Environmental Science and Engineering Department (ESED)

Annual Report 2020-2021

Introduction and an Overview of the Department

The Environmental Science and Engineering Department (ESED) was established in 1985 as a centre (CESE) and got departmental status in 2019. The department has a core group of 15 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 department is expanding teaching and research activities and has started a dual degree M.Sc. – PhD programme since July 2010, in addition to already existing M.Tech and PhD programmes. In addition to these three programmes, the department 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 has started 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 department runs several elective courses for sensitising students across all disciplines towards the urgent need for protection and restoration of the environment by adapting environment friendly life styles.

The on-going research activities of the department 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 department 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 department is also actively engaged in organizing workshops and CEP courses for benefiting the professional from other academic institutions, industries and governmental sectors.

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Academic Programmes

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

Academic Programme:

Academic Programme	Student intake	Degrees awarded
DD (BTech+MTech)	37	0
MTech	23	13
PhD	18	08
M.Sc (2-year)	-	5
DD (M.Sc.+ Ph.D)	07	1
DD (M.Tech.+ Ph.D)	02	1
M.S. by Research	-	-

1. Patents:

Sr. No.	Title of the Patent	Inventor	National / International	Status filed/ granted	Date of patent filed/granted
1.	Method and system for the remediation of contaminated earth from hazardous substances in a batch-wise e*x-situ* on-site manner US application No. 15/974,400 dated 8th May, 2018 (*Continuation Application* of U.S. Patent No. 9,993,856 for additional claims)	Asolekar S. R. and IIT Bombay	International (USA)	Notice of Allowance Issued by the USPTO	24th Feb, 2021
2.	Method and system for the remediation of contaminated earth from hazardous substances in a batch-wise *ex-situ* on- site manner" European Patent Application No. 11 805 621.7	Asolekar S. R. and IIT Bombay	International (Europe)	Intention for award of patent for application no. 11 805 621.7 – 1014 was received	Active

				from EPO	
3.	Method and system for the remediation of contaminated earth from hazardous substances in a batch-wise *ex-situ* on-site manner US application No.13/820,976 dated 03.05.2013 Based on PCT/IN2011/000609	Asolekar S. R. and IIT Bombay	International (USA)	Granted U.S. Patent No. 9,993,856	12th June, 2018 Active
4.	Method and system for the remediation of contaminated earth from hazardous substances in a batch-wise *ex-situ* on-site manner INDIA – Patent Application No. 2475/MUM/2010 (271269) dated 6th Sep,2010	Asolekar S. R. and IIT Bombay	National (India)	Granted India Patent No. 271269	12th Feb, 2016 Active
5.	Antimicrobial and antiviral composition, and method of preparation thereof	Mukherji Soumyo, Mukherji S., Sadani K., Pisharody, L. K. and Nag, P.	National, Provisional	Filed	27th May, 2020
6.	Preservation of hazardous organic compound (HOC) degrading bacteria under ambient conditions	Mukherji S. and Ansari A.	National	Filed	2nd June, 2020
7.	Copper nanoparticle based disinfectant composition, method of preparation and uses thereof	Mukherji S., Mukherji S., Sadani K., Nag, P., Xiao Y. T. and Pisharody, L. K.	National	Filed	29th October 2020
8.	Rotary drum composting system for household wet biodegradable waste stabilization	Manu, M.K., Garg, A., Kumar, R.	National	Filed (Application No.: 2018210191	May 2018

				81)	
9.	Development of efficient waste-derived catalysts for the degradation of chlorinated organics	Singh, S. and Garg, A.	National	Filed (Application No.: 201921053201)	December 2019
10.	Silver recovery as Ag^0nanoparticles from ion-exchange regenerant solution	Nawaz, T., Sengupta, S., and Yang, CL.	International (USA)	Granted (Patent No. 10807085)	October 2020
11.	"Method for Real Time Forecasting of Flood Risk Considering Hazard, Exposure and Vulnerability" Indian Patent: TEMP/E-1/57873/2019-MUM	Subimal G., Shrabani T. and Karmakar, S. IIT Bombay	India	Tentatively accepted	Aug., 2019

2. Extension activities:

Amritanshu Shriwastav

1. Reviewed the manuscripts submitted to multiple Journals for publication
2. Reviewed the book proposals submitted to CRC Press, Taylor & Francis
3. Reviewed the book chapters submitted to Springer for publication
4. Member of American Water Works Association (AWWA)
5. Member of International Water Association (IWA)

Anil Kumar Dikshit

1. Chairman, Board of Examiners for Research Scholar Mr. Vinay Kumar Singh, Earth Sciences Department, 1 July 2020.

2. Chairman, Board of Examiners for Research Scholar Mr. Vinod Kumar Yadav, Earth Science Department, 17 January 2020.

3. Judge for Aakar Symposium organized by Department of Civil Engineering, IIT Bombay.

4. Member of the Environmental Monitoring Committee (EMC) as a part of Mahul Trans Harbour Link-Project Implementation Unit (MTHL-PIU) since 2019

Anurag Garg

5. Garg, A. "Sewage sludge management". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 14th-18th December, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

6. Garg, A. "Sewage sludge management". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 15th-24th July, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

Harish Chandra Phuleria

7. Phuleria, H.C. "Environmental noise: sources, emissions, exposures, & health effects". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 14th-18th December, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

8. Phuleria, H.C. "Health and exposure". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 14th-18th December, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

9. Phuleria, H.C. "Environmental noise: sources, emissions, exposures, & health effects". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 15th-24th July, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

10. Phuleria, H.C. "Health and exposure". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 15th-24th July, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

11. Phuleria, H.C. "Noise Pollution: Sources, Measurements, Effects and Control", as a part of a FDP on Challenges and Approaches of Sustainable Developments in Civil Engineering organized by Vidyavardhaka College of Engineering, Mysuru, 7 Aug, 2020 (~1200 college teachers and students from Karnataka participated).

Sanjeev Chaudhari

12. Chaudhari, S. "Introduction to water treatment and supply". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 14^{th}-18^{th} December, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

13. Chaudhari, S. "Introduction to water treatment and supply". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 15^{th}-24^{th} July, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

Subhankar Karmakar

14. External Expert, IoE Proposal evaluation for the Department of Civil Engineering, IIT Delhi, 21st October, 2020.

15. External Committee Member, Evaluation of a faculty member for regularization, Indian Institute of Technology Patna, Bihar, April 2020

16. Reviewers of Journals: Advances in Water Resources (Elsevier), International Journal of Geographical Information Science, ISH Journal of Hydraulic Engineering, Journal of Climate, Climate Dynamic, Journal of Computing in Civil Engineering (American Society for Civil Engineers), Journal of Earth System Science, Journal of Flood Risk Management (Wiley), Journal of Hydrologic Engineering (ASCE), Journal of Hydrology (Elsevier), Journal of Hydro-Meteorology, Water Resources Research (AGU), MoES, GoI proposals.

Suparna Mukherji

17. Mukherji, S. "Decentralized wastewater and greywater treatment for promoting water recycling and reuse". Presentation and participation in the online panel discussion on

"Decentralized wastewater treatment: The need of the hour" organized by CSIR-National Environmental Engineering Research Institute (NEERI), 5th February, 2021.

18. Mukherji, S. "Biological treatment processes for removal of organic pollutants and nutrients from wastewater". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 14th-18th December, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

19. Mukherji, S. "Biological nutrient removal from wastewater". Lecture presented in TIEQP-III Sponsored Short-Term Course on "Recent Advances in Environmental Biotechnology" organized by School of Environmental Science & Engineering and Department of Civil Engineering, IIT Kharagpur, 5th – 9th October, 2020.

20. Mukherji, S. "Fundamentals and applications of advanced oxidation processes". Lecture presented in Training Programme on Water Value Chain including Desalination and Sewage Treatment, 27th -29th July, 2020. Organized by Centre of Excellence in Oil and Gas, IIT Bombay for participants from GAIL.

21. Mukherji, S. "Biological treatment processes for removal of organic pollutants and nutrients from wastewater". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 15th-24th July, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

Swatantra P. Singh

22. Singh, S. P. Lecture delivered in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 14th-18th December, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

23. Singh, S. P. Lecture delivered in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 15th-24th July, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

24. Member: European Membrane Society

25. Member: Association of Environmental Engineering & Science Professors

26. Life Membership: Indian Membrane Society

27. Life Membership: ISEES

28. Member: International Water Association

29. Member: North American Membrane Society

Tabish Nawaz

30. Nawaz, T. "Decentralized wastewater treatment technologies, resource recovery and water reuse". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 14th-18th December, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

31. Nawaz, T. "Decentralized wastewater treatment technologies, resource recovery and water reuse". Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 15th-24th July, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

Virendra Sethi

32. HPCL Officers' training (online – 3 trainings through CSE)

33. Sethi, V. "Case studies in air pollution" Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 15th-24th July, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

34. Sethi, V. "Case studies in air pollution" Lecture presented in TEQIP Course on Introduction to Environmental Engineering, Organized by ESED, IIT Bombay, 14th-18th December, 2020. Organized for Faculty from Government College of Technology (GCT), Coimbatore.

35. Participated in TEQIP organized by UPES, Dehra Dun

3. Visitors to the Department (Invited by the Faculty, if any):

Anil Kumar Dikshit

Hosted Prof. M.N.V. Prasad, Emeritus Professor, University of Hyderabad, who delivered Wednesday Workshop/Webinar from 14 October to 11 November 2020. The topics delivered by him were (1) Introduction to Sustainability Concepts (2) Millennium Development Goals (3) Introducing Sustainable Development Goals [SDGs] (4) Sustainable Development Goals [SDGs]– Topics (5) A Decade of Weather Extremes and Need for Introduction of Sustainability Science in Higher Education.

4. Conferences/Symposia/Workshops/Seminars (Participated/Papers Presented):

1. National

Anil Kumar Dikshit

1. Presented talk on "Concepts of Sustainable Development" in the Workshop/Webinar on "UN Sustainable Development Goals for Attaining Sustainability", organized by IIT Bombay jointly with University of Hyderabad, October 24, 2020, IIT Bombay.

Anurag Garg

2. Jain, A., Malhotra, M., Garg, A. (2020). "Pretreatment of sewage sludge by wet oxidation and surfactant addition". International Conference on Green Energy for Environmental Sustainability (ICGEES -2020) organized by National Institute of Technology Calicut during 5-6 August 2020 in *Online mode*. (Paper was presented by M. Malhotra)

3. Singh, S., Garg, A. (2020). "Degradation of Chlorophenols: A Comparison of Fenton's and Photo-Fenton Oxidation". International Conference on Green Energy for Environmental Sustainability (ICGEES -2020) organized by National Institute of Technology Calicut during 5-6 August 2020 in *Online mode*. (Paper was presented by S. Singh)

Suparna Mukherji

4. Ghosh, P. and Mukherji, S. (2020) "Biodegradation of Fluorene and Dibenzothiophene using *Pseudomonas aeruginosa* RS1", 2nd International Conference on Advanced Technologies for Industrial Pollution Control, 16th – 20th December, 2020, organized by Department of Civil Engineering, IIEST Shibpur, India. Online *Oral Presentation.*

5. Ghosh, P. and Mukherji, S. (2020) "Biodegradation of carbazole, fluorene and dibenzothiophene in presence of refinery wastewater", 2nd ASCE India Conference on "Challenges of Resilient and Sustainable Infrastructure Development in Emerging Economies" (CRSIDE2020), 2nd to 4th March 2020, Kolkata. *Oral Presentation.*

6. Pisharody, L., Suresh, S., Mukherji, S. (2020) "Monitoring of Rotavirus A, Coliforms and MS2 Coliphage in Powai Lake: seasonal variation in correlation between Rotavirus A and indicator organisms" National Conference on Issues and Challenges in Water Treatment and Allied Research for Sustainable Environment (WATER 2020), 23rd to 25th January, 2020, organized by Centre for Environment, IIT Guwahati, Guwahati, India. *Oral Presentation*.

2. International

Amritanshu Shriwastav

1. Karim, A.V., Krishan, S., Shriwastav, A. (2021) "Optimization of the Sonocatalytic Degradation of Tetracycline with Cu-Doped TiO_2 Catalyst Using Response Surface Methodology" in the 5th International Conference on Catalysis and Chemical Engineering (CCE-2021) on February 22-26, 2021-Virtual, organized by USG United Scientific Group. (Online talk / conference in virtual mode).

2. Krishan, S., Karim, A.V., Shriwastav, A. (2021) "A Comparative Study of Photocatalytic Degradation of Bisphenol-A by N, Cu, and Co-doped Cu, N/TiO_2 under Visible light" in the 6th International Conference on Nanoscience and Nanotechnology, February 1-3, 2021, Organized by Department of Physics and Nanotechnology, SRM Institute of Science & Technology. (Online talk / conference in virtual mode).

3. Shriwastav, A. (2020) "Microplastics as the Emerging Contaminant in the Environment" in the Vth International Conference on Sustainable Energy and Environmental Challenges (V SEEC_Virtual) on 19th December 2020, organized by the International

Society for Energy, Environment and Sustainability. (Online talk / conference in virtual mode).

4. Dutta, S., Shriwastav, A. (2020) "Microplastics in the Marine and Freshwater Ecosystems" in the International Conference on Water: From Pollution to Purification (ICW-2020) on 12th December 2020, Organized by Inter University Instrumentation Centre (IUIC), School of Environmental Sciences, Advanced Centre of Environmental Studies and Sustainable Development (ACESSD) & Society of Environmental Chemistry and Allied Sciences (SECAS) Mahatma Gandhi University, Kottayam, Kerala, India. (Online talk / conference in virtual mode).

Anil Kumar Dikshit

1. Presented invited talk on "Science of Climate Changes" in the International Conference on 'Climate Change & Sustainable Development', 22 September 2020, Parul University, Vadodara.

2. Participated in the international conference on 'Climate Changes & Sustainable Development' organized by Parul University and University of Lisbon, Portugal, 22-23 September 2020.

Anurag Garg

3. Garg, A. (2021) "Wastewater and sludge treatment using physico-chemical methods"A Symposium on Water and Wastewater Research jointly organized by Graduate Institute of Environmental Engineering, National Taiwan University and ESED, IIT Bombay on 6th January 2021 *Online Oral Presentation.*

Harish Chandra Phuleria

4. Anand A., Yadav S., Phuleria, H. C. (2020). "Assessment of chemical characteristics and oxidative potential of indoor $PM_{2.5}$ in densely populated urban slums". *30th Annual Meeting of the International Society of Exposure Science (ISES)*, September 21-22, a fully virtual meeting.

5. Patra A., Phuleria, H.C. (2020). "Commuter's exposure to different particle size ranges inside transportation modes". *30th Annual Meeting of the International Society of Exposure Science (ISES)*, September 21-22, a fully virtual meeting.

6. Patra A., Phuleria, H.C. (2020). "Can the socio-economic variables discriminate against the air pollution exposure?" *30th Annual Meeting of the International Society of Exposure Science (ISES)*, September 21-22, a fully virtual meeting.

7. Raparthi N., Manikyala N., Phuleria, H.C. (2020). "Estimating real-world emission factors for on-road vehicular fleet and their dependence on traffic and meteorological parameters". *30th Annual Meeting of the International Society of Exposure Science (ISES)*, September 21-22, a fully virtual meeting.

8. Manwani P., Kapoor T.S., Venkataraman C., Phuleria, H.C. (2020). "Examining the impact of open-field biomass burning on regional air quality in North India". *30th Annual Meeting of the International Society of Exposure Science (ISES)*, September 21-22, a fully virtual meeting.

9. Vijay P., Anand A., Phuleria, H.C. (2020). "Examining the spatial and temporal variation in the indoor gaseous, PM2.5, BC in urban homes in India". 30th Annual Meeting of the International Society of Exposure Science (ISES), September 21-22, a fully virtual meeting.

10. Debbarma S., Raparthi N., Venkataraman C., Phuleria, H.C. (2020). "Real-world traffic characterization on an inter-city expressway and its impact on air pollution emissions". 30th Annual Meeting of the International Society of Exposure Science (ISES), September 21-22, a fully virtual meeting.

11. Yadav S., Dubey S., Phuleria, H.C. (2020). "Characterization of soluble organic aerosol and related functional groups by 1H NMR at urban locations in Mumbai". 30th Annual Meeting of the International Society of Exposure Science (ISES), September 21-22, a fully virtual meeting.

12. Gupta K., Pullokaran D., Phuleria, H.C. (2020). "Health-risk assessment of human exposure to heavy metal using hair and nail as bio-samples". 32nd Annual Scientific Conference of International Society for Environmental Epidemiology (ISEE), August 24-27, a fully virtual meeting.

13. Yadav S., Raparthi N., Khare A., Phuleria, H.C. (2020). "Impact of traffic-origin particulate matter and its chemical constituents on oxidative potential". 32nd Annual Scientific Conference of International Society for Environmental Epidemiology (ISEE), August 24-27, a fully virtual meeting.

14. Navinya C., Patidar G., Phuleria, H.C. (2020). "Changes in air quality during the COVID-19 lockdown in India". 32nd Annual Scientific Conference of International Society for Environmental Epidemiology (ISEE), August 24-27, a fully virtual meeting.

15. Patra A., Phuleria, H.C. (2020). "Occupational Air Pollution Exposure of the People Working on or near Roads". International Conclave on Occupational Health – 2020, Mumbai, India, 28 Jan-1 Feb.

Sanjeev Chaudhari

16. Ghosh, S., and Chaudhari, S. (2021) "Introduction to water research lab, ESED" A Symposium on Water and Wastewater Research jointly organized by Graduate Institute of Environmental Engineering, National Taiwan University and ESED, IIT Bombay on 6th January 2021 *Online Oral Presentation.* (The talk was presented by S.Ghosh)

Subhankar Karmakar

17. Sudharsan, N., Singh, J., Karmakar, S., and Ghosh, S. (2020) "India can't Wait to Act upon Climate Change as Heatwaves Claim Life." European Geophysical Union General Assembly, 4 May to 8 May 2020, Pages 1071.

18. Gusain, A., Sudharsan, N., Karmakar, S., and Ghosh, S. (2020) "Flood Risk Characterization of Highly Flood-prone Data Scarce Region under Changing Climate." European Geophysical Union General Assembly, 4 May to 8 May 2020, Pages 1078.

19. Ghosh, M., Mohanty, M.P., and Karmakar, S. (2020) "Identification of Optimal Hydraulic Flood Management Scenarios for a Socially Vulnerable Urban Coastal Catchment: A 3-way Coupled Hydrodynamic Approach." American Geophysical Union Virtual Fall Meeting 1 December to 17 December 2020, Issue No. H218-0012.

20. Ghosh, M., Karmakar, S., and Ghosh, S. (2021) "Flood modelling for an urban Indian catchment: Challenges and way forward." Virtual conference on disaster risk reduction, Civil engineering for a disaster resilient society 15 March to 20 March 2021, Paper No. 198.

21. Ghosh M., Paul, S., Karmakar, S., and Ghosh, S. (2021) "Near-real-time flood forecasting for an urban coastal catchment: An approach in combination of numerical weather and 3-way coupled hydrodynamic flood modelling" European Geophysical Union General Assembly 19 April to 30 April 2021, Issue No. EGU21-12834.

Suparna Mukherji

22. Ghosh, P. and Mukherji, S. (2020) "Desorption and Biodegradation of Soil Sorbed PAHs and Heterocyclic PAHs by Pseudomonas aeruginosa RS1", the 5th BRICS Young Scientist Conclave, 21st to 25th September, 2020 at Chelyabinsk, Russia. Online Oral Presentation.

23. Chand, P., Datta, S. Mukherji, S. (2020) "Biodegradation of Water-Soluble Fraction of Oily Sludge by Bacillus cereus: Preferential Degradation of Naphthalenes and Quinolines", 3rd International Conference on Waste Management, Recycle 2020, 13th -14th February, 2020 at IIT Guwahati, Guwahati, India. Oral Presentation.

24. Garg, N., Mukherji, S. (2020) "Leaching of Metals from Steel Making Slag Using Mineral and Organic Acids" 3rd International Conference on Waste Management, Recycle 2020, 13th -14th February, 2020 at IIT Guwahati, Guwahati, India. Oral Presentation.

25. Mukherji, S. (2021) "An overview of water and wastewater research in treatment, remediation and applied microbiology (TRAM) Lab, ESED" A Symposium on Water and Wastewater Research jointly organized by Graduate Institute of Environmental Engineering, National Taiwan University and ESED, IIT Bombay on 6th January 2021 Online Oral Presentation.

Swatantra P. Singh

26. Barbhuiya, N.H., Misra, U. & Singh, S. P. (2020). Biocatalytic Membranes for Removing Emerging Micropollutants and Fouling. *Sustainable Technologies for Water Treatment and Desalination (STWTD – 2020),* 18 -19 December, 2020 at NIT Calicut.

27. Misra, U., Barbhuiya, N.H., & Singh, S. P. (2020). Energy-efficient configurations and system designs for membrane-based desalination and wastewater reuse.

Sustainable Technologies for Water Treatment and Desalination (STWTD – 2020), 18 -19 December, 2020 at NIT Calicut.

28. Barbhuiya, N.H., Misra, U. & Singh, S. P. (2020). Electro-conductive Membranes for Desalination, Water and Wastewater Treatment. *Sustainable Technologies for Desalination & National Water mission and Annual Congress of InDA (InDACON 2020),* 13 to 15 February, 2020 at Indus University, Ahmedabad, India.

29. Misra, U., Barbhuiya, N.H., & Singh, S. P. (2020). New generation nanomaterials modified energy efficient membranes for desalination and wastewater reuse. *Sustainable Technologies for Desalination & National Water mission and Annual Congress of InDA (InDACON 2020),* 13 to 15 February, 2020 at Indus University, Ahmedabad, India.

30. Jashrapuria K., Dixit N., & Singh, S. P. (2020). Biofouling control in membrane technology for desalination and wastewater treatment. *Sustainable Technologies for Water Treatment and Desalination (STWTD – 2020),* 18 -19 December, 2020 at NIT Calicut.

31. Priya, I. K., Kumar, A., Singh, S. P. (2020). "Next Generation Membranes for Desalination and Wastewater Treatment". *STWTD,* 18th to 19th December 2020, NIT Calicut. India

32. Kumar, A., Santoki, S., Singh, S. P. (2020). Doped Laser-Induced Graphene Catalytic Filters and Membranes for Wastewater Treatment. *MelPro,* 8th to 11th November 2020 Prague, Czech Republic

33. Kumar, A., Santoki, S., Singh, S. P. (2020). Doped Laser-Induced Graphene Catalytic Membranes for Wastewater Treatment. *17th Network Young Membrrains Meeting,* 3-4th Dec 2020 Manchester, UK

34. Kumar, A., Singh, S. P. (2020). Metal Doped Laser-Induced Graphene Conductive Filters and Membranes: Future for Desalination and Wastewater Treatment. *ICOM,* 7th to 11th December 2020, London, United Kingdom

35. Nair, A.M. & Singh, S.P. (2020). Biological based strategies for mitigating biofouling in MBRs. *Sustainable Technologies in Water Treatment and Desalination (STWTD – 2020),* 18-19 December, 2020 at NIT Calicut.

36. Dixit N., Singh S.P. (2020) Carbon-based Nanomaterials for Electrochemical Disinfection Applications. *2nd International online conference on Nanomaterial (IOCN-20), Sciforum.*

Tabish Nawaz

37. Nayyar, D., and Nawaz, T. (2021) "Wastewater and resource recovery lab, ESED" A Symposium on Water and Wastewater Research jointly organized by Graduate Institute of Environmental Engineering, National Taiwan University and ESED, IIT Bombay on 6th January 2021 *Online Oral Presentation.* (The talk was presented by D.Nayyar)

5. Conferences/Symposia/Workshops/Seminars (Coordinated/Chaired by Faculty):

Anil Kumar Dikshit

1. Organised 5-week online workshop on "Bio-medical Waste Management During & After Covid-19", jointly with TSEC Mumbai, IIT Bombay.

2. Organized 5-week webinar on "UN-Sustainable Development Goals for Attaining Sustainability", jointly with Hyderabad University**,** 14 October-11 November 2020, IIT Bombay.

3. Organized Symposium on "Data Analytics", Organized for Russian-Indian Network of Universities (RIN), 6-7 October 2020, IIT Bombay.

4. Organized Symposium on "Nano Materials", Organized for Russian-Indian Network of Universities (RIN), 3-4 November 2020, IIT Bombay.

Subhankar Karmakar

5. Brainstorming session (virtual) on activities under State Knowledge Management Centre on Climate Change, Maharashtra with Department of Science and Technology, Govt. of India; Interdisciplinary Programme in Climate Studies (IDPCS), IIT Bombay; and Department of Environment, Govt. of Maharashtra, 7 August, 2020.

6. e-School on Climate Science & Policy, 17-28 August 2020, Interdisciplinary Programme in Climate Studies (IDPCS), IIT Bombay.

7. Webinar on "Scope for Technology Development & Entrepreneurship in Climate Studies" on 17 March 2021, Interdisciplinary Programme in Climate Studies (IDPCS), IIT Bombay.

8. Webinar on "Climate Resilient Engineering Design" on 24 March 2021, Interdisciplinary Programme in Climate Studies (IDPCS), IIT Bombay.

Swatantra P. Singh

9. Vth International Conference on Sustainable Energy and Environmental Challenges (V SEEC) (Virtual Mode) 19-21 Dec. 2020 Co-Organizer

Tabish Nawaz

10. Co-ordinated and chaired a Symposium on Water and Wastewater Research jointly organized by Graduate Institute of Environmental Engineering, National Taiwan University and ESED, IIT Bombay on 6th January 2021 (Online mode).

6. Invited Lectures:

1. National

Abhishek Chakraborty

1. Chakraborty, A. (2021). “Modelling air quality and hydro-meteorological extremes over Indian mega cities” Invited to give a talk at IIT Madras as a part of “short term training programme on”; 22nd-27th March 2021, IIT Madras (remotely via VC).

Abhishek Chakraborty

2. Delivered an invited talk on “The Lost Plastic and its Consequences” in the National Policy Workshop Webinar Series (Webinar-4) on “Countermeasures for Riverine and Marine Plastic Litter in India” organized by National Productivity Council, Ministry of Commerce and Industry, Government of India on 18th May 2020.

Anil Kumar Dikshit

3. Delivered Invited Talk Titled " Municipal Solid Waste Management" in the TEQIP Course on ‘Introduction to Environmental Engineering’ for Government College of Technology Coimbatore, 15-24 July 2020, organized by the Environmental Science & Engineering Department, IIT Bombay.

4. Delivered Invited Talk Titled "Environmental Impact Assessment” in the TEQIP Course on ‘Introduction to Environmental Engineering’ for Government College of Technology Coimbatore, 15-24 July 2020, organized by the Environmental Science & Engineering Department, IIT Bombay.

5. Delivered Invited Talk on "Reduce, Reuse, Refuse, Recycle - remediation concepts, implement strategies” in the One Week Online Short-Term Training Programme on ‘Solid Waste-A Hidden Treasure in Reality’, 16-24 July 2020. Vachana Pitamaha Dr P.G. Halakatti College of Engineering & Technology, Vijayapur, Karnataka.

6. Delivered Invited Talk Titled "Planning, Design and Operation of Sanitary landfill for Indian cities" in the One Week Online Short-Term Training Programme on ‘Solid Waste-A Hidden Treasure in Reality’, 16-24 July 2020. Vachana Pitamaha Dr P.G. Halakatti College of Engineering & Technology, Vijayapur, Karnataka.

7. Delivered talk on "Data Analytics for Sustainable Agriculture" in the Online Symposium on "Data Analytics", 6-7 October 2020, organized for Russian-Indian Network, IIT Bombay.

8. Delivered Invited Talk Titled "What do We Mean by Sustainability?" in the TEQIP-III Sponsored One Week Online Short-Term Course on ‘Sustainable Concrete Construction-Issues and Challenges’, 26-30 October 2020, organized by Mining & Metallurgy Department, NIT Jalandhar.

9. Delivered talk on "CalsiCo: A Nano-material to Remove Arsenic from Groundwater" in the Online Symposium on 'Nano Materials', 3-4 November 2020, organized for Russian-Indian Network, IIT Bombay.

10. Delivered Invited Talk Titled " Municipal Solid Waste Management" in the TEQIP Course on 'Introduction to Environmental Engineering' for Government College of Technology Coimbatore, 14-23 December 2020, organized by the Environmental Science & Engineering Department, IIT Bombay.

11. Delivered Invited Talk Titled " Environmental Impact Assessment" in the TEQIP Course on 'Introduction to Environmental Engineering' for Government College of Technology Coimbatore, 14-23 December 2020, organized by the Environmental Science & Engineering Department, IIT Bombay.

12. Delivered Invited Talk Titled "Designing a Composter for Urban Households" in the One Week Course on 'Composting Technologies for Municipal Solid Waste Management', 4-8 January 2021, organized by Department of Civil Engineering, National Institute of Technology Warangal.

13. Delivered Invited Talk Titled "Environmental Systems Modelling and Optimization" in the FDP on 'Creating Wealth from Waste (CWW-2021)', 18-22 January 2021, Organized by Department of Metallurgical and Materials Engineering, N.I.T Durgapur along with ATAL Academy, Government of India.

14. Delivered Invited Talk Titled "R&D Work by IIT Bombay on SDG6: Clean Water & Sanitation" in the Webinar on 'SDG-6 Clean Water & Sanitation', 17 March 2021, Organized by SDF, IEI(I) and ERDMP Academy, Bhopal.

Anurag Garg

15. Garg, A. (2021) "Valorisation of Wet Organic Fraction of Municipal Solid Waste" in Recent Innovation in Cleaner Technologies (RICT-2021), 8-9 March 2021 at MNIT Jaipur, India. (Keynote Address)

16. Garg, A. (2021) "Potential of Hydrothermal Treatment for Decontamination and Resource Recovery from Industrial Effluents and Sewage Sludge" in TEQIP-III Sponsored One Week Online Short Term Course on "Sustainable Trends in Energy

& Environment" (STEE-2021), 6-10 February 2021 at Institute of Engineering & Technology, Lucknow, India. (Invited lecture)

17. Garg, A. (2021) "Solid Waste Handling & Treatment" in International Conference on Green Energy for Environmental Sustainability (ICGEES 2020), 5-6 August 2020 at NIT, Calicut, India. (Plenary lecture)

18. Garg, A. (2021) "Hydrothermal Pretreatment of Sewage Sludge" in TEQIP-III Sponsored Short Term Training Programme on "Waste Management Techniques with Special Attention to COVID-19 Waste", 22-26 June 2020 at Department of Civil Engineering, SVNIT Surat, India. (Invited lecture)

Harish Chandra Phuleria

19. Phuleria, H.C, Navinya, C. (2020). "What did the lockdowns tell us about air pollution source contributions?" Part of a CCAPC series on "Communicating air pollution-linked risks in India in light of COVID-19". CCAPC/2020/04, Sep, 2020. https://ccapc.org.in/policy-briefs/2020/phuleria-navinya-commentary

Munish Chandel

20. Chandel, M.K. (2020), Key note speaker in National Seminar on 'Waste to Wealth: Opportunities & Challenges' organised by Translational research and Professional Leadership Centre [TPLC], Government Engineering College, Bartonhill, Trivandrum and Ecoloop 360. 4 March 2020.

21. Chandel, M.K. (2020), Expert lecture on Hazardous Waste Management. Second TEQIP course for GCT Coimbatore held between 14th-23rd December 2020 (Online mode)

22. Chandel, M.K. (2020), Expert lecture on 'Waste landfill: Issues and challenges' in TEQIP-III Short term course on "Challenges and opportunities in Solid and Liquid Waste Management" November 2-6, 2020. IIT Guwahati (Online mode).

23. Chandel, M.K. (2020), Expert lecture on 'Climate change mitigation' in TEQIP-III Sponsored one-week Faculty Development Programme on Recent Developments in Environmental Engineering (RDEE-2020) (15th – 19th September, 2020) conducted at VSSUT Burla (Online mode).

24. Chandel, M.K. (2020), Expert lecture on ‘Hazardous Waste Management’ TEQIP Course on "Introduction to Environmental Engineering" 15-24 July 2020 for GCT Coimbatore.

Shyam R. Asolekar

25. Asolekar, S, R. (2020), “Circular Economy Approach to Women Empowerment Through Reusing Treated Rural Wastewater using *CW4Reuse* Constructed Wetland Technology”, Online Webinar Series organized by the International Water Association India Chapter, 5th December, 2020 at IIT Madras.

Subhankar Karmakar

26. Hydro-climatic Extremes and Flood Management using Risk Mapping, ATAL ACADEMY, Government of India Sponsored Short Term Course, Organized by MME Department, NIT Durgapur; January 18-22, 2021.

27. Urban Flood Risk Management, AICTE short-course, IIT Madras, March 22 - 27, 2021.

28. Online Winter School - 2020 on Adaptive Management of Floods in coastal wetlands in the Context of a Changing Climate, CTARA, IIT Bombay, 7 - 13 December, 2020.

29. An Introduction to Uncertainty Modeling of Environmental Systems, TEQIP Course on "Introduction to Environmental Engineering" For Government College of Technology Coimbatore - Organized by Environmental Science and Engineering Department, IIT Bombay, 14-23 December 2020.

30. Keynote speaker in the online faculty development programme “State-of-the-Art Experimental and Numerical Techniques in Civil Engineering” organized by the Department of Civil Engineering, Saintgits College of Engineering, sponsored by the A P J Abdul Kalam Technological University from 1st - 22nd March 2021, SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)(Approved by AICTE & Affiliated to APJ Abdul Kalam Technological University), Kottayam, Kerala, 2 March 2021.

Suparna Mukherji

31. Mukherji, S. (2020) "Harnessing Novel Microbes for Treating Industrial Wastewater, Sludge and Solid Waste" Invited talk presented at the faculty development program on "Current Trends in Life Sciences" organized jointly by the School of Biosciences and Technology and the Academic Staff College at Vellore Institute of Technology (VIT), Vellore,17th – 22nd December, 2020.

32. Mukherji, S. (2020) "The need for Sensors in Water Quality Monitoring and Inherent Challenges" Invited lecture presented at the Online Workshop "IITB Sensors Workshop: Sensing the World" 5th -6th March, 2021, organized by IRCC, IIT Bombay, Mumbai Maharashtra, India.

Swatantra P. Singh

33. Singh, S. P. (2021) Short Term Courses TEQIP Course on "Introduction to Environmental Engineering" For Government College of Technology Coimbatore, Organized by Environmental Science and Engineering Department, IIT Bombay 14-23 December 2020.

34. Singh, S. P. (2020) An Invited Lecture at Workshop on Cleaner Technologies for Sustainable Environment (CTSE) 21-25 Dec. 2020," IIT Hyderabad.

35. Singh, S. P. (2021) A lecture in the 5 Day Value Added Programme on Nanoscience and Nanotechnology and its Application at KCT 15-19 Feb. 2021," Kumaraguru College of Technology, Coimbatore, Online, 2021-02-15, 2021-02-19.

Tabish Nawaz

36. Nawaz, T. (2020). "Environmental modelling and computation: a case of dissolved oxygen in river streams". Invited to give a talk at DAV Jalandhar, Punjab on the occasion of birth anniversary of S. Ramanujan by the Department of Mathematics, DAV Jalandhar on 22nd December 2020 (remotely via VC).

Virendra Sethi

37. Sethi, V., (2020), "Combustion Aerosols, Webinar on Environmental Management: Challenges and Road-ahead", CSIR-Indian Toxicology Research Institute, June 29, 2020.

2. International

Amritanshu Shriwastav

1. Delivered a lecture on “Introduction to Climate Change, Biodiversity and Ecosystem” in the TEQIP Course on "Introduction to Environmental Engineering" for GCT Coimbatore organized at IIT Bombay on 14th December 2020.
2. Delivered a lecture on “Introduction to Environmental Systems Modelling” in the TEQIP Course on "Introduction to Environmental Engineering" for GCT Coimbatore organized at IIT Bombay on 24th July 2020.
3. Delivered a lecture on “Introduction to Climate Change, Biodiversity and Ecosystem” in the TEQIP Course on "Introduction to Environmental Engineering" for GCT Coimbatore organized at IIT Bombay on 15th July 2020.

Anil Kumar Dikshit

1. Dikshit, A., K. (2020). Delivered talk on "Experiences from IIT Bombay" in International Virtual Workshop on ‘Linking Research and Education Through Strengthening International Collaboration’, 2 December 2020, organized by Malardalen University, Sweden.

Harish Chandra Phuleria

2. Phuleria, H.C. (2020). Participated and delivered a talk in the *Vaibhav Summit* under Environmental Sciences vertical, and Clean Air horizontal on the topic “Air pollution health effects modelling”, Virtual meeting, 21 Oct, 2020.

Suparna Mukherji

3. Mukherji, S. (2020). “Pharmaceuticals as Emerging Contaminants: Challenges in Monitoring and Removal from Water and Wastewater” Invited talk presented as a Panelist in Panel-I on “Emerging Contaminants: Monitoring and Degradation Challenges” in the 5th International Conference on Sustainable Energy and Environmental Challenges, 19th to 21st December, 2020 (Virtual Conference) organized by the International Society for Energy Environment and Sustainability (ISEES).

4. Mukherji, S. (2020). “Water Disinfection Using Immobilized Silver Nanoparticles: Mechanism and Implications of Water Chemistry on Disinfection Effectiveness” 57th Annual Convention of Chemists, International Conference on Recent Trends in Chemical Sciences: Environmental Chemistry Section (RTCS-ENV 2020),

Organized jointly by ONGC Energy Centre (R&D), Delhi and Indian Chemical Society, Kolkata, India, 26th – 29th December 2020. Invited Plenary Lecture.

Swatantra P. Singh

5. Singh, S. P. (2020). "Biofouling control through textured surfaces" during 5th International Conference on Sustainable Energy and Environmental Challenges, 19th to 21st December, 2020 (Virtual Conference) organized by the International Society for Energy Environment and Sustainability (ISEES).

6. Singh, S. P. (2021). Laser-Induced graphene for water purification," International E- Conference on Multifunctional Materials and Environment (E-ICMME-21) 01-02 Feb. 2021,

7. Singh, S. P. (2021). Conductive Laser-induced graphene membranes and filters: Future in desalination and wastewater application," International Online Congress on Membranes and Membrane Assisted Processes (ICMMAP 2021) 12-14 Feb. 2021.

8. Singh, S. P. (2021). Laser-induced Graphene Filters and Membranes for Desalination and Water Purification," International Web- Conference on "Recent Trends in Chemistry and Environment" (RTCE-2021) 05-06 March 2021.

Tabish Nawaz

9. Nawaz, T. (2020). Participated as a panelist and delivered a talk on "Resource recovery opportunities from reverse osmosis concentrate" during 5th International Conference on Sustainable Energy and Environmental Challenges, 19th to 21st December, 2020 (Virtual Conference) organized by the International Society for Energy Environment and Sustainability (ISEES).

7. CEP Organized:

Amritanshu Shriwastav

1. Coordinated and organized a TEQIP course on "Introduction to Environmental Engineering" for Government College of Technology Coimbatore in online mode during 14th-23rd December 2020

2. Coordinated and organized a TEQIP course on "Introduction to Environmental Engineering" for Government College of Technology Coimbatore in online mode during 15th-24th July 2020

Anurag Garg

3. Organized a CEP titled "Water Value Chain including Desalination and Sewage Treatment" (In-house course for GAIL India Pvt. Ltd. only) Duration: 4 days (27 - 30 July 2020) in online mode. Number. of participants: 30.

Swatantra P. Singh

4. Coordinated and Co-organized a TEQIP course on "Introduction to Environmental Engineering" for Government College of Technology Coimbatore in online mode during 14th-23rd December 2020

8. Honorary Work:

Abhishek Chakraborty

1. Reviewed research papers from reputed international journals (Atmospheric Environment, Science of the Total Environment and Atmospheric Chemistry and Physics)

2. Reviewed M.S by research thesis from IIT Kanpur

3. Reviewed PhD theses from IIT Kanpur and Mumbai University

Amritanshu Shriwastav

4. Expert member of the Working Group under Scientific Panel on Contaminants in Food Chain for Microplastics, constituted by Food Safety and Standards Authority of India

5. Member of the advisory committee for a student of Master of Fisheries Science at ICAR-CIFE, Mumbai

Anil Kumar Dikshit

6. Attended Webinar on International E-Waste Day, 14 October 2020.

7. Member of Bio-Medical Waste Advisory Committee, Maharashtra Pollution Control Board since 2009.

8. Mentor, Civil Engineering Department, Nirma University Since 2007.

9. Honorary Senate Member (External), National Institute of Technology Hamirpur since 2014.

10. Honorary Senate Member (External), Government Engineering College, Amravati since 2014.

11. Member of Alumni Association, HB Technological Institute, Kanpur since 2019.

Anurag Garg

12. Reviewed papers for ACS Omega (1), Industrial & Engineering Chemistry Research (2), Water Research (1), Chemical Engineering Journal (1), Applied Nanosciences (1), Bioresource Technology (1), Water Environment Research (2).

13. Reviewed 11 Ph.D. theses from IITs, NITs and other Universities

14. Examined one Masters Dissertation from foreign University

Harish Chandra Phuleria

15. Reviewed two external PhD theses.

16. Reviewed manuscripts for scientific journals - Atmospheric Environment, Science of Total Environment, Aerosol and Air Quality, Sound and Vibration.

Manoranjan Sahu

17. External Expert for PhD final Defense, Simanchala Das, NIT Rourkela, 2021

18. Review PhD Thesis, Anup Kumar Swain, NIT Rourkela,2021

Shyam R. Asolekar

19. Currently serving as the *M.P.C.B. Chair Professor* at the Environmental Science and Engineering Department at Indian Institute of Technology Bombay

Subhankar Karmakar

20. External Ph.D. thesis evaluation, August 2020, Dept of Civil Engineering. Jadavpur University, Kolkata.

21. External PhD thesis evaluation, March 2021, Agriculture and Food Engineering Department, Indian Institute of Technology, Kharagpur.

22. Associate Editor (from 2019 till date), Frontiers in Water and Built Environment Journal.

23. Managing Guest Editor, Special Issue (January 2021) - Water Security in Floodplains, Science of the Total Environment, Elsevier.

Suparna Mukherji

24. Member of Editorial Board, Applied Nanoscience, Springer, since 2011.
25. Associate Editor, Journal of The Institution of Engineers (India): Series A; since April 2017.

26. Reviewer for National and International Journals.

27. Member of CSIR Thematic Committee on "Ecology, Environment, Earth Sciences, Ocean and Water (E3OW)" for review of Niche Creating Projects (NCPs)/Focus Basic Research (FBR) projects, October, 2019- present.

28. Expert Member of BIRAC Area Review Panel on "Environment, Energy and Secondary agriculture" for review of projects in this area, July 2019-present.

29. Session Chair in the Second International Conference on Advanced Technologies for Industrial Pollution Control (ATIPC–2020), Organized by Department of Civil Engineering, IIEST Shibpur, Kolkata, 16th to 18th December, 2020.

30. Member of National Advisory Committee, Second International Conference on Advanced Technologies for Industrial Pollution Control (ATIPC–2020), Organized by Department of Civil Engineering, IIEST Shibpur, Kolkata, 16th to 18th December, 2020.

31. Member of Monitoring Committee of Dahanu Taluka Environmental Protection Authority, November, 2020 – present.

Swatantra P. Singh

32. Reviewed research papers for national and international journals (Since of Total Environment, Applied Nanomaterials, ACS Applied Materials and Interfaces, ACS ES&T Water, Plos One

33. Advisor and judge for Young Earth Champions competition organized by Sony BBC Earth Channel

34. Academic Editor of PlosOne

Tabish Nawaz

35. Reviewed research papers for national and international journals (Separation and Purification Technology, Environmental Engineering Science, Journal of The Institution of Engineers (India): Series A, Plos One and a book review from Cambridge University Press)

36. Advisor and judge for Young Earth Champions competition organized by Sony BBC Earth Channel

V. S. Vamsi Botlaguduru

37. Advisor and judge for Young Earth Champions competition organized by Sony BBC Earth Channel

Virendra Sethi

38. Reviewer of scientific research papers

39. Member of Institute of Eminence (IoE) Committee

40. Chairperson IRB, IIT Bombay

41. Member, National Knowledge Network

42. Member, Green Crackers Committee

43. Selection Committee, IIT Tirupathi

44. GATE ES Service

45. PhD Examiner, IIT Kanpur, Jamia and NITIE

9. Publications:

1. Books

2. Books (Edited)

Swatantra P. Singh

1. Singh, S. P., Rathinam, K., Gupta, T., and Agarwal, A. K. (2021). "Pollution Control Technologies. ed. , Singapore, Springer

2. Singh, S. P., Rathinam, K., Gupta, T., and Agarwal, A. K. (2021)."Nanomaterials and Nanocomposites for Environmental Remediation ed., Singapore, Springer.

3. Chapters in Books

Anurag Garg

1. Singh, S., Garg, A. (2021**).** "Advanced oxidation processes for industrial effluent treatment". Published in an Edited book "Advanced Oxidation Processes for Effluent Treatment Plants" Editor: Maulin P. Shah, Elsevier publication, 255-272.

Manoranjan Sahu

2. Sahu,M, Malyan, V and Mayya Y.S (2021), Technologies for Controlling Particulate Matter Emissions from Industries, Pollution Control Technologies, 978-981-16-0857-5, 501692_1_En

3. Mandal C, Sahu, M (2021), Application of Metal and Metal Oxide Nanoparticles as Potential Antibacterial Agents, Nanomaterials and Nanocomposites for Environmental Remediation, Springer

Shyam R. Asolekar

4. Sutar, R. S., Lekshmi, B., Ranade, D. R., Parikh, Y. J., & Asolekar, S. R. (2021). "Towards enhancement of water sovereignty by implementing the 'constructed

wetland for reuse' technology in gated community" in Sustainable Environment and Infrastructure, 90, pp. 157-163. Edited by K. R. Reddy, A. K. Agnihotri, Y. Yukselen-Aksoy, B. K. Dubey & Ajay Bansal, Springer, Cham, Switzerland.

5. Lekshmi, B., Sutar, R. S., Ranade, D. R., Parikh, Y. J., and Asolekar, S. R. (2020). "Enhancement of water reuse by treating wastewater in constructed wetlands: minimization of nutrients and fecal Coliform" in Sustainable Environmental Geotechnics, 89, pp. 213-223. Edited by K. R. Reddy, A. K. Agnihotri, Y. Yukselen-Aksoy, B. K. Dubey & Ajay Bansal, Springer, Cham, Switzerland.

Suparna Mukherji

6. Mohapatra, S., Menon, N.G., Padhye, L.P., Tatiparti, S.S.V. and Mukherji, S. (2020) "Natural attenuation of pharmaceuticals in the aquatic environment and role of phototransformation" In "Contaminants in Drinking and Wastewater Sources: Challenges and Reigning Technologies", Editors: Kumar, M., Snow, D.D., Honda, R., Mukherjee, S., Springer Transactions in Civil and Environmental Engineering, Springer Nature Singapore Pte Ltd., 2020, ISBN 978-981-15-4599-3.

Swatantra P. Singh

7. Kumar, A., Singh, S. P., (2021) Titanium Oxide Composites with Graphene and Laser-Induced Graphene for the Environmental Applications. In: **Singh**, S.P., **Rathinam**, K., **Gupta**, T., **Agarwal**, A.K. (Eds.) Nanomaterials and Nanocomposites for Environmental Remediation. Springer, Singapore
8. Barbhuiya, N.H. & Singh, S.P. (2021), Membrane Technology for Desalination and Wastewater recycling. In: Singh, S.P., Rathinam, K., Gupta, T., Agarwal, A.K. (Eds.), Pollution Control Technologies: Current Status and Future Prospects. Springer, Singapore.
9. Jashrapuria K. & Singh, S.P. (2021). Forward Osmosis in Desalination and Waste water Treatment. In: Singh, S.P., Rathinam, K., Gupta, T., Agarwal, A.K. (Eds.), Pollution Control Technologies: Current Status and Future Prospects. Springer, Singapore.
10. Dixit N.D., Shriwastav A. & Singh, S.P. (2021), Metal and Carbon-based Nanomaterials For Water Disinfection. In: Singh, S.P., Rathinam, K., Gupta, T., Agarwal, A.K. (Eds.), Pollution Control Technologies: Current Status and Future Prospects. Springer, Singapore.
11. Singh, S. P., Rathinam, K., Gupta, T., and Agarwal, A. K. (2021), " Introduction of Pollution Control Technologies. Pollution Control Technologies: Current Status and Future Prospects. Springer, Singapore.

12. Singh, S. P., Rathinam, K., Gupta, T., and Agarwal, A. K. (2021), " Introduction of Nanomaterials and Nanocomposites for Environmental Remediation. Nanomaterials and Nanocomposites for Environmental Remediation. Springer, Singapore
13. Shriwastav, S., Singh, S. P., and Singh, K.K., (2021) Multifunctional Hybrid Nanostructures as New Generation Environmental Decontamination Materials. In: Singh, S.P., Rathinam, K., Gupta, T., Agarwal, A.K. (Eds.) Nanomaterials and Nanocomposites for Environmental Remediation. Springer, Singapore
14. Kumar, J., Singh, K.K., Shriwastav, S., and Singh, S. P., (2021) Removal of Water Pollutants Utilizing Metal-Organic Framework. In: Singh, S.P., Rathinam, K., Gupta, T., Agarwal, A.K. (Eds.) Nanomaterials and Nanocomposites for Environmental Remediation. Springer, Singapore

Tabish Nawaz

15. Nawaz, T. and Selvaratnam, T. (2020). "Resource recovery from reverse osmosis concentrate as a solution to water crisis: A technological assessment". In "Sustainable Water: Resources and Management" Editors: Veera Gnaneswar Gude, Venkataramana Gadhamshetty and Ramanitaharan Kandiah, Nova Science Publishers INC., New York, 207-246.
16. Nawaz, T. and Sengupta, S. (2021). "Wastewater: novel treatment technologies and source of epidemiological studies". In "Handbook of Water Purity and Quality" Editor: Satinder Ahuja, Academic Press (Elsevier), 293-337.

4. Articles in Journals

a) National

Anurag Garg

1. Khatri, I., Garg, A. (2020). "Color Removal and Biodegradability Enhancement of Biomethanated Spent Wash from Distillery Using Wet Oxidation Treatment". *Indian Journal of Chemical Technology* 27, 503-508.
2. Khatri, **I., Garg, A. (2020). "**Challenges in the treatment of biomethanated spent wash by electro-Fenton process". *Journal of Indian Chemical Society* 97, 521-525.

b) International

Abhishek Chakraborty

1. Kanawade, V.P., Tripathi, S.N., Chakraborty, A. and Yu, H. (2020). Chemical Characterisation of Sub-micron Aerosols During New Particle Formation in an Urban Atmosphere. Aerosol Air Qual. Res. 20: 1294–1305.

Amritanshu Shriwastav

2. Krishnan, S., Shriwastav, A. (2021). Application of TiO_2 nanoparticles sensitized with natural chlorophyll pigments as catalyst for visible light photocatalytic degradation of methylene blue. Journal of Environmental Chemical Engineering, 9(1), pp. 104699.
3. Sandhu, S., Krishnan, S., Karim, A.V., Shriwastav, A. (2020). Photocatalytic denitrification of water using polystyrene immobilized TiO_2 as floating catalyst. Journal of Environmental Chemical Engineering, 8(6), pp. 104471.

Anil Kumar Dikshit

4. Chaudhary, R., Tong, Y.W., Dikshit, A.K. (2020). Kinetic study of nutrients removal from municipal wastewater by Chlorella vulgaris in photobioreactor supplied with CO_2-enriched air, Environmental Technology (United Kingdom), 41(5), 617-626.
5. Yadav, V., Kalbar, P.P., Karmakar, S., Dikshit, A.K. (2020). A two-stage multi-attribute decision-making model for selecting appropriate locations of waste transfer stations in urban centers, Waste Management, 114, 80-88.

Anurag Garg

6. Singh, S., Garg, A. (2021) "Conversion of Waste Materials into Heterogeneous Oxidation Catalysts for the Treatment of Chlorinated Organics". *Journal of Environmental Engineering, ASCE* 147(2), pp.7.
7. Malhotra, M., Garg, A. (2021) "Characterization of value-added chemicals derived from the thermal hydrolysis and wet oxidation of sewage sludge". *Frontiers in Environmental Science and Engineering* 15(1), pp.14.
8. Gupta, D., Mahajani, S. M., Garg, A. (2020) "Improved Hydrochar and Macromolecules Recovery Opportunities from Food Waste after Pretreatment at Moderate Temperature Hydrothermal Carbonization". *Science of Total Environment* 749, pp. 11.
9. Malhotra, M., Garg, A. (2020) "Hydrothermal Carbonization of Centrifuged Sewage Sludge: Determination of Resource Recovery from Process Wastewater and Thermal Behaviour of Hydrochar". *Waste Management*, 117 (2020) 114-123.
10. Mohite, R., Garg, A. (2020) "Performance of Supported Copper Catalysts for Oxidative Degradation of Phenolics in Aqueous Medium: Optimization of Reaction Conditions, Kinetics, Catalyst Stability, Characterization, and Reusability". *Industrial & Engineering Chemistry Research* 59, 12986-12998.
11. Malhotra, M., Garg, A. (2020) "Proteins Recovery from Hydrothermally treated Diluted and Centrifuged Sewage Sludge Samples". *Journal of Hazardous, Toxic and Radioactive Waste* 24(4), pp. 8.

12. Garg, N., Garg, A., Mukherji, S. (2020) “Eco-friendly decolorization and degradation of reactive yellow 145 textile dye by Pseudomonas aeruginosa and Thiosphaera pantotropha”. *Journal of Environmental Management* 263, pp.11.

Harish Chandra Phuleria

13. Anand, A., Phuleria, H.C. (2021). “Spatial and seasonal variation of outdoor BC and $PM_{2.5}$ in densely populated urban slums”. *Environmental Science and Pollution Research*, 28, 1397–1408.

14. Mahesh, P.A., Larsson, K., Johanson, G., Phuleria, H.C. Ravindra PV, Ernstgard L, Ulaganathan M, Krishna M, Palmberg L, Pollitt K, Upadhyay S, Ganguly K. 2020. “Clinical, epidemiological and experimental approaches to assess adverse health outcomes of indoor biomass smoke exposure: Conclusions from an Indo-Swedish workshop in Mysuru”. *Toxics*, 8(3), 68, 1-17.

15. Singh, V., Phuleria, H.C., Chandel, M.K. (2020). “Estimation of Energy Recovery Potential of Sewage Sludge in India: Waste to Watt Approach”. *Journal of Cleaner Production,* 276, 122538.

16. Navinya, C., Patidar, G., Phuleria, H.C. (2020). “Examining effects of the COVID-19 national lockdown on ambient air quality across urban India.” *Aerosol and Air Quality Research,* 20, 1759–1771.

17. Venkataraman, C., Bhushan, M., Dey, S,, Ganguly, D., Gupta, T., Habib, G., Kesarkar, A., Phuleria, H.C., Raman, R. (2020). Indian network project on carbonaceous aerosol emissions, source apportionment and climate Impacts (COALESCE)”. *Bulletin of the American Meteorological Society,* 101 (7), E1052-E1068, 2020.

Munish Chandel

18. Sharma, B. K. and Chandel M. K. (2021), “Life Cycle Cost Analysis of Municipal Solid Waste Management Scenarios for Mumbai, India.” *Waste Management*.124, 293-302.

19. Negi, R. and Chandel M. K (2021), “Analysing water-energy-GHG nexus in wastewater treatment plant of Mumbai metropolitan region, India.” *Environmental Research*. 196, 110931. https://doi.org/10.1016/j.envres.2021.110931

20. Singh, V.,, Phuleria, H.C., and Chandel M. K (2020), “Estimation of energy recovery potential of sewage sludge in India: Waste to watt approach.” *Journal of Cleaner Production* 276, 122538. https://doi.org/10.1016/j.jclepro.2020.122538

21. Singh, A., and Chandel M. K (2020), “Physicochemical and FTIR spectroscopic analysis of fine fraction from a municipal solid waste dumpsite for potential reclamation of materials.” *Waste Management & Research*, 0734242X20962844. https://doi.org/10.1177%2F0734242X20962844

22. Singh, A., and Chandel M. K (2020), "Effect of ageing on waste characteristics excavated from an Indian dumpsite and its potential valorisation." *Process Safety and Environmental Protection* 134, 24-35. https://doi.org/10.1016/j.psep.2019.11.025

23. Dasgupta, A., and Chandel M. K (2020), "Enhancement of biogas production from organic fraction of municipal solid waste using alkali pretreatment." *Journal of Material Cycles and Waste Management*. DOI: 10.1007/s10163-020-00970-2

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