

Centre for Environmental Science and Engineering

(Annual Report 2010-2011)

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 9 Faculty members with multi-disciplinary background and diversifying research interests. In addition to the above 9 faculty members, one visiting faculty also joined CESE in January 2011 for six months. Apart from this, the professionals from consultancies and government organizations come for delivering the lectures time to time. Currently, the centre is expanding teaching and research activities and has started a new dual degree M.Sc.–Ph.D. programme since July 2010 in addition to already existing M. Tech. and Ph.D. programmes. The Centre also runs a Minor in Environmental Science and Engineering for undergraduates studying in other departments at IIT Bombay. In addition to the above listed programmes, CESE offers an Institute core course “Environmental Studies: Science and Engineering” to undergraduates of all disciplines. Besides, the centre runs several elective courses for sensitizing students across all disciplines towards the urgent need for protection and restoration of environment.

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, SPCBs, MNRE, DBT, MoEF, CSIR, DST, AICTE. 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.

Important MoUs and Collaborations

Infrastructure development:

- Renovation of biogas and Air Lab (Second floor)
- Construction of three new faculty offices
- Creation of space for Ph. D. students

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.	: 15
Ph. D.	: 3

Scholarships: Information is provided in the table given below.

Category	Number of Students Admitted Under Each Programme in 2010
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	<u>M. Tech</u>	<u>Ph.D</u>	<u>M.Sc.-Ph.D.</u>
Institute Teaching Assistance (TA)	12	7	7
External sponsored College Teacher (CT) Industry	-	1	-
Project sponsored (PS)	1	-	-
UGC/CSIR/DBT / QIP/CPHEO fellowship holders	2	4	-

R&D Activities

Three new projects have been awarded in 2010-2011. The details of ongoing projects are given below:

Sponsored Research Projects

Sponsored Research Projects: 24

New : 3

Ongoing : 16

Completed : 5

Faculty Involved : 9

Project Title	Sponsoring Agency	Status (New/ Ongoing/ Complete)	Total Income from the project (in Rs.)
“Ganga river basin management plan”	MoEF	New	Five lakhs (part of funds available for CESE)
“C V Raman International fellowship award for African researchers (Norbert Francois Tchouaffe Tchiadje)”	Federation of Indian Chambers of Commerce and Industry (FICCI)	New	One lakh sixty thousand
“Multivariate flood frequency analysis: nonparametric approach”	DST	New	Nineteen lakhs only
“Uncertainty modeling in waste load allocation for a river system”	IRCC, IIT Bombay	Ongoing	Five lakhs only
“Development of two-step treatment strategy for effluent generated from agro based pulp and paper mills”	DST	Ongoing	Eleven lakhs and seventy six thousand
“Wastewater minimization in batch plants through on-site treatment, reuse and recycle	DST, India and NRF, South Africa	Ongoing	Three lakhs and fifty one thousand

processes”			
“Energy recovery options from municipal solid waste and control/treatment measures of carbon emissions from landfills”	DST, India and NRF, South Africa	Ongoing	Three lakhs and eighty one thousand
“Simultaneous nitrification/ denitrification of nitrogen fertilizer wastewater using sequencing batch bioreactor with mixed biomass containing Thiosphaera Pantotropha”	DBT, New Delhi	Ongoing	Twenty six lakhs and eighty eight thousand
“Sampling and analysis techniques for bioaerosols : standardization and field evaluation of airborne endotoxin”	DST	Ongoing	Twenty eight lakhs thirty four thousand and eight hundred
“Preventive technological interventions for improving environmental attributes of ship recycling in Alang i.e. Green Alang Initiative”	Gujarat Maritime Board, Gandhinagar	Ongoing	One crore and sixty two lakhs
“Development of wastewater treatment technology to achieve total reuse of treated sewage” [Co-ordinated by Centre for Gandhian Studies, Wardha with knowledge partnership of CESE, IIT Bombay]	Jamunalal Bajaj Foundation, Pune	Ongoing	Seven lakhs
“Dismantling of vessels with enhanced safety and technology i.e. DIVEST”	European Union	Ongoing	Eighty five lakhs
“Surfactant aided biodegradation of model NAPLs”	DST	Ongoing	Twenty four lakhs forty five thousand
Development of Cooling-cleaning system for PG cleanup	MNRE	Ongoing	Twenty lakhs
“Life cycles of metals in coal combustion: Speciation in fly ash, and transformations during ash reuse and storage”	MacDonnald Research Scholars Academy, Washington University, St. Louis, USA	Ongoing	Fourteen lakhs forty eight thousand
“Climate change research: atmospheric aerosol characterization using multi-sensor data from satellite and ground observations”	Lloyd Register Engineering Education and Research Trust	Ongoing	Eighteen lakhs
“Development of continuous	DST	Ongoing	Fifty lakhs

mode arsenic removal technology for drinking water based on indigenous zerovalent iron”			
“Sustainable technology for removal of arsenic from drinking water principles and performance of Electrocoagulation”	McDonnell Academy, St. Louis, USA	Ongoing	Four lakhs
“Continuous arsenic removal using zerovalent iron filter (ARUZIF) from drinking water	DST	Ongoing	One crore twelve lakhs
“Development of Reactors Using Palladium Immobilized on Bacterial Cellulose for Remediation of Water Contaminated with Pentachlorophenol and Lower Chlorinated Phenols”	DST	Completed	Thirty Eight Lakhs
“Oxidative treatment of industrial wastewater: Development of novel catalysts and technology evaluation”	MAGEEP	Completed	One lakh and thirty eight thousand
High Temperature Gas Phase Synthesis & Characterisation of Tailored Ultrafine Powders	DST	Completed	Twenty two lakhs and seventy eight thousand
Characterisation, source identification and apportionment of atmospheric particles	DST	Completed	Fifteen lakhs and twenty five thousand
Study and Optimization of DI Engine performance running on Jatropha bio-diesel blend and straight vegetable oil (SVO)	VRDE	Completed	*Main Dept. ME Nine lakhs and eighty three thousand

Apart from this, following activities were also performed:

- Synthesis of TiO₂-CeO₂ in a flame reactor for photo-catalytic oxidation applications
- Aerosol properties and their influence in inversion of remote sensing data
- Use of thermophoretic deposition for clean-up of producer gas from thermal biomass gasification

Consultancy Projects

- A total of nine consultancy jobs were undertaken by 4 faculty members. Total income generated from consultancy work was Rs. 43982000/-.

Patents

Prof. Suparna Mukherji and Anal Chavan

Indian Patent Application No 2177/MUM/2006; Grant No. 240970, Filed on 29th December 2006; Granted on June 2010.

“Biological Treatment of Aqueous Effluents Containing Non- Aqueous Phase Liquid Pollutants”

Extension activities

- Organised the Indo-German Conference on “Cities in the Era of Climate Change” (IGC2011) organised jointly with Goethe Institute/Max Mueller Bhavan Mumbai at IIT Bombay, India, January 16-18, 2011.
- Developed a collaborative research project on “Developing and Testing Hydrogels for Water Treatment in Disaster Situations” with SMTC.
- Developing a web course on Advanced Hydrology (Project deadline June 2012) under National Programme on Technology Enhanced Learning (NPTEL), funded by MHRD.

Visitors to the Department

- Prof. Shankar Chellam, Department of Civil and Environmental Engineering, University of Houston, Houston, U.S.A. visited CESE on 24th November, 2010 to discuss the research work done at CESE as well as issues related to advanced water and wastewater treatment.
- Mr. Hasse Sjoström and Dr. Karin Garmer of Swerea IVF, Gothenburg, Sweden have visited CESE during 4th March to 9th March, 2011 to discuss the validation of developed three-step risk assessment method.
- Norbert François TCHOUAFFE TCHIADJE, Assistant Lecturer at International Institute of Water and Environmental Engineering (2iE), Ouagadougou, Cameroon spent three months in the research laboratory of Prof. A.K. Dikshit from February to April 2011 under the CV Raman International Fellowship for African Researcher sponsored jointly by DST-FICCI.
- Prof. P. A. Ramachandran, School of Engineering and Applied Sciences, University of Washington in St. Louis, USA visited CESE, IIT Bombay in January, 2011 to discuss about future collaborative opportunities in the area of environment.
- Dr. S. Venkatesh, Consultant, Air Quality & Environmental Modelling, Canada visited CESE for conducting a workshop on Air Quality : Modelling the Global Transport and Transformation of Toxic Substances
- Dr. Yun Luo, Post Doctoral Fellow from Department of Energy, Environmental and Chemical Engineering, Washington University, Saint Louis, Mo, USA spent her research time in the research group of Prof. A.K. Dikshit from February 7 to 22, 2011.
- Prof. Krishnanand Yogi Maillacheruvu from Bradley University on a Visiting Faculty position for six months (from January 2011)

Any other information

- Faculty Academic and Research Meet, IIT Bombay September 2010

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

National

Asolekar, S.R.

- Round Table on “Comprehensive Environmental Pollution Index” jointly organised by IEA and CESE on 10th April, 2010.
- IEA Annual Conference on “Advances in Environmental Technology And Management” EnviroVision 2010 jointly organised by IEA and CESE during 25th to 27th April, 2010.
- Workshop on “Ship Recycling Plan and Associated Risks” conducted on 4th December, 2010 for the safety officers and environmental managers working in the various ship dismantling yards in Alang.
- Workshop on “Risk Assessment and Workplace Safety in Ship Dismantling Yards” conducted on 9th March, 2011 organized by Centre for Environmental Science and Engineering (CESE) Indian Institute of Technology Bombay (IITB), Mumbai, India.

Dikshit, A.K.

- Invited speaker for One Day Workshop on “Emerging Trends in Water Supply Sector” organised by Centre for Water Resources Development and Management, Kozhikode on November 29, 2010. Delivered the talk on “A Decision Support System for Supplying Water to a City”.
- Chairman and Keynote Speaker of the International Conference on “Life Science and Technology” (ICLST 2011) organised by The Asia-Pacific Chemical, Biological & Environmental Engineering Society (APCBEES) held on January 9-11, 2011 at Mumbai. Delivered keynote on “Recent Advances in Environmental Biotechnology”.
- Presented talk on “Environmental Planning and Management for Abating Floods in Mumbai” at the Indo German Conference (IGC2011) on “Cities in the Era of Climate Changes”, January 17, 2011 at IIT Bombay.
- Plenary speaker and Chairman of Technical Session III in the National Conference on “Biological Wastewater Treatment towards Green Environment” (BWTGE2011) at National Institute of Technology, Calicut, held on January 28-29, 2011. Delivered the plenary talk on “Treatment of Distillery Wastewater Using Fungal Biomass”.

Mukherji, S.

- Participated in the National Conference “Envirovision 2010: Advances in Environmental Technology and Management” held on Nov. 25-27, 2010 at IIT Bombay, Mumbai, India. (organized by CESE, IIT Bombay and Indian Environmental Association (IEA), Mumbai, India).

Garg, A.

- Participated in the National Conference “Envirovision 2010: Advances in Environmental Technology and Management” held on Nov. 25-27, 2010 at IIT Bombay, Mumbai, India. (organized by CESE, IIT Bombay and Indian Environmental Association (IEA), Mumbai, India).

International**Asolekar, S.R.**

- Workshop on “Ship Dismantling: Current Problems and Ways Forward”, held on 4th May, 2010 at University of Uppsala organized by DevNet (The Development Research Network on Nature, Poverty and Power) and CSD Uppsala, Sweden.
- Seminar on “Environmental and Ecological Risks of Toxic Metal Pollution from Natural and Anthropogenic Sources Problems, Challenges and Remedies” held on June 7, 2010 at Royal Institute of Technology (KTH) organized jointly by Royal Institute of Technology (KTH),

Stockholm, KTH-International Groundwater Arsenic Research Group, Department of Land and Water Resources Engineering, University of Uppsala, Uppsala, Swedish Maritime Environmental Markets, Uppsala and Centre for Environmental Science and Engineering (CESE) Indian Institute of Technology Bombay (IIT-B), Mumbai, India.

Dikshit, A.K.

- Attended the Workshop on “Water Technology for Difficult Circumstances” on June 29, 2010 organized jointly by SMTC (Singapore Membrane Technology Centre), NTU and PUB (Public Utility Bureau), Singapore at SUNTEC City Seminar Hall.
- Attended Water Expo organized by SIWW2010 (Singapore International Water Week) from June 30 to July 1, 2010 at SUNTEC International Convention and Exhibition Centre.
- Attended India Business Forum on July 1, 2010 at SUNTEC International Convention and Exhibition Centre.

Mukherji, S.

- Participated in the International Conference World Congress on Biotechnology, held on March, 21-23, 2011 at Hyderabad International Convention Centre, Hyderabad, India. (organized by Ohmics International)

Karmakar, S.

- Participated and presented a paper in the 4th International Perspective on Water Resources & the Environment (IPWE 2011), EWRI of American Society for Civil Engineers, held on January 4-6, 2011 at National University of Singapore, Singapore.

Sethi, V.

- Delegate to the Second Indo-German Frontiers of Engineering (INDOGFOE) Symposium, Potsdam, Germany, June 24-27, 2010.
- “Air Quality Community of Practice - Activities in India” , User Engagement Session, GEO Summit, Beijing, China, November 1-2, 2010.
- Delegate, GlobalTech Presidents’ Meeting and the First GlobalTech Workshop, Shanghai, China, May 3-6, 2010.

Sumathi, S.

- Presented a paper in IWA (International Water Association) Water Congress & Exhibition that was held at Montreal, Canada, 18-24 September, 2010.
- Presented in 4th ASCE-EWRI International Perspective on Water Resources & the Environment (IPWE) that was held at National University of Singapore, Singapore, January 4-6, 2011.

Garg, A.

- Participated in the International Symposium on Global Energy Future, held during October 1-4, 2010 at University of Washington in St. Louis, USA (Poster Presentation).
- Participated in the Indo-German Conference (IGC2011) on *Cities in the Era of Climate Change*, conducted jointly by IIT Bombay and Goethe-Institute/ Max Mueller Bhavan Mumbai during January 17 – 18, 2011 at IIT Bombay, Mumbai.

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Invited Lectures

National

Patil, R.S.

- “Modelling for Health Benefit Assessment of Air Quality Management Strategies”, Workshop organized by NEERI, Mumbai at Khandala, Nov. 2010.

Mukherji, S.

- “Water Disinfection with Chloridized Silver Surfaces” in IITB Monash Research Academy, Annual Symposium on Water, Nanotechnology and Digital Divide, IIT Bombay, February 17-19, 2011.
- “Industrial Waste Treatment Technology” Seminar on “Environmental Biotechnology, Recent Advances” Organized by Department of Life Sciences, University of Mumbai, December 20, 2010.

Sethi, V.

- Workshop on “Air Quality Modelling to Improve the Decision Making Process for Air Quality Management” NEERI and USEPA, Supported by MoEF, MPCB and CPCB, Khandala 23 and 24 November, 2010.

International

Patil, R.S.

- “The Challenges in Monitoring and Control of Indoor Air Pollution due to Combustion in Kitchens in Urban and Rural Areas”, Indo-French Seminar at Nantes, France organized by IFPCPAR, 30th May – 3rd June, 2010.
- “Indoor Air Pollution due to Domestic Combustion” Dept. of Envntl. Health Sciences, School of Public Health, Univ. of California, Berkeley, US, 11th June, 2010.

Asolekar S.R.

- Invited by Marine Pollution Prevention and Ship Recycling Section, IMO to speak in the concluding session of TradeWinds “Ship Recycling Forum” held on 1st and 2nd March, 2011 at Jumeirah Emirates Tower in Dubai.

Dikshit, A.K.

- Arsenic Decontamination of Groundwater as 1st public seminar on 18th June, 2010 at R3C seminar hall, NTU Singapore.
- Site Selection for Sanitary Landfill using GIS as 2nd public seminar on 25th June, 2010 at R3C seminar hall, NTU Singapore.
- Minimizing Environmental Impacts of a Petroleum Refinery Operation: An LCA Approach as 3rd public seminar on 2nd July, 2010 at R3C seminar hall, NTU Singapore.
- Planning, Design and Implementation of a Municipal Solid Waste Management Plan for an Urban Area as 4th public seminar on 15th July, 2010 at R3C seminar hall, NTU Singapore.

Karmakar, S.

- "Systems Techniques and Uncertainty Modeling for Water Resources and Environmental Management," Nicholas School of the Environment, Duke University, North Carolina, USA, June 22, 2010.
- "Optimizing the Monitoring Program in the Neuse Estuary: A Design based on Entropy within a Hierarchical Spatio-Temporal Bayesian Framework," Nicholas School of the Environment, Duke University, North Carolina, USA, August 30, 2010.

- "Flood Risk-Vulnerability Analysis," Centre for Hazards Research, Department of Civil and Environment Engineering, National University of Singapore, SINGAPORE, January 6, 2011.
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Significant Awards/ Distinctions

Patil, R.S.

- Member, Program Advisory Committee in Atmospheric Sciences under SERC, DST, GOI, 2004 till 2011.
- Expert Reviewer, Global Energy Assessment (GEA), Knowledge Module 4, Health Impacts of Energy System; Int. Institute for Applied Systems Analysis, Austria, 2010.
- Visitors Nominee, Garhwal University, Srinagar, Uttarkand, 2009-2010
Member, Editorial Board, Asian Journal of Chemical and Environmental Research, May 2007-2010.
- Member, Editorial Board, Jnl. of Scientific and Industrial Research, Published by NISCAIR, New Delhi, Jan. 2008 – Dec., 2010.

Dikshit, A.K.

- Member, Editorial Advisory Board, Journal of Environmental Science and Engineering, (Publishers: NEERI, Nagpur, India)
- Member, Editorial Board, Journal of Environmental Science and Health, Part A (Publishers: Taylor and Francis Group)
- Member, Editorial Board, Journal of Clean Technology and Environmental Policy (Publishers: Springer Verlag)

Karmakar, S.

- "BOYSCAST Fellowship 2009 - 2010 from DST, Govt. of India" to conduct research on Ecological Engineering at Nicholas School of Environmental, Duke University, North Carolina, USA during June - October 2010.
- Member, Editorial Advisory Board, Journal of Disaster Advances, India.

Honorary Work

Patil, R.S.

- Reviewed papers for Atmospheric Science, Aerosol Science and Technology, Atmospheric Pollution Research.

Asolekar S.R.

- Member of the Technical Expert Panel (TEP) for the World Bank aided "Capacity Building for Industrial Pollution Management Project (CBIPMP)"
- Member of delegation from India to participate in the meetings and study visits to Sweden during 31st May and 4th June, 2010 under Indo-Swedish cooperation on Environmental Control of Pulp and Paper Industries

Dikshit, A.K.

- Reviewed papers for Journal of Environmental Engineering (ASCE); Bioresource Technology; Journal of Clean Technology and Environmental Policy; Waste Management; Environmental Modelling & Software; Journal of Environmental Engineering Science; Waste Management and Research; Water Science and Technology during April 2010-March 2011.
- Examiner, Ph.D. Thesis of Ms. R. Kanimozhi, Research Scholar, Department of Civil Engineering, Anna University, Chennai, October 2010. (Topic: Integrated Biological and Chemical Treatment of Anaerobically Digested Distillery Wastewater)
- Examiner, Ph.D. Thesis of Ms. Papiya Roy, Research Scholar in Environmental Science, Indian School of Mines, Dhanbad, June 2010. (Topic: Air Quality Assessment and Its Impacts on Social Spectrum in Talcher Coalfield, Orissa)

- Examiner, Ph.D. Thesis of Mr. Manish Mudgal, Research Scholar in Rajiv Gandhi Proudyogiki Viswavidyalaya, Bhopal, August 2010. (Topic: Development of Treatment Technology for Solidification and Stabilization of Hazardous Waste from Metal Processing Industries)
- External Examiner, Ph.D. Thesis of Mr. Huang Xiaofeng, Research Scholar in School of Civil Engineering, Nanyang Technological Institute, Singapore, September 2010. (Topic: Air Experimental Investigation on Kopak Fiber and Its Application in Oil Spill Cleanup)
- Examiner, Ph.D. Thesis of Mr. S. Murali, Research Scholar in Department of Civil Engineering, MANIT, Bhopal, October 2010. (Topic: Development of Energy Model for Agricultural Residues and Assessment of Their Power Generation Potential)
- Examiner, Ph.D. Thesis of Mr. Abdul Saleem, Research Scholar in Rajiv Gandhi Proudyogiki Viswavidyalaya, Bhopal, October 2010. (Topic: Lysimeter Studies for Minimization of Municipal Solid Waste Landfill Leachate)
- Chairperson of the technical session on Energy and Climate Change in the “2 day All India Expo and National Level Conference on Environment & Pollution” (POLLUTETECHINDIA 2010) organised by Bangalore Media Centre in association with Karnataka state Pollution Control Board at J.N. Tata Auditorium, Indian Institute of Science Annex, Bangalore on October 29-30, 2010. Also participated as a member of the Panel Discussion.
- Member, Advisory Committee for Bio-Medical Rules, Govt. of Maharashtra since 2009.
- Member, Academic Advisory Committee, Nirma University, Ahmedabad since 2010.
- Member, Sub-Committee for ‘Development of National Sustainable Habitat Parameters in the field of Storm Water Management’ constituted by the Carbon Credit Cell of the Ministry of Urban Development, Govt. of India since 2010.
- Honorary Professor in the School of Civil Engineering, Faculty of Engineering, University of KwaZulu-Natal, Durban, South Africa.
- Nominate Invited External Member to the Senate of the NIT Jamshedpur (Jharkhand).
- Nominated Invitee Member on the Academic Board of the Government College of Engineering, Amravati (Maharashtra).

Mukherji, S.

- Reviewed papers for International Journals: Environmental Science & Technology, April 2010; Materials Research Bulletin, April 2010; Korean Journal of Chemical Engineering, June 2010; Environmental Engineering Science, November 2010; Chemosphere, November 2010.
- Reviewed papers for Indian Journals: Proceedings of the Indian National Science Academy; April, 2011.
- Reviewed project proposals submitted to: DBT, New Delhi January, 2011 and MoEF, New Delhi, August 2010
- Examiner for Ph.D. Thesis, Punjab University, Chandigarh, India
- Associate Editor, Applied Nanoscience, Published by Springer-Verlag, Germany.

Karmakar, S.

- Reviewed 7 manuscripts for: JI. of Flood Risk Mng., Emerald (02); Adv. in Water Res., Elsevier (01); Journal of Computing in Civil Engg., ASCE (02); International Journal of Geographical Information Science (01), Journal of Earth System Science (01) during Apl. 2010 – March 2011
- Reviewed 2 research project proposals submitted to DST, India and Environmental Biotechnology Division, Department of Biotechnology, Ministry of Science & Technology, Government of India.

Sethi, V.

- Reviewed papers for CPCB and MoEF
- Steering committee, CEPI Evaluation, CPCB, Delhi

Sumathi, S.

- Editorial board member of the following journals: Journal of Disaster Advances, Journal of Pediatric Biochemistry, Advanced Material Letters, The Open Waste Management Journal; The Open Colloid Science Journal.
- Associate editor for Journals published under Asian Network for Scientific Communication (since February 2007)

Garg A.

- Reviewed papers for Practice Periodical of Hazardous, Toxic, and Radioactive Waste Management, June 2010, Water Environment Research, October 2010, Asian Journal of Water, Environment and Pollution, January, 2011.
 - Reviewed a project proposal submitted for funding to Knowledge Foundation, Sweden.
 - Honorary Research Fellow in the School of Civil Engineering, Faculty of Engineering, University of KwaZulu-Natal, Durban, South Africa.
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Faculty Members and their Specializations

Virendra Sethi

Professor & Head

- Aerosols and Air Quality

Rashmi S. Patil

Professor

- Air Quality Modelling
- Indoor Air Quality and Exposure Assessment
- Air Quality Monitoring and Management
- Environmental Impact Assessment

Shyam R. Asolekar

Professor

- Development and modelling of reactors for treatment of domestic sewage and industrial wastewaters for pollution control and reuse
- Combination of tertiary treatment technologies (advanced solutions) with low cost natural treatment systems (ecological solutions) aimed at reuse of sewage and industrial effluents for:
 - Rejuvenation of lakes (renewal of contaminated water bodies)
 - Applications in green buildings, green habitats (renewal of urban environment)
 - Development of strategies to minimize carbon footprint of an industry
- Assessment of technologies aimed at development of appropriate and rational treatment strategy to achieve a given desirable application of reuse of treated effluent (Decision Support Tool based on “life cycle” approach and sustainability criteria)
- 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, eco-industrial networking and corporate social responsibility
- Application of remotely sensed data for monitoring and modelling of environmental systems; Environmental planning, policy and law

Anil Kumar Dikshit

Professor

- Water and Wastewater Treatment Technologies

- Urban Solid Waste Management
- Environmental Systems Modelling and Optimization
- Environmental Management and Impact Assessment
- GIS Applications for Environment

Sumathi Suresh

Professor

- Remediation of Chlorinated Organic Compounds (pesticides), Textile Dyes, Heavy Metals using Bimetallic Systems, Immobilized Metals and Zero-valent Metals
- Microbiological Processes for Treatment of Industrial Pollutants (textile dyes, pulp and paper mill wastes, heavy metals, tannery wastes): Elucidation of the Mechanism of Pollutant Removal and Design of Bioreactors
- Microbial Remediation of Metabolites Formed from Chemical and Biological Treatment of Chlorinated Pesticides in Soil and Water
- Application of Biological Processes (whole cell and enzyme based) for Developing Cleaner Technologies (for example pulp biobleaching using microbial xylanases and ligninases)
- Microbial Toxicity Testing Assays for Biomonitoring Pollutants and Industrial Wastewaters
- Enzyme Catalyzed Bioremediation Reactions (Characterization of active site, inhibition of enzyme activity, structure-function relationship in enzyme catalysis)

Sanjeev Chaudhari

Professor

- Arsenic removal from water
- Biological nutrient removal from wastewater
- Application of Natural coagulants for water and Wastewater treatment
- Treatment of textile wastewater by biological and physicochemical processes

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

Assistant Professor

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

Anurag Garg

Assistant Professor

- Catalytic wet oxidation for industrial wastewater
 - Biological treatment processes for wastewater treatment
 - Municipal Solid waste characterization and treatment
 - Energy from solid waste
 - Decision support modeling for solid waste management
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Publications

Books

Arceivala, S. J. and Asolekar, S. R.

“Wastewater Treatment for Pollution Control” (3rd Edition, Fifth and Sixth Reprints). McGraw Hill Educational Publications (India) Ltd., New Delhi

Saji B. and Dikshit A.K. (Editors),

Proceedings of 2011 International Conference on Life Science and Technology (ICLST2011), Institute of Electrical and Electronics Engineers Inc., Chengdu, China, 2011, pp.1-206.

Book Chapter(s)

Asokan, P., Saxena, M., Asolekar, S. R., Pickering, K., L., and Gupta, A. K.
“Design and Optimization for Hazardous Jarosite Waste Recycling in Environmentally Suitable Composite Products Using Response Surface Methodology” in the book Management of Hazardous Residues Containing Cr(VI) (Editor: M.J. Balart Murria) Nova Science Publishers, Inc. Hauppauge, New York State. ISBN: 978-1-61668-267-5, 2010.

Mukherji S. and Ghosh, I.

“Bacterial Degradation of High Molecular Weight Polynuclear Aromatic Hydrocarbons” in Microbial Degradation of Xenobiotics, Singh, S.N., ed., Germany, Springer, (2011). In Press.

Vyjayanthi, J. P., Patel, U.D., and Sumathi, S.

“Reductive transformation of 2-nitrophenol using palladized bacterial cellulose” in: Advances in Fermentation Technology, Chapter 17, pp 211-218, 2010, Asiatech publishers, India.

Articles in Journals

National

Karmakar, S. and Mujumdar, P.P.

“An Application of Grey Integer Programming in Floodplain Planning,” Journal of Flood Engineering, Vol. 1, 2, 2010, pp. 185-200.

International

Gangamma S., Patil, R.S. and Mukherjee S.

“Characterization and Proinflammatory Response of Airborne Biological Particles from Wastewater Treatment Plants”, Environmental Science and Technology, Vol. 45(8), 2011, pp. 3282-3287.

Asokan, P., Saxena, M. and Asolekar, S. R.

“Recycling hazardous Jarosite waste using coal combustion residues”, Materials Characterization, Volume 61, Issue 12, December 2010, pp. 1342-1355.

Sudhakar, Y. and Dikshit, A.K.

“Competitive Sorption of Pesticides onto Treated Wood Charcoal and the Effect of Organic and Inorganic Parameters on Adsorption Capacity”, Journal of Environmental Engineering, ASCE, Vol.136, 2010, pp. 1096:1104

Chavan, A. and Mukherji, S.

“Effect of Co-contaminant Phenol on Performance of a Laboratory-Scale RBC with Algal-Bacterial Biofilm Treating Petroleum Hydrocarbon-rich Wastewater” Journal of Chemical Technology and Biotechnology, Vol. 85(6), June 2010, pp. 851-859.

Mishra, P.K., Prasad, R.S. and Karmakar, S.

“Infrastructure Vulnerability Assessment of Mumbai City to Natural Hazards”, Journal of Disaster Advances, 3(2), 2010, 7-17.

Karmakar, S., Simonovic, S.P., Peck, A., and Black, J.

"An information system for risk-vulnerability assessment to flood", Journal of Geographic Information System, 2, 2010, pp. 129-146.

Vyjayanthi, J. P., and Sumathi, S.

"Decolorization of Drimarene Red Dye Using Palladized Bacterial Cellulose in a Reactor", Water Environment Research, Volume 82, Number 7, 601-609, 2010.

Garg, A. and Mishra, A.

"Wet oxidation – An option for enhancing biodegradability of leachate derived from municipal solid waste (MSW) landfill," Industrial and Engineering Chemistry Research, Vol. 49, May 2010, pp. 5575-5582.

Garg, A., Mishra, I. M. and Chand, S.

"Effectiveness of coagulation and acid precipitation processes for the pre-treatment of diluted black liquor," Journal of Hazardous Materials, August 2010, pp.158-164.

Papers Published in Proceedings of Conferences/Symposia

National

Asolekar, S. R., Kantawala, D. and Kalbar, P. P.

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Asolekar, S. R.

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