

Centre for Environmental Science and Engineering

Annual Report 2017-2018

Introduction and an Overview of the Centre

The Centre for Environmental Science and Engineering (CESE) was established in 1985. The Centre has a core group of 10 faculty members with multi-disciplinary background and diversifying research interests. Apart from this, the professionals from consultancies and government organizations come for delivering the lectures time to time. The centre is expanding teaching and research activities and has started a dual degree M.Sc. – Ph.D. programme since July 2010, in addition to already existing M.Tech. and Ph.D. programmes. In addition to these three programmes, the centre is running a minor in Environmental Science and Engineering for undergraduates studying in other departments at IIT Bombay. A dual degree B. Tech.- M. Tech. programme is starting from Autumn 2018. In addition to the above listed programmes, CESE offers an Institute core course “Environmental Studies: Science and Engineering” to all undergraduates and M.Sc.– Ph.D. students. Besides, the centre runs several elective courses for sensitizing students across all disciplines towards the urgent need for protection and restoration of environment by adapting environment friendly life styles.

The on-going research activities of the Centre are focused towards addressing the priority areas (local and global) set by major national agencies like MHRD, CPCB, SPCB, MNRE, DBT, MoEF, CSIR, DST. In addition, the Centre has already established strong links and collaborations with leading industries, academic institutions and national/international agencies by conducting sponsored research and offering consultancy and technical services. The research activities of CESE are supported by excellent experimental and computational facilities, competent and dedicated technical staff and high quality students. The centre is also actively engaged in organizing workshops and CEP courses for benefiting the professional from other academic institutions, industries and governmental sectors.

Academic Programmes

CESE currently offers M.Tech., Ph.D. and M.Sc.-Ph.D. programmes in Environmental Science and Engineering with a strong focus in teaching and research.

Degrees Awarded last year	
M. Tech.	: 18
Ph. D.	: 5

Scholarships: Information is provided in the table given below.

Category	Number of Students Admitted Under Each Programme in 2017		
	<u>M. Tech</u>	<u>Ph.D</u>	<u>M.Sc.-Ph.D.</u>
Institute Teaching Assistance (TA)	13	7	7
External sponsored College Teacher (CT) Industry	-	-	-
Project sponsored (PS)	-	-	-
UGC/CSIR/DBT / QIP/CPHEO fellowship holders	-	-	-

R&D Activities

Four new projects have been awarded in 2017-2018. The details of the projects are given below.

Sponsored Research Projects

Sponsored Research Projects:	
New:	4
Ongoing:	16
Completed:	3
Faculty Involved :	10

Sr.No.	Project Title	Sponsoring Agency	Project Status
1	“Capacity Building in Sustainability and Environmental Management” (CapSEM) The CapSEM Project is designed to contribute in achieving global frameworks for sustainable development, including the UN Sustainable Development Goals and the UNFCCC Climate Agreement and help to combat climate change and global poverty from a transregional perspective. To nurture	European Region Action Scheme for the Mobility of University Students (ERASMUS)	Ongoing

	the multi-actor collaborative partnerships and to enhance the educational capacity and sustainability knowledge around the globe are the main objectives of the CapSEM project.		
2	Catalyzing Rural Development and Women Empowerment through Implementing Eco-Centric Technology Aimed at Gainful Recycling of Treated Sewages (Technology development and optimization in IIT Bombay and demonstration of technology at a real-life scale at Mhaswad, District Satara, State of Maharashtra) (2014-2017)	Rajiv Gandhi Science and Technology Commission (RGSTC), Govt. of Maharashtra	Ongoing
3	Municipal Solid Waste Characterization and Monitoring of Existing Solid Waste Management Systems in IIT Bombay Campus	Tata Centre for Technology & Design, IIT Bombay	Ongoing
4	Energy recovery from municipal solid waste using anaerobic digestion and its life cycle analysis	IRCC, IIT Bombay	Ongoing
5	Coping With Climate: Assessing Policies For Climate Change Adoption And Transport Sector Mitigation In Indian Cities (CLIMATRANS)	Research Council Of Norway	Ongoing
6	Sustainable Technology for Removal of Arsenic from drinking water: Principles and performance of Electrocoagulation.	MCDONNELL ACADEMY ,ST. LOUIS, USA.	Ongoing
7	Development of Household or Community Composting System for Food Waste (MSW) Recycling	Tata Centre for Technology & Design, IIT Bombay	Ongoing
8	Conducting Source Apportionment Study for Mormugao Port Trust	MPT, Goa	New
9	Portable Testing Facility for Cookstoves	Clean Energy Access Network (S3IDF*/CLEAN)	New
10	Synergy at Water Interfac : Transforming Arsenic and Fuloride Crisis in India into an Economic Enterprise through Technology Innovation	Global Innovation Initiative ,Department of State, U.S.A.	Ongoing
11	Experimental Study to Evaluate Emissions from Cook Stoves using Solid Fuels with a Focus on Reduction of Exposure	Tata Centre for Technology and Design	Ongoing
12	Development of a Combustion System for Energy Recovery from Municipal	MHRD, New Delhi under IMPRINT	Ongoing

	Solid Waste Derived Fuel	scheme	
13	Design of an Expert System for Flood Forecasting and Management for The City Of Chennai	PSA, Govt. of India	Ongoing
14	Coupled Human And Natural Systems Environment (Chanse) For Water Management Under Uncertainty In The Indo-Gangetic Plain	Ministry of Earth Sciences	New
15	Characterization of Grey Water and Development of Cost Effective Systems for Grey Water Recycling”	Tata Centre, IIT Bombay,	Ongoing
16	Removal of Micropollutants from Water using TiO ₂ Nanocomposites	DST, New Delhi	Ongoing
17	Treatment of Oily Sludge: Biodegradability Assessment and Effect of Bio-augmentation and Bio-stimulation	IRCC, IIT Bombay	Ongoing
18	Indoor and outdoor air pollution exposure assessment in urban metropolitan slums	IRCC, IIT Bombay	Ongoing
19	Air Quality Monitoring and Emission Source Apportionment Studies for Ten Cities in the State of Maharashtra	MPCB, Maharashtra	Ongoing
20	Emission Inventory and Air Quality Model Development for Industrial City Centres in Maharashtra: Framework for Air quality Management with Resources to Science based Policy and Action Plan for Chandrapur Area, MPCB	MPCB, Maharashtra	Completed
21	Characterization of Particulate Emissions from Non-Cooking Residential Sources in Rural Areas of Maharashtra (Research internship project)	IRCC, IIT Bombay	Completed
22	Solid Waste Characterization and Its Management in IIT Bombay Campus	Tata Centre for Technology and Design	Completed
23	Assessment of municipal solid waste based biogas plants in India	Tata Centre for Technology and Design	New

Consultancy Projects:

Following consultancy projects are being undertaken by CESE faculty members.

Sr No.	Project Title	Sponsoring Agency	Project Status (as New, Completed, or Ongoing)
1	Articulation of the Environmental Performance Objectives and Advice for Achieving Near-zero Liquid Discharge through Suitable Design of ETP at a Powerloom Textile Mega Cluster	Ichalkaranji Powerloom Mega Cluster Ltd, Ichalkaranji, Maharashtra	Ongoing
2	Work Order for setting up of wind Augmentation and Air purifying unit on Air pollution control system for traffic junctions and congested roads in Mumbai.	Maharashtra Pollution Control Board	Ongoing
3	Technical Audit Report on Surya II Water Supply Scheme	Environmental Science & Engineering	Ongoing
4	Evaluation of Road Marking Material	MCGM, Mumbai	Ongoing

Patents

Extension activities

Garg, A.

- Short course on "Total Quality Management (TQM) in Sewerage Operations including Equipment & Instrumentation Maintenance" - 2 day specialized course (13- 14 Nov 2017) for MCGM; Co-coordinator: Prof. S. Chaudhari & Prof. A. Shriwastav
- Short Term Courses Short course on "Total Quality Management (TQM) in Sewerage Operations including Equipment & Instrumentation Maintenance" - 2 day specialized course (16 - 17 Nov 2017) for MCGM; Co-coordinator: Prof. S. Chaudhari & Prof. A. Shriwastav
- July 2017 – onwards: Member, Technical Committee for scrutinizing applications for change in product-mix, Maharashtra Pollution Control Board, Mumbai.
- 2016 – onwards: Member, Waste Management Facility Monitoring Committee constituted by Municipal Corporation of Greater Mumbai on the direction from Honorable High Court.

- November 2015 – onwards: Member, Project Monitoring Review Committee constituted to review project under ‘Green Chemistry’ by the Office of the Principal Scientific Adviser to the Government of India, New Delhi.

Visitors to the Department

Conferences/Symposia/Workshops/Seminars (Participated/Papers Presented)

National

Das D., Dutta S., Bhandarkar U. and **Sethi V.** Study of Raw and Processed Coal for Reducing Cookstove Emissions, 25th National Conference on I.C. Engines and Combustion, NITK Surathkal, (15- 17 December, 2017)

International

Dikshit A.K.

Biliangadi, S., Yellishetty, M., Wong, V.N.L., Dikshit, A.K., Majumdar, S.

"Experimental Investigation of Synthetic (Top) Soils for Mine Rehabilitation: Column Leaching Study" *Proceedings of 2nd International Symposium on Land Reclamation and Ecological Restoration*, Beijing, China, October 2017. (Biliangadi, S. won the best presentation award) for this paper).

Garg, A.

Malhotra, M., Garg, A. Hydrothermal Pretreatment of Waste Activated Sludge (WAS)," *Proceedings of National Conference on Sustainable Advanced Technologies for Environmental Management (SATEM-2017)* organized during 28th - 30th June, 2017, IEST Shibpur, India.

Singh, S., Garg, A. Degradation of Chlorophenols by Photo-Fenton Oxidation Process. IWWA Annual Convention on “Water.....The Elixir of Life” in Kala Academy, Panaji, Goa during 19-21 February 2018.

Phuleria H.C.

Davuluri, S., Vernekar, P., Lohe, S., Rane, R., Phuleria, H.C. "Indoor air pollution exposure and health issues among women in rural areas of Maharashtra, India", 29th Annual Scientific Conference of International Society for Environmental Epidemiology, 2017, Sydney, Australia

Anand, A, Gulam, T.J., Phuleria, H.C. " Assessment of indoor PM_{2.5} in slums of Mumbai, India," 29th Annual Scientific Conference of International Society for Environmental Epidemiology, 2017, Sydney, Australia,

Chandel, M.K.

Presented a paper “Thermal investigation and FTIR analysis of sewage sludge generated from municipal wastewater treatment plants in India” 6th International Waste Management and Landfill Symposium, held during 2-6 October 2017, at Sardinia, Italy

Presented a paper “A Life Cycle Assessment to Compare Composting Schemes for the Treatment of Municipal Solid Waste in Mumbai, India” 6th International Waste Management and Landfill Symposium, held during 2-6 October 2017, at Sardinia, Italy

Mukherji S.

Mohapatra, S., D. Snow, M. Kumar, P. Shea, L.P. Padhye and S. Mukherji, “Influence of DOM and POM on Photolysis of Diclofenac” International Symposium on Sustainable Urban Environment (ISSUE 2017), 23rd -24th June, 2017, Tezpur University, Assam, India. *Oral Presentation.*

Kumar R. and S. Mukherji, “Feasibility of Photocatalytic Degradation of an Organophosphorus Pesticide using Graphene Oxide-TiO₂ Nanocomposite” National Conference on Sustainable Advanced Technologies for Environment Management (SATEM-2017), Organized by Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Kolkata, India, June 28-30, 2017. *Oral Presentation.*

Menon G., S.S.V. Tatiparti and S. Mukherji, “Effect of Calcination Temperature on the Microstructure and Photocatalytic Decolorization of Methyl Orange Dye using TiO₂/ZnO Nanocomposites” National Conference on Sustainable Advanced Technologies for Environment Management (SATEM-2017), Organized by Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Kolkata, India, June 28-30, 2017. *Oral Presentation.*

Bharti, S., S. Mukherji, and S. Mukherji, “Photocatalytic Action of Silver-Titanium dioxide Nanocomposites Against Pathogenic Bacteria”, National Conference on Sustainable Advanced Technologies for Environment Management (SATEM-2017), Organized by Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Kolkata, India, June 28-30, 2017. *Oral Presentation.*

Mishra, M., G. Menon, S.S.V. Tatiparti and S. Mukherji, “Assessment of Endocrine Disruption Potential of Selected Pharmaceuticals Using an In-vitro Assay”, National Conference on Sustainable Advanced Technologies for Environment Management (SATEM-2017), Organized by Department of Civil Engineering, Indian Institute of Engineering Science and Technology, Shibpur, Kolkata, India, June 28-30, 2017. *Oral Presentation.*

Ghosh, P. and S. Mukherji, “Screening of mineral media components for enhancing carbazole degradation by *Pseudomonas aeruginosa* (RS1) using Plackett-Burman design” SETAC Europe 27th Annual Meeting, Brussels, Belgium, 7-11 May, 2017. *Poster Presentation.*

Ghosh, P. and S. Mukherji, “Comparative Toxicity Assessment of PAHs and Nitrogen and Sulfur Heterocyclic PAHs by Bioluminescence Inhibition Assay” National Seminar on

"Recent Advances in Environmental Toxicology" organized by Department of Biotechnology, Jamia Millia Islamia, New Delhi, February 13-14, 2017. *Oral Presentation.*

Conferences/Symposia/Workshops/Seminars (Coordinated/Chaired by Faculty)

Invited Lectures

National

Garg, A.

An invited presentation on "Sewage Sludge Solubilization and its Volume Reduction by Hydrothermal Pretreatment", National Seminar on Innovative Water and Sewerage Management Practices in Urban Environment organised by IWWA, Mumbai (oral presentation), India, held on January 20-21, 2018 at IIT Bombay, Mumbai. (The lecture included the research work by Ph.D. Scholar Mr. Milan Malhotra).

Phuleria H.C.

"Indoor Air Pollution: Exposure and Health Issues among Women in Rural areas of Maharashtra," Airothon International Summit IIT Bombay, Mumbai 2017-11-17

"Near-road particulate measurements: Which metric represents health-relevant exposures," IITB-WUSTL Joint workshop on Aerosols & Air Quality IIT Bombay, Mumbai. 2017-06-08

"Indoor and Outdoor particulate matter exposure in urban slums of Mumbai," Research Seminar in Department of Civil Engg. Monash Univ, Melbourne 2017-10-4

Mukherji, S.

"Potential of Silver Nanoparticle Immobilized Glass Surfaces for Disinfection of Water", Joint Workshop of IIT Bombay, University of Alberta & IC Impacts, 25th November, 2016.

International

CEP Organized

Significant Awards/ Distinctions

Dikshit, A.K.

Faculty Secondment by MHRD to Asian Institute of Technology (AIT) Bangkok to teach "ED79.04: Environmental Science and Technology for Decision Makers" in the School of Environment, Resources and Development (SERD), January-May 2017.

Honorary Work

Dikshit, A.K.

External Ph.D Thesis Examiner for PhD Thesis of Ms. Suganya E, Department of Chemical Engineering, Nation Institute of Technology, Calicut, July 2017 (Topic: *Hexavalent Chromium Removal from Aqueous Solutions Using Novel Plant Based Lignocellulosic Biosorbents-Equilibrium, Kinetic and Thermodynamic Studies*)

Garg, A.

Appointed as Director's Nominee for the Doctoral Advisory Committee (DAC) for two Ph.D. students enrolled in National Environmental Engineering Research Institute (NEERI), Nagpur.

Evaluated three Ph.D. theses submitted in Guwahati University, Mahatma Gandhi University (MGM), Kottayam and Institute of Chemical Technology (ICT), Mumbai. Also appointed as External examiner by MGM University, Kottayam and ICT, Mumbai.

Reviewed papers submitted to Industrial & Engineering Chemistry Research, Environmental Science and Pollution Research, Clean Technologies and Environmental Policy, Water Science and Technology, Journal of the Taiwan Institute of Chemical Engineers, Journal of The Electrochemical Society.

Mukherji, S.

Associate Editor, Applied Nanoscience, Springer

Associate Editor, Journal of The Institution of Engineers (India) Series A, Springer

Member of organizing committee, "World Recycling Summit and Environmental Management" 22nd to 24th May 2017, Malaysia.

Member of Faculty Selection Committee in IISER, Bhopal: April, 2017.

Member of Faculty Selection Committee in SRM University, Amaravati (held at SRM University, Kattankulathur): April, 2017.

Member of Expert Committee on Procurement of additional Oil Spill Response equipment for the TIER-I OSR facilities, March 2017.

Reviewer for Papers submitted to National and International Journals

Reviewer for project submitted to Agence Nationale de la Recherche (ANR) France, May

2107.

Member, Selection Committee for Chemical, Bio-Chemical & Material Sciences for the GIAN Initiative of MHRD, June, 2017.

Expert in Site Visit Team for review of project submitted to SPARSH scheme of BIRAC, March, 2018.

External Examiner for Ph.D. Thesis Submitted in Department of Civil Engineering, IIT Delhi, Fibers & Textile Processing Department, Institute of Chemical Technology, Department of Biochemical Engineering & Biotechnology, IIT Delhi, Department of Civil & Environmental Engineering, University of Auckland, New Zealand, Department of Civil Engineering, IIT Kharagpur, Department of Civil Engineering, IIT Madras

Faculty Members and Their Specializations

Anil Kumar Dikshit

Professor

Environment and Water Technologies; Municipal, Biomedical and Industrial Wastes Management; Environmental Impact Assessment, Systems Modelling and Sustainability; GIS Application for Environmental Planning and Management.

Shyam R. Asolekar

Professor

Development and modelling of reactors for treatment of domestic sewage and industrial wastewaters for pollution control and reuse, Hazardous, solid, and biomedical wastes management including decontamination of soils and sediments (field assessments, reactor development and modelling), Preventive environmental management and sustainable development incorporating waste minimization, cleaner and greener technologies, Application of remotely sensed data for monitoring and modelling of environmental systems; Environmental planning, policy and law

Virendra Sethi

Professor

Air Pollution Science and Engineering, Aerosol Transport Measurements, Aerosol Characterisation. Satellite Data Assisted Air Quality Management, Biomass Gasification Hot Gas Cleanup, Engineering Education.

Sanjeev Chaudhari

Professor & Head

Water and Wastewater Treatment.

Suparna Mukherji

Professor

Biodegradation and Bioremediation of Complex Organic Pollutants, Toxicity Evaluation of Complex Mixtures, Environmental Application of Nanomaterials, Sorption Phenomena, Sampling and Analysis of Bioaerosols

Subhankar Karmakar**Assoc. Professor**

Environmental and Water Resources Systems Engineering, Uncertainty Modeling, Disaster Risk and Vulnerability Assessment.

Anurag Garg**Assoc. Professor**

Municipal solid waste treatment by composting; energy from waste; hydrothermal treatment of sludge and municipal solid waste; Industrial wastewater treatment by catalytic wet oxidation and advanced wastewater treatment methods

Munish Kumar Chandel**Assoc. Professor**

Carbon Capture and Storage, Chemical Looping Combustion, Fluidized bed combustion, Greenhouse Gas Mitigation, Solid Waste Management, Waste to Energy, Water-Energy Nexus

Harish C. Phuleria**Asst. Professor**

Aerosols & Air Quality Characterization, Environmental Noise Exposures, Environmental Health

Amritanshu Shrivastav**Asst. Professor**

Ecology of microorganisms, Water and wastewater treatment, Algal bio-refinery for biofuel production, Algal-bacterial photo-bioreactors, Remediation of heavy metal contamination

Publications**Books****Books (Edited)****Chapters in Books**

Shrivastav, A., Gupta, S.K. (2017). Key Issues in pilot scale production, harvesting, and processing of algal biomass for biofuels. In: Gupta, S.K., Malik, A., Bux, F. (Eds), Algal Biofuels: Recent Advances and Future Prospects. pp. 247–258. DOI 10.1007/978-3-319-51010-1_12. Springer International Publishing. ISBN 978-3-319-51009-5.

Research Books (Authored)

Articles in Journals

National

International

Maji, K.J., **Dikshit, A.K.**, Deshpande, A. "Disability-adjusted Life Years and Economic Cost Assessment of the Health Effects Related to PM_{2.5} and PM₁₀ Pollution in Mumbai and Delhi, in India from 1991 to 2015," *Environmental Science and Pollution Research*, Vol. 24 (Issue 5), 2017, pp. 4709–4730.

Maji, K. J., Arora, M., **Dikshit, A. K.** "Burden of Disease Attributed to Ambient PM_{2.5} and PM₁₀ Exposure in 190 Cities in China," *Environmental Science and Pollution Research*, Vol. 24 (Issue 12), 2017, pp. 11559–11572.

Maji, K.J., **Dikshit, A.K.**, Deshpande, A. "Assessment of City Level Human Health Impact and Corresponding Monetary Cost Burden due to Air Pollution in India Taking Agra as a Model City," *Aerosol and Air Quality Research*, Vol. 17 (Issue: 3), 2017, pp. 831-842.

Maji, K.J., **Dikshit, A.K.**, Deshpande, A. "Human Health Risk as a Basis for Prioritizing Air Quality Monitoring Stations in a Megacity: a Case Study," *Arabian Journal of Geosciences*, Vol. 10 (Issue 18), 2017, pp. 394-406.

Maji, K.J., **Dikshit, A.K.**, Deshpande, A. "Can Fuzzy Set Theory Bring Complex Issues in Sizing Air Quality Monitoring Network into Focus?," *International Journal of System Assurance Engineering and Management*, Vol. 8, 2017, pp. 2118–2128.

Maji, K.J., **Dikshit, A.K.**, Chaudhary, R. "Human Health Risk Assessment due to Air Pollution in the Megacity Mumbai in India," *Asian Journal of Atmospheric Environment*, Vol. 11 (Issue 2), 2017, pp. 61-70.

Gupta, A., **Garg, A.** "Degradation of ciprofloxacin using Fenton's oxidation: Effect of operating parameters, identification of oxidized by-products and toxicity assessment," *Chemosphere*, vol. 193, 2018, pp. 1181-8.

Yadav, B.R., **Garg, A.** "Hetero-catalytic hydrothermal oxidation of simulated pulping effluent: Effect of operating parameters and catalyst stability," *Chemosphere*, vol. 191, pp. 128-35.

Oke, N., Singh, S., **Garg, A.** "A comparative treatment of bleaching wastewater by physicochemical processes," *Water Science and Technology*, vol.76, 2017, pp. 2367-79.

Singh, S., **Garg, A.** "Catalytic oxidative degradation of 4-chlorophenol: Effect of operating parameters and prediction of intermediates/by-products," *Environmental Progress & Sustainable Energy*, vol. 36, 2017, pp.1734-42.

Lal, K., **Garg, A.** "Utilization of dissolved iron as catalyst during Fenton-like oxidation of pretreated pulping effluent," *Process Safety and Environmental Protection*, vol. 111, 2017, pp. 766-74.

Lal, K., **Garg, A.** "Physico-chemical treatment of pulping effluent: characterization of flocs and sludge generated after treatment," *Separation Science and Technology*, vol. 52, 2017, pp. 1583-93.

Manu, M.K., Kumar, R., **Garg, A.** "Performance assessment of improved composting system for food waste with varying aeration and use of microbial inoculum," *Bioresource Technology*, vol. 234, 2017, pp. 167-7.

Mohite, R., **Garg, A.** "Performance of heterogeneous catalytic wet oxidation for the removal of phenolic compounds: Catalyst characterization and effect of pH, temperature, metal leaching and non-oxidative hydrothermal reaction," *Journal of Environmental Chemical Engineering*, vol. 5, 2017, pp. 468-78.

Puthussery, J.V., Kumar, R., **Garg, A.** "Evaluation of recycled concrete aggregates for their suitability in construction activities: An experimental study," *Waste Management*, vol. 60, 2017, pp. 270-6.

Yadav, B.R., **Garg, A.** "Performance assessment of activated carbon supported catalyst during catalytic wet oxidation of simulated pulping effluents generated from wood and bagasse based pulp and paper mills," *RSC Advances*, vol.7, 2017, pp. 9754-63.

AR Akash, AB Rao, **Chandel M.K.** Relevance of Carbon Capture & Sequestration in India's Energy Mix to Achieve the Reduction in Emission Intensity by 2030 as per INDCs. *Energy Procedia* 114, July 2017, 7492-7503

Singh U, Rao A.B., **Chandel M.K.** Economic Implications of CO₂ Capture from the Existing as Well as Proposed Coal-fired Power Plants in India under Various Policy Scenarios. Volume 114, July 2017, Pages 7638-7650

Singh V., **Phuleria H.C., Chandel M.K.** Greenhouse Gas Emissions from Sewage Treatment Plants Based on Sequential Batch Reactor in Maharashtra. In: Singh V., Yadav S., Yadava R. (eds) *Climate Change Impacts*. Water Science and Technology Library, vol 82. 2018 Springer, Singapore

Sarat Chandra, T., Aditi, S., Maneesh Kumar, M., **Mukherji, S.**, Modak, J., Chauhan, V.S., Sarada, R., Mudliar, S.N. 2017 "Growth and biochemical characteristics of an indigenous freshwater microalga, *Scenedesmus obtusus* cultivated in an airlift photobioreactor: Effect of reactor hydrodynamics, light intensity and photoperiod", *Bioprocess and Biosystems Engineering*, 40, 1057-1068.

Ghosh, I. and **S. Mukherji**, 2017 “Substrate interaction effects during pyrene biodegradation by *Pseudomonas aeruginosa* RS1”, *Journal of Environmental Chemical Engineering*, 5, 1791-1800.

Sarat Chandra, T., M. Maneeshkumar, V. S. Chauhan, **S. Mukherji**, R. Sarada, S. N. Mudliar, 2017 “Life cycle assessment of microalgae based biodiesel production to assess the impact of biomass productivity and energy source”, *Resources Conservation and Recycling*, 122, 286-294.

Chakraborty, D., V. Sharma, S. Agnihotri, **S. Mukherji** and S. Mukherji, 2017 “Disinfection of Water in a Batch Reactor using Chloridized Silver Surfaces”, *Journal of Water Process Engineering*, 16, 41-49.

Shriwastav, A., Sudarsan, G., Bose, P., Tare, V. (2017). A modified Winkler’s method for determination of dissolved oxygen concentration in water: Dependence of method accuracy on sample volume. *Measurement*. 106. pp. 190–195. (2016 Impact Factor: 2.843)

Gupta, S.K., Ansari, F.A., **Shriwastav, A.**, Guldhe, A., Rawat, I., Bux, F. (2017). Evaluation of various solvent systems for lipid extraction from wet microalgal biomass and its effects on primary metabolites of lipid extracted biomass. *Environmental Science and Pollution Research*. 24. pp. 15299–15307. (2016 Impact Factor: 2.741)

Ansari, F.A.[#], **Shriwastav, A.**[#], Gupta, S.K., Rawat, I., Bux, F. (2017). Exploration of microalgae biorefinery by optimizing sequential extraction of major metabolites from *Scenedesmus obliquus*. *Industrial & Engineering Chemistry Research*. 56. pp. 3407–3412. (2016 Impact Factor: 2.843)

[#] Equal contribution

Shriwastav, A., Thomas, J., Bose, P. (2017). A comprehensive mechanistic model for simulating algal growth dynamics in photobioreactors. *Bioresource Technology*. 233. pp. 7–14. (2016 Impact Factor: 5.651)

Shekhar, M., **Shriwastav, A.**, Bose, P., Shemeera, H. (2017). Microfiltration of algae: Impact of algal species, backwashing mode and duration of filtration cycle. *Algal Research*. 23. pp. 104–112. (2016 Impact Factor: 3.994)

SS Bhusnoor, UV Bhandarkar, **V Sethi**, PP Parikh, Thermophoresis deposition studies for NaCl and diesel exhaust particulate matter under laminar flow, *Journal of Aerosol Science* 105, 84-93, 2017

Book Chapters

Papers Published in Proceedings of Conferences/Symposia

National

Singh, S., Garg, A. Degradation of Chlorophenols by Photo-Fenton Oxidation Process. IWWA Annual Convention on “Water...The Elixir of Life” in Kala Academy, Panaji, Goa during 19-21 February 2018. (*Full paper*)

International

Singh V., **Phuleria H.C., Chandel M.K.** Thermal investigation and FTIR analysis of sewage sludge generated from municipal wastewater treatment plants in India. Proceedings of 16th International Waste management and landfill symposium. 2-6 October 2017, Sardinia, Italy

Sharma B.K., **Chandel M.K.** Comparing composting schemes for the treatment of municipal solid waste in Mumbai, India using life cycle assessment. Proceedings of 16th International Waste management and landfill symposium. 2-6 October 2017, Sardinia, Italy

Joshi, L., **Garg, A.** “Characterisation of refuse derived fuel and its constituents to predict their energy recovery potential.” *9th Asia-Pacific Landfill Symposium (APLAS)* organized by The University of Hong Kong during 9 – 11 November 2016.

Manu, M.K., Kumar, R., **Garg, A.** “Food waste drum composting: Effect of addition of inoculum.” *Proceedings of 10th International Conference on Circular Economy and Organic Waste.* May 25-28, 2016, Greece.

Gupta, A., **Garg, A.** “Recycling of Sewage Sludge as Adsorbents in Wastewater Treatment.” *5th Annual International Conference on Sustainable Energy and Environmental Sciences (SEES 2016)* February 22-23, 2016, Singapore.

Manu, M.K., Kumar, R., **Garg, A.** “Composting of organic fraction of municipal solid waste.” *The 31th International Conference on ‘Solid Waste Technology and Management’* sponsored by Widener University and The Journal of Solid Waste Technology and Management. April 3-6, 2016, Philadelphia, PA, U.S.A.

Lal, K., **Garg, A.** “Combustion Characteristics and Kinetics of the Pulping Effluent Sludge using Thermogravimetric Analysis.” *International Conference on Environmental Science and Technology 2016* sponsored by the American Academy of Sciences. June 6-10, 2016, Houston, Texas, USA.

Gupta, A., **Garg, A.** “Conversion of Black Liquor into Activated Carbon for Ciprofloxacin Removal from Wastewater.” *International Conference on Environmental Science and Technology 2016* sponsored by the American Academy of Sciences. June 6-10, 2016, Houston, Texas, USA.