.2,26,70.325/- . Prof. Shibani Chaudhury (PI), Prof. A. Hazra (Co-PI) and Dr. S. Balachandran (Co-PI). The other Co-PIs are from IITM and IITB

Abstract: This project will be developed an integrated solution for renewable energy technologies by using solar photovoltaic and biomass power generation such that an autonomous power supply can be made for the users. The solar power will be generated by the high efficient concentrating photovoltaic system (CPV). An anaerobic digester will also be developed for utilizing locally available biomass resources such that electricity will be provided during the unavailability of solar energy. In addition, metal hydride-based material will be examined for enhancing the performance efficiency of hydrogen. All three energy technologies will be integrated to provide electricity to 45 households in a rural tribal area at Santiniketan. [This project is a collaborative project where IIT Madras will be working on CPV and IIT Bombay will work and Hydrogen generation, and Visva-Bharati will work on Biogas generation.]

Projects Ongoing;

1. Name of the Project: **"Earthworm Gut Microbes Mediated Carcinogenic Polycyclic Aromatic Hydrocarbons (CPAHs) Remediation in Contaminated Soil"** submitted to DBT under Twinning Program
   Sponsoring Agency; DBT Twinning project, Period; December 2018-December 2021
   Collaboration with Department of Environmental Sciences, Tezpur University
   Amount Sanctioned: **Rs. 56,39,200 /-** of which amount for Visva-Bharati is Rs. **22,54,600** /-. Dr. S. Balachandran (PI), Prof. N.C. Mandal, Dept. of Botany, Visva-Bharati (Co-PI).
2. Name of the Project; "**Development, Research and Pilot scale installation of solar-hydro pumped storage scheme in a remote village of Manipur to ensure 24x7 electricity.**"
   Sponsoring agency; DST, Period 2018-2020
   Collaboration with Dr. SP Gonchaudhury, NBIRT Kolkata
   Amount Sanctioned; Rs. 2,60, 67,500 of which amount for Visva-Bharati is Rs. 88,57,000 /. Prof. Shibani Chaudhury, Dept. of Environmental Studies is the Principal

Investigator, and Prof. Amit Kumar Hazra, Department of Lifelong Learning & Extension, PSV, Visva-Bharati and Dr. S. Balachandran, Dept. of Environmental Studies are the Co-Investigators of the project.

3. Name of the Project; BEFWAM-**Bioenergy, Fertiliser and Clean Water from Invasive Aquatic Macrophytes**
   Amount Sanctioned; UK £**262,595.28** for Visva-Bharati is Rs. 2,37,85,233.43 (1 UK£ @Rs. 90.58). Prof. Shibani Chaudhury, Dept. of Environmental Studies; Prof. Amit Kumar Hazra, Department of Lifelong Learning & Extension, PSV and Dr. S. Balachandran, Dept. of Environmental Studies are the Co-Investigators of the project, Principal Investigator of the Project Andrew B Ross, University of Leeds, UK.
   Sponsoring Agency: Biotechnology and Biological Sciences Research Council (BBSRC) and Research Council United Kingdom (RCUK)
   Collaboration with University of Leeds, UK; Centre for Research in Energy and Energy Conservation, Uganda; Institute of Chemical Technology, India

S. Balachandran