

Curriculum Vitae

Subhankar Karmakar

Professor, Environmental Science and Engineering
Department, ESED (Formerly Centre for Env. Sci.
Engg., CESE);

Associate Faculty: Interdisciplinary Program in
Climate Studies (IDPCS), Centre for Urban Science &
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Google Scholar:

<http://scholar.google.co.in/citations?user=jd4NUPYAAAAJ&hl=en>

PRESENT STATUS

Professor in Environmental Science and Engineering Department (ESED), Indian Institute of Technology Bombay, Mumbai, India since 3rd December 2018.

RESEARCH EXPERIENCE

1. *Associate Professor* (September 2014 – December 2018) at Environmental Science and Engineering Department, Indian Institute of Technology Bombay; Mumbai; India.
2. *Visiting Scholar* (June 2010 - October 2010) at Nicholas School of the Environment, Duke University, North Carolina, USA. (Host Professor: Prof. K. H. Reckhow)
3. *Assistant Professor* (December 2007 – September 2014) at Environmental Science and Engineering Department, Indian Institute of Technology Bombay; Mumbai; India.
4. *Post-doctoral fellow* (November 2006 – November 2007) at Department of Civil and Environmental Engineering, The University of Western Ontario, London, Ontario, Canada. (Post-doctoral Supervisor: Prof. S. P. Simonovic)

EDUCATION

Indian Institute of Science, Bangalore, India

Doctor of Philosophy (Ph. D.)

August 2000 to October 2006 *

Water Resources and Environmental Engineering

Department of Civil Engineering

Title of the thesis: Grey optimization for uncertainty modeling in water resources systems

Supervisor: Prof. P. P. Mujumdar

Jalpaiguri Government Engineering College, West Bengal, India

Bachelor of Engineering (B.E), Department of Civil Engineering

August 1994 to July 1998

* Upgraded to Ph. D. degree programme from Master's degree programme after an evaluation in front of the Senate Committee, Indian Institute of Science, Bangalore on 30th October 2002

RESEARCH INTERESTS

Analysis of Hydro-climatic Extremes, and Floodplain Hydrology and Management: multivariate flood, drought and heatwave (extreme and oppressive) frequency analyses, non-stationary modeling of hydro-climatic extremes, mapping vulnerability to natural and human-induced hazards using GIS (at regional- and country-scales), flood risk mapping, near-real-time flood forecasting, sociohydrological modeling - human-flood and human-environment interactions.

Environmental and Water Resources Systems: development of optimization models for surface water quality management, irrigation water management, solid waste management (facility location problem), floodplain planning and management, landfill leachate contamination risk assessment, optimal design of water & wastewater conveyance systems, design & evaluation of water quality monitoring network.

Environmetrics: multivariate statistical surface water quality assessment, evaluation of trophic states (particularly for lakes and reservoirs), rationalization of water quality monitoring stations.

Uncertainty Modeling and Decision Science for Environmental Systems: probabilistic, fuzzy and interval approaches; multi-attribute decision-making

ACADEMIC HONORS

- Research Excellence Award 2020, IRCC, IIT Bombay.
- Professor S.P. Sukhatme Award for Excellence in Teaching 2019, IIT Bombay.
- Work done in DST Fast Track Project adjudged “Excellent” (May 2014) by expert committee appointed by Dept. of Science and Tech., Govt. of India.
- Fast Track Project Grant for Young Scientists from Science and Engineering Research Council (SERC), Department of Science and Technology (DST), India (2011).
- BOYSCAST Fellowship 2009 - 2010 from Dept. of Science & Tech., Govt. of India, to conduct research on Ecological Engineering at Nicholas School of Environmental, Duke University, North Carolina, USA.
- Post-doctoral fellowship for November 2006 – November 2007 from Department of Civil and Environmental Engineering, The University of Western Ontario, London, Ontario, Canada.
- Recommendation for the Upgradation of Registration from Master’s degree programme to Ph. D. degree programme by the Senate Committee, Indian Institute of Science, Bangalore, with the effect from 30th October 2002, decided on academic excellence basis.
- Member, Editorial Advisory Board, Journal of Disaster Advances, India (2012 - 2015)
- Associate Editor, Frontiers in Water and Built Environment Journal (from 2019 till date)
- Managing Guest Editor, Special Issue (January 2021) - Water Security in Floodplains, Science of the Total Environment (IF 6.551), Elsevier.

- Member, American Geophysical Union.
- Member, International Water Association
- Member, International Society of Ecotoxicology and Environmental Safety, Germany.
- Member, Technical committee, National Conference on Sustainable Water, Environmental Planning and Management (SWEPM-2010), BITS-Pilani, Hyderabad campus, March 5th-6th, 2010.
- National Advisory Committee Member, HYDRO 2019 International Conference, 18-20, December, 2019, Osmania University (in association with Indian Society for Hydraulics), India.
- "Grey fuzzy optimization model for water quality management of a river system" – by S. Karmakar and P. P. Mujumdar has been selected as one of the 25 hottest articles of Advances in Water Resources (Pub: Elsevier, Netherlands) for the periods of April-June, 2006; July-Sep., 2006 and Oct.-Dec., 2006.
- "A two-phase grey fuzzy optimization approach for water quality management of a river system " – by S. Karmakar and P. P. Mujumdar has been selected as one of the 25 hottest articles of Advances in Water Resources (Pub: Elsevier, Netherlands) for the periods of Jan.-March, 2007; April-June, 2007.
- The Institute Scholarship for pursuing Ph. D. in the Indian Institute of Science, Bangalore (2000 to 2006).
- The Graduate Aptitude Test in Engineering (GATE) scholarship for higher studies (2000).
- Associate Member of the Institute of Engineers (India).
- The National Scholarships in 12th standard (1994) and 10th standard (1992).

PUBLICATIONS

Papers in refereed journals

- 1 Mohanty, M.P. and Karmakar, S, 2021. WebFRIS: An efficient web-based decision support tool to disseminate end-to-end risk information for flood management. Journal of environmental management, 288, p.112456.
- 2 Mishra, H., Singh, J., Karmakar, S. and Kumar, R, 2021, An integrated approach for modeling uncertainty in human health risk assessment, Environmental Science and Pollution Research. <https://doi.org/10.1007/s11356-021-14531-z>.
- 3 Mohanty, M.P. and Karmakar, S., 2021. Hydrodynamic Flood Modelling of Large Regions Under Data-Poor Situations: A Case Study of Jagatsinghpur District, Odisha. International Journal of Business Analytics (IJBAN), 8(2), pp.1-16.
- 4 Ghosh, M., Singh, J., Sekharan, S., Ghosh, S., Zope, P.E. and Karmakar, S., 2021. Rationalization of automatic weather stations network over a coastal urban catchment: A multivariate approach. Atmospheric Research, 254, p.105511.

- 5 Tripathy, S.S., Bhatia, U., Mohanty, M., Karmakar, S. and Ghosh, S., 2021. Flood evacuation during pandemic: a multi-objective framework to handle compound hazard. *Environmental Research Letters*, 16(3), p.034034.
- 6 Ghosh, M., Mohanty, M.P., Kishore, P. and Karmakar, S., 2021. Performance evaluation of potential inland flood management options through a three-way linked hydrodynamic modelling framework for a coastal urban watershed. *Hydrology Research*, 52(1), pp.61-77.
- 7 Ghosh, M., Mohanty, M. and Karmakar, S., 2021. Identification of Optimal Hydraulic Flood Management Scenarios for a Socially Vulnerable Urban Coastal Catchment: A 3-way Coupled Hydrodynamic Approach. *Earth and Space Science Open Archive ESSOAr*.
- 8 Varekar, V., Yadav, V. and Karmakar, S., 2021. Rationalization of water quality monitoring locations under spatiotemporal heterogeneity of diffuse pollution using seasonal export coefficient. *Journal of Environmental Management*, 277, p.111342.
- 9 Yadav, V., Kalbar, P.P., Karmakar, S. and 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, pp.80-88.
- 10 Mohanty, M.P., Sahil, M., & Karmakar, S, 2020, "Flood management in India: A focussed review on the current status and future challenges." *International Journal of Disaster Risk Reduction*, Elsevier (in press). <https://doi.org/10.1016/j.ijdr.2020.101660>
- 11 Sudharsan, N., Karmakar, S., Fowler, H.J. and Hari, V., 2020. Large-scale dynamics have greater role than thermodynamics in driving precipitation extremes over India. *Climate Dynamics*, 55(9), pp.2603-2614.
- 12 Hari, V., Villarini, G., Karmakar, S., Wilcox, L.J. and Collins, M., 2020. Northward propagation of the Intertropical Convergence Zone and strengthening of Indian summer monsoon rainfall. *Geophysical Research Letters*, 47(23), p.e2020GL089823.
- 13 Mohanty, M.P., Nithya, S., Nair, A.S., Indu, J., Ghosh, S., Bhatt, C.M., Rao, G.S. and Karmakar, S., 2020. Sensitivity of various topographic data in flood management: Implications on inundation mapping over large data-scarce regions. *Journal of Hydrology*, 590, p.125523.
- 14 Tripathy, S.S., Vittal, H., Karmakar, S. and Ghosh, S., 2020. Flood risk forecasting at weather to medium range incorporating weather model, topography, socio-economic information and land use exposure. *Advances in Water Resources*, 146, p.103785.
- 15 Patel, P., Karmakar, S, Ghosh, S., and Niyogi, D, 2020, "Improved simulation of very heavy rainfall events by incorporating WUDAPT urban land use/land cover in WRF" *Urban Climate*, Elsevier, 32, 100616.
- 16 Singh, J., Karmakar, S, Paimazumder, D., Ghosh, S., and Niyogi, D, 2020, "Urbanization alters rainfall extremes over the contiguous United States" *Environmental Research Letters*, IOP Publishing, (in press <https://doi.org/10.1088/1748-9326/ab8980>)
- 17 Gusain, A., Mohanty, M. P., Ghosh, S., Chatterjee, C., Karmakar, S, 2020, "Capturing transformation of flood hazard over a large River Basin under changing climate using a top-down approach" *Science of The Total Environment*, Elsevier, 726, 138600.
- 18 Mohanty, M. P., Sherly, M. A., Ghosh, S., and Karmakar, S, 2020, "Tide-Rainfall Flood Quotient: An incisive measure of comprehending a region's response to storm-tide and pluvial flooding. *Environmental Research Letters*, IOP Publishing. (in press <https://doi.org/10.1088/1748-9326/ab8092>)

- 19 Sharma, T., Vittal, H., Karmakar, S, and Ghosh, S, 2020, “Increasing agricultural risk to hydro-climatic extremes in India” *Environmental Research Letters*, IOP Publishing, 15(3), 034010.
- 20 Vittal, H., Karmakar, S., Ghosh, S., and Murtugudde, R, 2020, “A comprehensive India-wide social vulnerability analysis: highlighting its influence on hydro-climatic risk” *Environmental Research Letters*, IOP Publishing, 15(1), 014005.
- 21 Mohanty, M.P., Vittal, H., Yadav, V., Ghosh, S. Srinivasa Rao, G. and Karmakar, S, 2020, "A new bivariate risk classifier for management considering hazard and socio-economic dimensions" *Journal of Environmental Management*, Elsevier, Volume 255, 109733.
- 22 Rehana, S., Rajulapati, C.R., Ghosh, S., Karmakar, S. and Mujumdar, P., 2020. Uncertainty quantification in water resource systems modeling: Case studies from India. *Water*, 12(6), p.1793.
- 23 Yadav, V., and Karmakar, S, 2020, Sustainable collection and transportation of municipal solid waste in urban centers. *Sustainable Cities and Society*, Elsevier, 101937.
- 24 Gusain, A., Ghosh, S., and Karmakar, S, 2020, Added value of CMIP6 over CMIP5 models in simulating Indian summer monsoon rainfall. *Atmospheric Research*, Elsevier, 232, 104680.
- 25 Ghosh, S., Subhankar Karmakar, Saha, A., Mohanty, M. P., Ali, S., Raju, S. K., ... & Murty, P. L. N. (2019). Development of India's first integrated expert urban flood forecasting system for Chennai. *CURRENT SCIENCE*,117(5), 741-745.
- 26 Patel, P., Ghosh, S., Kagainalkar, A., Islam, S., & Subhankar Karmakar. (2019). Performance evaluation of WRF for extreme flood forecasts in a coastal urban environment. *Atmospheric Research*, Elsevier, 223, 39-48.
- 27 Gusain, A., Vittal, H., Kulkarni, S., Ghosh, S., & Subhankar Karmakar. (2019). Role of vertical velocity in improving finer scale statistical downscaling for projection of extreme precipitation. *Theoretical and Applied Climatology*, Springer, 137(1-2), 791-804.
- 28 Shastri, H., Ghosh, S., Paul, S., Shafizadeh-Moghadam, H., Helbich, M., and Subhankar Karmakar. (2019) “Future urban rainfall projections considering the impacts of climate change and urbanization with statistical–dynamical integrated approach.” *Climate Dynamics*, Pub. Springer, 1-19. 52: 6033. <https://doi.org/10.1007/s00382-018-4493-8>.
- 29 Yadav, V., Subhankar Karmakar., Kalbar, P. P., and Dikshit, A. K. (2019). PyTOPS: A Python based tool for TOPSIS. *SoftwareX*, Elsevier, 9, 217-222.
- 30 Shashikanth, K., Ghosh, S., Vittal, H., Subhankar Karmakar. (2018). Future projections of Indian summer monsoon rainfall extremes over India with statistical downscaling and its consistency with observed characteristics. *Climate dynamics*, Springer, 51(1-2), 1-15. <https://doi.org/10.1007/s00382-017-3604-2>.
- 31 Devanand, A., Ghosh, S., Paul, S., Subhankar Karmakar., & Niyogi, D. (2018). Multi-ensemble regional simulation of Indian monsoon during contrasting rainfall years: role of convective schemes and nested domain. *Climate dynamics*, Springer, 50(11-12), 4127-4147. DOI 10.1007/s00382-017-3864-x.
- 32 Mohanty, M. P., Sherly, M. A., Ghosh, S., Subhankar Karmakar. (2018) “Regionalized design rainfall estimation: An appraisal of inundation mapping for flood management under data-scarce situations.” *Water Resources Management*, Springer, 32 (14), 4725-4746.
- 33 Yadav, V., Subhankar Karmakar, Dikshit, A. K, Bhurjee, A. K. (2018) “Interval-valued facility location model: An appraisal of municipal solid waste management system”, *Journal of Cleaner Production*, Elsevier, Vol.171, pp. 250-263.

- 34 Mishra, H., Subhankar Karmakar, Kumar, R., Kadambala, P. (2018) "A long-term comparative assessment of human health risk to leachate-contaminated groundwater from heavy metal with different liner systems", *Environmental Science and Pollution Research*, Springer, Vol. 25(3), pp. 2911-2923.
- 35 Sharma, T., Vittal, H., Chhabra, S., Salvi, K., Ghosh, S., Subhankar Karmakar (2018) "Understanding the cascade of GCM and downscaling uncertainties in hydro-climatic projections over India" *International Journal of Climatology*, John Wiley & Sons Ltd, Vol. 38, pp. e178-e190.
- 36 Paul, S., Ghosh, S., Mathew, M., Devanand, A., Subhankar Karmakar, Niyogi, D. (2018) "Increased Spatial Variability and Intensification of Extreme Monsoon Rainfall due to Urbanization", *Scientific Reports*, Nature Publishing Group, Vol. 8 (1), pp. 3918.
- 37 Yadav, V., Bhurjee, A.K., Subhankar Karmakar, Dikshit, A.K. (2017) "A Facility Location Model for Municipal Solid Waste Management System under Uncertain Environment", *Science of the Total Environment*, Elsevier, Vol. 603 (1), pp. 760-771.
- 38 Mishra, H., Subhankar Karmakar, Kumar, R., Singh, J. (2017) "A Framework for Assessing Uncertainty Associated with Human Health Risks from MSW Landfill Leachate Contamination", *Risk Analysis*, Wiley, Vol. 37(7), pp. 1237-1255.
- 39 Singh, J., Sekharan, S., Subhankar Karmakar, Ghosh, S., Zope, P. E., Eldho, T. I. (2017). "Spatio-temporal analysis of sub-hourly rainfall over Mumbai, India: Is statistical forecasting futile?", *Journal of Earth System Science*, Springer, Vol.126(3), pp. 38.
- 40 Kalbar, P. P., Birkved, M, Subhankar Karmakar, Nygaard, S.E., Hauschild., M. (2017) "Can carbon footprint serve as proxy of the environmental burden from urban consumption patterns?", *Ecological Indicators*, Elsevier, Vol.74, pp. 109–118.
- 41 Shastri, H., Ghosh, S., Subhankar Karmakar (2017) "Improving Global Forecast System of extreme precipitation events with regional statistical model: Application of quantile based probabilistic forecasts", *Journal of Geophysical Research: Atmospheres*, American Geophysical Union, Vol. 122(3), pp. 1617-1634.
- 42 Singh, S., Ghosh, S., Saheer, A.S., Vittal, H., Subhankar Karmakar (2017) "Do Dynamic Regional Models add Value to the Global Model Projections of Indian Monsoon?", *Climate Dynamics*, Springer, Vol. 48, pp. 1375-1397.
- 43 Singh, J., Vittal, H., Subhankar Karmakar, Ghosh, S., Niyogi, D. (2016) "Urbanization causes non-stationarity in Indian summer monsoon rainfall extremes", *Geophysical Research Letters*, American Geophysical Union, Vol. 43(21).
- 44 Vittal, H., Ghosh, S., Subhankar Karmakar, Pathak. A., Murtugudde, R. (2016) "Lack of Dependence of Indian Summer Monsoon Rainfall Extremes on Temperature: An Observational Evidence", *Scientific Reports*, Nature Publishing Group, Vol. 6, pp. 31039.
- 45 Ghosh, S., Vittal, H., Sharma, T., Subhankar Karmakar, Kasiviswanathan, K. S., Dhanesh, Y., Sudheer, K. P., Gunthe, S.S. (2016) "Indian Summer Monsoon Rainfall: Implications of Contrasting Trends in the Spatial Variability of Means and Extremes", *PLoS ONE*, Pub. Public Library of Science (PLOS), Vol. 11(7). pp. e0158670.

- 46 Yadav, V., Subhankar Karmakar, Dikshit, A.K., Vanjari, S. (2016) “A Feasibility Study for the Locations of Waste Transfer Stations in Urban Centers: A Case Study on the City of Nashik, India”, *Journal of Cleaner Production*, Elsevier, Vol. 126, pp. 191–205.
- 47 Mishra, H., Rathod, M., Subhankar Karmakar, Kumar, R. (2016) “A framework for assessment and characterisation of municipal solid waste landfill leachate: an application to the Turbhe landfill, Navi Mumbai, India”, *Environmental monitoring and assessment*, Springer, Vol.188(6), pp.357.
- 48 Kalbar, P.P., Subhankar Karmakar, Asolekar, S.R. (2016) “Life cycle-based decision support tool for selection of wastewater treatment alternatives”, *Journal of Cleaner Production*, Elsevier, Vol. 117, pp.64-72.
- 49 Varekar, V., Subhankar Karmakar, Jha, R. (2016) “Seasonal rationalization of river water quality sampling locations: a comparative study of the modified Sanders and multivariate statistical approaches”, *Environmental Science and Pollution Research*, Springer, Vol. 23 (3), pp. 2308-2328.
- 50 Yadav, V., Subhankar Karmakar, Dikshit, A. K., & Vanjari, S. (2016) “A Facility Location Model for MSW Management Systems Under Uncertainty: A Case Study of Nashik City, India”, *Procedia Environmental Sciences*, Elsevier, Vol. 35, pp. 90-100.
- 51 Yadav, V., Subhankar Karmakar, Dikshit, A.K., Vanjari, S. (2016) “Transfer Stations Siting in India: A Feasibility Demonstration (in A Glance at the World series)”, *Waste Management*, 47, Elsevier, I–IV.
- 52 Sherly M. A., Subhankar Karmakar, Parthasarathy D., Chan T., Rau, C. (2015) “Disaster-Vulnerability Mapping for a Densely Populated Coastal Urban Area: An Application to Mumbai, India”, *Annals of the Association of American Geographers*, Taylor and Francis, Vol. 105 (6), pp.1198-1220.
- 53 Vittal, H., Singh, J., Kumar, P., Subhankar Karmakar (2015) “A Framework for Multivariate Data-based At-site Flood Frequency Analysis: Essentiality of the Conjugal Application of Parametric and Nonparametric Approaches”, *Journal of Hydrology*, Elsevier, Vol. 525, pp. 658-675.
- 54 Sherly, M. A., Subhankar Karmakar, Chan, T. and Rau, C. (2015) “Design Rainfall Framework using Multivariate Parametric-Nonparametric Approach”, *Journal of Hydrologic Engineering*, American Society of Civil Engineers (ASCE), 04015049 pp.1-17.
- 55 Varekar, V., Subhankar Karmakar, Jha, R. and Ghosh, N. C. (2015) “Design of sampling locations for river water quality monitoring considering seasonal variation of point and diffuse pollution loads”, *Environmental Monitoring and Assessment*, Springer, Vol. 187(6), pp.1-26.
- 56 Kalbar, P.P., Subhankar Karmakar, Asolekar., S.R. (2015) “Selection of wastewater treatment alternative: significance of choosing MADM method”, *Environmental Engineering & Management Journal (EEMJ)*, Vol. 14(5), pp. 1011-1020.
- 57 Shastri, H., Paul, S., Ghosh, S., Subhankar Karmakar (2015) “Impacts of Urbanization on Indian Summer Monsoon Rainfall Extremes”, *Journal of Geophysical Research: Atmospheres*, American Geophysical Union (AGU), Vol. 120, pp. 495-516.
- 58 Singh, J., H Vittal, T Singh, Subhankar Karmakar, Ghosh, S. (2015) “A Framework for Investigating the Diagnostic Trend in Stationary and Nonstationary Flood Frequency Analyses Under Changing Climate”, *Journal of Climate Change*, Vol. 1 (1, 2), pp. 47-65.

- 59 Musthafa, O. M., Subhankar Karmakar, Harikumar, P. S. (2014) “Assessment and rationalization of water quality monitoring network: a multivariate statistical approach to Kabbini River (India)”, *Environmental Science and Pollution Research*, Springer, Vol. 21, pp. 10045-10066.
- 60 Tejaswini, D. N., Subhankar Karmakar (2014) “Modeling Impreciseness of Trophic State Levels for Eutrophication Assessment”, *Journal of Clean Energy Technologies*, IACSIT Press, Vol. 2(2), pp. 140-144.
- 61 Kalbar, P. P., Subhankar Karmakar, Asolekar, S, R. (2014) “Life cycle-based environmental assessment of municipal WWTP in India”, *International Journal of Environment and Waste Management*, Inderscience, Vol. 14(1), pp. 84-98.
- 62 Kalbar, P. P., Subhankar Karmakar, Asolekar, S, R. (2013) “The influence of expert opinions on the selection of wastewater treatment alternatives: a group decision-making approach”, *Journal of Environmental Management*, Elsevier, Vol. 128, pp. 844-851.
- 63 Alameddine, I., Subhankar Karmakar, Qian, S, S., Paerl, H, W., Reckhow, K, H. (2013) “Optimizing an estuarine water quality monitoring program through an entropy-based hierarchical spatio-temporal Bayesian framework”, *Water Resources Research*, American Geophysical Union (AGU), Vol. 49 (10), pp. 6933-6945.
- 64 Vittal, H., Subhankar Karmakar, Ghosh, S., (2013) “Diametric changes in trends and patterns of extreme rainfall over India from pre-1950 to post-1950.” *Geophysical Research Letters*, American Geophysical Union (AGU), Vol. 40(12), pp. 3253-3258.
- 65 Kalbar, P. P., Subhankar Karmakar, Asolekar, S, R.(2013) “Assessment of wastewater treatment technologies: life cycle approach”, *Water and Environment Journal*, Wiley, Vol. 27, pp. 261-268.
- 66 Rathod, M., Mishra, H., Subhankar Karmakar (2013) “Leachate characterization and assessment of water pollution near municipal solid waste landfill site”, *International Journal of Chemical and Physical Sciences (IJCPS)*, Vol. 2, pp. 186-199.
- 67 Kalbar, P. P., Subhankar Karmakar, Asolekar, S. R. (2013) “Selection of appropriate wastewater treatment technology: scenario based multiple-attribute decision-making approach”, *Journal of Environmental Management*, Elsevier, Vol. 113, pp. 158-169.
- 68 Kalbar, P. P., Subhankar Karmakar, Asolekar, S. R. (2012) “Technology assessment for wastewater treatment technologies using multiple-attribute decision-making”, *Technology in Society*, Elsevier, Vol. 34(4), pp. 295-302.
- 69 Kurwattia, T. B., Subhankar Karmakar (2012) “Development of Modified Trophic State Index for Lakes”, *International Journal of Global Technology Initiatives*, Vol. 1(1), pp. A71-A78.
- 70 Kalbar, P. P., Subhankar Karmakar, Asolekar, S. R. (2012) “A framework for selection of an appropriate technology for wastewater treatment: incorporation of sustainability criteria and experts' opinion”, *International Journal of Sustainable Innovations*, Inderscience, Vol. 2(1), pp. 11-17.
- 71 Subhankar Karmakar (2011) “Propagation of uncertainties in water distribution systems modeling”, *Desalination and Water Treatment*, Taylor & Francis Group, Vol. 33(1-3), pp. 107-117.

- 72 Subhankar Karmakar, S. P. Simonovic, Peck, A., Black, J. (2010) “An information system for risk-vulnerability assessment to flood”, Journal of Geographic Information System, Scientific Research, Vol. 2, pp. 129-146.
- 73 Mishra, P. K., Prasad, R, S., Subhankar Karmakar (2010) “Infrastructure vulnerability assessment of Mumbai city to natural hazards.” Journal of Disaster Advances, Vol. 3(2), pp. 7-17.
- 74 Subhankar Karmakar, Mujumdar, P, P. (2010) “An application of grey integer programming in floodplain planning”, Journal of Flood Engineering, Serial Publications, Vol. 1(2), pp. 185-200.
- 75 Subhankar Karmakar, Simonovic, S, P. (2009) “Bivariate flood frequency analysis. Part 2: a copula based approach with mixed marginal distributions”, Journal of Flood Risk Management, Wiley, Vol. 2(1), pp. 32-44.
- 76 Subhankar Karmakar, Mujumdar, P, P. (2009) “Advances of grey optimization in water quality management” ISH Journal of Hydraulic Engineering, Indian Society for Hydraulics (ISH), Vol. 15(1), pp. 1-24.
- 77 Subhankar Karmakar, Simonovic, S. P. (2008) “Bivariate flood frequency analysis: Part 1. Determination of marginals by parametric and nonparametric techniques.” Journal of Flood Risk Management, Wiley, Vol. 1(4), pp. 190-200.
- 78 Subhankar Karmakar, Mujumdar, P, P. (2008) “A two-phase grey fuzzy optimization approach for water quality management of a river system”, Advances in Water Resources, Elsevier, Vol. 30(5), pp. 1218-1235.
- 79 Subhankar Karmakar, Mujumdar, P. P. (2007) “An inexact optimization approach for river water quality management”, Journal of Environmental Management, Elsevier, Vol. 81(3), pp. 233-248.
- 80 Subhankar Karmakar, Mujumdar, P. P. (2006) "Grey fuzzy optimization model for water quality management of a river system", Advances in Water Resources, Elsevier, Vol. 29(7), pp. 1088-1105.
- 81 Mujumdar, P. P., Vedula, S., Subhankar Karmakar, Manavalan, P., Rao., P. P. N. (2004) “Irrigation water allocation in canal command areas”, ISH Journal of Hydraulic Engineering, Indian Society for Hydraulics (ISH), Vol. 10(1), pp. 33-47.

Papers in refereed conference (oral and poster)

1. 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. (Oral Presentation)
2. 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. (Poster Presentation)
3. 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. (Poster Presentation)

4. 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. (Poster Presentation)
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6. Sherly, M. A., Janadri, K. K., Subhankar Karmakar. (2019) "Fuzzy cognitive mapping of flood risk perception and adaptive capacity of slum communities over the most flood-prone city in India", Proceedings of 4th IMA International Conference on Flood Risk, Swansea, UK, 12-13 September 2019 (Oral Presentation)
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2. Subhankar Karmakar (2009) *Grey Optimization for Uncertainty Modeling in Water Resources Systems*, LAP Lambert Academic Publishing, PP. 252, ISBN-13: 978-3-8383-2775-4 (Derived from my Ph.D. thesis)

MAJOR SPONSORED RESEARCH PROJECTS

Sr. No.	From	To	Role	Agency Name	Project Title	Cost (in Lakhs)	Status
1	2019	2021	PI	STC-IITB (ISRO)	Mapping flood risk in data poor regions enforcing combined geomorphic and socio-economic indicators: An application to Jagatsinghpur District Odisha	23.5	Ongoing
2	2018	2023	PI	Department of Science and Technology	DST-Centre of Excellence in Climate Studies, IIT Bombay	750.0	Ongoing
3	2019	2022	Co-PI	Department of Science and Technology	Autonomous wireless sensor network for Real-time water Quality Monitoring	239.0	Ongoing
4	2020	2023	Co-PI	DST-CNRS Targeted Programme	Monitoring and modelling of the Mahanadi river basin in preparation of the SWOT	31.3	Ongoing
5	2018	2020	Co-PI	Ministry of Water Resources (MoWR), GoI	Impact of climate change on water resources in river basins from Tadri to Kanyakumari	128.0	Ongoing
6	2018	2019	PI	IRCC	Web-based Flood Information System under Changing Climate: A Demonstration on the Kosi River Bihar India	1.0	Completed
7	2016	2019	Co-PI	Ministry of Earth Sciences (MoES), GoI (Indo-UK)	Coupled Human And Natural Systems Environment (CHANSE) for water management under uncertainty in the Indo-Gangetic Plain	98.8	Completed
8	2016	2018	Co-PI	Office of the Principal Scientific Advisor, GoI	Design of an Expert System for Flood Forecasting and Management for the city of Chennai (1.5 years in mission mode)	271.0	Completed
9	2014	2018	PI	STC-IITB (ISRO)	A Comprehensive Mapping of Flood Risk in Changing Climate: An Application to Jagatsinghpur District, Orissa	41.0	Completed
10	2014	2018	PI	Ministry of Earth Sciences (MoES), GoI	Near-Real-Time Urban Flood Forecasting System	93.0	Completed
11	2014	2018	Co-PI	Ministry of Earth Sciences (MoES), GoI	Seasonal Hydrologic Predictions based on Regional Forecasts of Monsoon Rainfall with CWRF and Statistical Downscaling	99.0	Completed
12	2012	2016	PI	Thane Municipal Corporation	Evaluation of trophic state of lakes in thane city	2.0	Completed
13	2012	2015	PI	Department of Science & Technology, GoI	Multivariate flood frequency analysis: nonparametric approach	18.6	Completed
14	2008	2012	PI	IRCC Seed Grant	Uncertainty modeling in waste load allocation for a river system	5.0	Completed

INVITED RESEARCH PRESENTATIONS

1. 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.
2. Invited talk on Urban Flood Risk Management, IIT Madras, March 22 - 27, 2021.
3. 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.
4. 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.
5. 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 (Approved by AICTE & Affiliated to APJ Abdul Kalam Technological University), Kottayam, Kerala, 2 March 2021.
6. Plenary talk in the 1st International Conference on Urban Science and Engineering (ICUSE), 28 -29 Feb 2020, Centre for Urban Science and Engineering, Indian Institute of Technology Bombay, Mumbai, *India on Urban Flood Forecasting and Risk Mapping: Present Status and Future Needs*.
7. Invited talk in AICTE funded Faculty Development Programme (FDP) on "Applications of GPS and Remote Sensing in Civil Engineering", 10th January 2020 at SPCE, Mumbai, on *Risk Assessment and Mapping through Remote Sensing and GIS for Flood Management*.
8. Invited talk on *Urban Flood Forecasting and Risk Management: Present Status and Future Needs* at Department of Civil Engineering, Indian Institute of Technology Indore, 7 October 2019.
9. Invited talk on *Flood Management* in the Preparatory Meeting of DST-CNRS project on Monitoring and Modelling of the Mahanadi river basin in preparation of the SWOT, 17 September 2019, IIT Bombay, India
10. Invited talk in the National Workshop on Urban Climate Network, on *Understanding the urban climate processes of Mumbai city and generating extremes (floods and heat-waves) projections, risk-vulnerability maps* held on 2-3 August 2019, Interdisciplinary Centre for Water Research (ICWaR), IISc Bangalore, India.

11. Invited talk in TEQIP III FDP on "Innovative Technologies for Sustainable Water Resources Management", June 10, 2019 at VJTI, Mumbai, *on The Need for Uncertainty Modeling and Risk Analysis on Environmental and Hydro-climatic Systems*.
12. Invited talk in the National conference on Flood Early Warning for Disaster Risk Reduction, 30-31 May 2019, National Remote Sensing Centre (NRSC), Hyderabad, India on *Real-time Integrated Flood Forecasting for Chennai*.
13. Invited talk in the workshop - "Urban Floods" on *Urban Flood Risk Mapping: Present Status and Future Needs* held on 27-29 June, 2018; IISc Bangalore, India.
14. Invited presentation on *Rationalization of Water Quality Monitoring Networks in India* in Environmental Science & Technology Symposium - India, held on April 7, 2018, at Shiv Nadar University, organized by American Chemical Society (ACS), India Chapter.
15. Invited presentation on "GIS-based Risk Mapping and Uncertainty Modeling for Scientific Flood Management" in Short Term Training Program on - "Application of Remote Sensing and GIS in Disaster Management: Response, Recovery and Reconstruction" Mahatma Education Society's Pillai HOC College of Engineering & Technology, Rasayani, Department of Civil Engineering, 5 - 11 January 2018.
16. Invited presentation on "Urban Flood Risk Mapping: Present Status and Future Needs" in DST's National Workshop on "Urban Climate: Science, Impacts and Adaptation" as part of proposed DST's National Network Programme on Urban Climate, 21- 22 September, 2017; IIT Bhubaneswar, India.
17. Keynote lecture on *Uncertainty Modeling and Risk Analysis of Environmental and Hydro-climatic Systems*, in the 5th National Conference on "Role of Engineers in Nation Building" (NCRENB 2017), VIVA Inst. of Tech, Virar, India, 3-4 March 2017.
18. Invited presentation on "Climate Change Impact Assessment" in GIAN programme on Climate Change: Science, Impacts and Adaptation (1-8 December 2016) organized by Prof. Dev Niyogi, Purdue University; Prof. U.C. Mohanty, IIT Bhubaneswar; Prof. V. Vinoj, IIT Bhubaneswar.
19. Invited lecture on *Uncertainty Modeling and Human Health Risk Assessment: A Case Study of Municipal Solid Waste Management*, Quantitative Sustainability Assessment (QSA) Division, DTU Management Engineering, Technical University of Denmark (DTU), Denmark, 22 June 2016.
20. Keynote lecture on "Uncertainty Modeling and Risk Analysis of Environmental and Hydro climatic Systems" in the 4th Annual International Conference entitled "India Biodiversity Meet – 2016 (IBM 2016)" held in Indian Statistical Institute (ISI), Kolkata, India, October 24-27, 2016.
21. Invited presentation on "Uncertainty modeling" in the Workshop - "Statistical Applications for Environmental Analysis and Modeling" September, 21-23, 2016, Health Physics Auditorium, CTCRS building Anushaktinagar, Bhaba Atomic Research Centre, Mumbai, India

22. Invited talk in the workshop - "Water Security under Global Change" on *Rationalization of Surface Water Quality Monitoring Network* held on April 13, 2015, jointly organised by the Center for Ecology and Hydrology (CEH), Wallingford, UK and the Department of Civil Engineering, Indian Institute of Science, Bangalore, Bangalore, India.
23. Invited talk in the Session 3 - *Uncertainty modelling and impacts assessment on Assessing Impacts of Climate Change* held on March 20, 2015 at the Centre for Excellence in Climate Studies, Indian Institute of Technology Bombay, Victor Menezes Convention Centre, IIT Bombay, Powai, Mumbai 400076, India.
24. Invited talk in the Royal Society and DST Scientific Seminar on "Water, Food and Energy Nexus" on *Rationalization of river water quality monitoring network* considering seasonal variation of pollution loads, held on March 2, 2015, IIT Gandhinagar, Gandhinagar.
25. Invited presentation on *Design of sampling locations for river water quality monitoring considering seasonal variation of discrete and diffuse pollution loads* on 10 May 2013 at Centre for Water Resources Development and Management (CWRDM), Kozhikode, Kerala, An Institution of the Kerala State Council for Science, Technology and Environment, Government of Kerala.
26. Invited presentation in one-day workshop on Building climate resilient cities: responding to the emerging water crisis, on *Risk Management, Floods and Climate Change*. Monash Sustainability Institute and TERI, New Delhi, January 30, 2013.
27. Invited presentation in a Brain-storming session on Downscaling and Impact Assessment for River-basin Scale Studies, on *Vulnerability, Hazard and Risk to Extremes*. Indian National Committee on Climate Change (INCCC), Ministry of Water Resources (MoWR), New Delhi, October 19, 2012.
28. Invited presentation on *Flood Risk-Vulnerability Analysis*, Centre for Hazards Research, Department of Civil and Environment Engineering, National University of Singapore, SINGAPORE, January 6, 2011.
29. Invited presentation on *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.
30. Invited presentation on *Systems Techniques and Uncertainty Modeling for Water Resources and Environmental Management*, Nicholas School of the Environment, Duke University, North Carolina, USA, June 22, 2010.
31. Invited presentation on *Vulnerability and Risk analysis of Urban Flooding Problems* in National Workshop on Coastal Urban Flood Hazards & Management, Supported by DST, February 19-20, 2010, at IIT Bombay, Mumbai, India.

32. Invited presentation on *Risk Management* in Puri, Orissa, India, organized by Monash University through AUSAID funding 21-22 November 2009.
33. Invited presentation on *Flood Management* in Monash University, 1-2 September 2009, Melbourne, Australia.
34. Invited presentation in Division of Environmental and Water Resources Engineering, School of Civil & Environmental Engineering (CEE) under the GlobalTECH programme on *Systems Techniques and Uncertainty Modeling in Water Resources Management*, 6-8 April 2009, Nanyang Technological University, Singapore.
35. Keynote presentation on *Assessing Vulnerability to Natural Hazards* at Pravara Rural Engineering College, Loni (under Pune University, India) on 26th September 2008.
36. Invited presentation on *Advances of grey optimization in water quality management*, in the Brainstorming Work shop on Application of Advanced Soft Computing Techniques in Geo-Spatial Data Analysis, Supported by DST, September 22-23, 2008, Department of Civil Engineering, Indian Institute of Technology Bombay, Mumbai, India.

TEACHING EXPERIENCE

Courses offered from ESED and IDP in Climate Studies, IIT Bombay:

Academic year & Semester	Course (number and name)	Credits	Co-instructors (if any)	Remarks
2020-2021 Spring	ES 206: Water Resources & Open Channel Flow	6	Prof. A. Garg	50% sharing
	ES 216: GIS Aided Environmental Planning and Management	6	Prof. S. Durbha (CSRE)	50% sharing
2020-2021 Autumn	ES 301: (UG and PG) Introduction to Fluid Mechanics	6	None	Full
	ES 655: Environmental Management	6	Prof. A. Garg	50% sharing
	ES 659: Mathematics and Statistics for Environmental Engineering	6	Prof. A. Shrivastav	50% sharing
2019-2020 Spring	ES 206: Water Resources & Open Channel Flow	6	Prof. M. Sahu	50% sharing
	CM 801/601(UG): Introduction to Risk Analysis	6	None	Full (offered from IDP Climate Studies, also an ESED PG elective)
2019-2020 Autumn	CM 803/CM 603 (UG): Introduction to Climate Change	6	Prof. A.B. Rao Prof. T. Mishra	33.3% sharing (offered from IDP Climate Studies)
	ES 221: Mathematics Foundation	6	Prof. A. Shrivastav	50% sharing
	ES 301: (UG and PG) Introduction to Fluid Mechanics	6	None	Full
	ES 655: Environmental Management	6	Prof. A. Garg	50% sharing
2018-2019 Spring	ES 200: Environmental Studies: Science and Engineering	6	Prof. V. Sethi, Prof. M. Chandel	33.3% sharing
	ES 600: Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg, Prof. S. P. Singh	33.3% sharing
	ES 206: Water Resources & Open Channel Flow	6	Prof. M. Sahu	50% sharing
	CM 801/601(UG): Introduction to Risk Analysis	6	None	Full (offered from IDP Climate Studies, also an ESED PG elective)

Academic year & Semester	Course (number and name)	Credits	Co-instructors (if any)	Remarks
2018-2019 Autumn	ES 221: Mathematics Foundation	6	Prof. A. Shriwastav	50% sharing
	ES 207: Introduction to Fluid Mechanics	6	None	Full
	ES 655: Environmental Management	6	Prof. A. Garg	50% sharing
2017-2018 Spring	ES 600:Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg	50% sharing
	ES 206: Water Resources & Open Channel Flow	6	None	Full
	CM 801/601(UG): Introduction to Risk Analysis	6	None	Full (offered from IDP Climate Studies, also a CESE PG elective)
2017-2018 Autumn	ES 221: Mathematics Foundation	6	Prof. A. Shriwastav	50% sharing
	ES 207: Introduction to Fluid Mechanics	6	None	Full
	CM 803/CM 603 (UG): Introduction to Climate Change	6	Prof. A.B. Rao Prof. C. Venkataraman	33.3% sharing
	ES 655: Environmental Management	6	Prof. A. Garg	50% sharing
2016-2017 Spring	ES 600:Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg	50% sharing
	ES 206: Water Resources & Open Channel Flow	6	None	Full
	CM 801: Introduction to Risk Analysis	6	None	Full (offered from IDP Climate Studies, also a CESE PG elective)
2016-2017 Autumn	ES 221: Mathematics Foundation	6	None	Full
	ES 207: Introduction to Fluid Mechanics	6	Prof. A. Garg	50% sharing
	CM 803/CM 603 (UG): Introduction to Climate Change	6	Prof. A.B. Rao Prof. C. Venkataraman	33.3% sharing
2015-2016 Spring	ES 668: Environmental Computational Laboratory	2 (Lab)	None	Full

Academic year & Semester	Course (number and name)	Credits	Co-instructors (if any)	Remarks
	ES 254: Environmental Computational Laboratory	3 (<u>Lab</u>)	None	Full
	ES 206: Water Resources & Open Channel Flow	6	None	Full
	CM 801: Introduction to Risk Analysis	6	None	Full (offered from IDP Climate Studies, also a CESE PG elective)
2015-2016 Autumn	ES 221: Mathematics Foundation	6	None	Full
	ES 207: Introduction to Fluid Mechanics	6	Prof. A. Garg	50% sharing
	CM 803: Introduction to Climate Change	6	Prof. A.B. Rao Prof. C. Venkataraman	33.3% sharing
2014-2015 Spring	ES 668: Environmental Computational Laboratory	2 (<u>Lab</u>)	None	Full
	ES 254: Environmental Computational Laboratory	3 (<u>Lab</u>)	None	Full
	ES 206: Water Resources & Open Channel Flow	6	Prof. A. Garg	50% sharing
	ES 270: Environmental Statistics	6	Prof. S. Mukherji	50% sharing
	ES 670: Environmental Statistics	6	Prof. S. Mukherji	50% sharing
	CM 801: Introduction to Risk Analysis	6	None	Full course. Offered from IDP Climate Studies
2014-2015 Autumn	ES 221: Mathematics Foundation	6	None	Full
	ES 207: Introduction to Fluid Mechanics	6	Prof. A. Garg	50% sharing
2013-2014 Spring	ES 668: Environmental Computational Laboratory	2 (<u>Lab</u>)	None	Full
	ES 600: Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg	50% sharing
	ES 254: Environmental Computational Laboratory	3 (<u>Lab</u>)	None	Full
	ES 206: Water Resources & Open Channel Flow	6	Prof. A. Garg	50% sharing
	ES 270: Environmental Statistics	6	Prof. S. Mukherji	50% sharing
	ES 670: Environmental Statistics	6	Prof. S. Mukherji	50% sharing
2013-2014 Autumn	ES 221: Mathematics Foundation	6	None	Full
	ES 207: Introduction to Fluid Mechanics	6	Prof. A. Garg	50% sharing
	ES 668: Environmental Computational Laboratory	2 (<u>Lab</u>)	None	Full
	ES 600: Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg	50% sharing

Academic year & Semester	Course (number and name)	Credits	Co-instructors (if any)	Remarks
2012-2013 Spring	ES 254: Environmental Computational Laboratory	3 (Lab)	None	Full
	ES 206: Water Resources & Open Channel Flow	6	Prof. A. Garg	50% sharing
	ES 200: Environmental Studies: Science and Engineering (UG Common)	3	Prof. V. Sethi Prof. A. Garg	33.3% sharing
2012-2013 Autumn	ES 221: Mathematics Foundation	6	None	Full
	CM 801: Introduction to Risk Analysis	8	None	Full course. Offered from IDP Climate Studies
2011-2012 Spring	ES 668: Environmental Computational Laboratory	2 (Lab)	None	Full
	ES 600: Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg	50% sharing
	ES 254: Environmental Computational Laboratory	3 (Lab)	None	Full
	ES 206: Water Resources & Open Channel Flow	6	Prof. A. Garg	50% sharing
	ES 200: Environmental Studies: Science and Engineering (UG Common)	3	Prof. V. Sethi Prof. S.K.Chaudhari	33.3% sharing
2011-2012 Autumn	ES 221: Mathematics Foundation	6	None	Full
	ES 200: Environmental Studies: Science and Engineering (UG Common)	3	Prof. V. Sethi Prof. A. Garg	33.3% sharing
2010-2011 Spring	ES 668: Environmental Computational Laboratory	2 (Lab)	None	Full
	ES 600: Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg	50% sharing
	ES 254: Environmental Computational Laboratory	3 (Lab)	None	Full
	ES 270: Environmental Statistics	6	Prof. S. Mukherji	50% sharing
	ES 206: Water Resources & Open Channel Flow	6	None	Full
	ES 200: Environmental Studies: Science and Engineering (UG Common)	3	Prof. R.S.Patil Prof. A. Garg	33.3% sharing
2009-2010 Spring	ES 668: Environmental Computational Laboratory	2 (Lab)	None	Full
	ES 600: Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg	50% sharing
	ES 200: Environmental Studies: Science and Engineering (UG Common)	3	Prof. A.K.Dikshit Prof. R.S. Patil Prof. S. Mukherji	25% sharing
2009-2010 Autumn	ES 651: Environmental Monitoring Laboratory	6 (Lab)	Prof. A. Garg Prof. S. Suresh	33.3 sharing
	ES 200: Environmental Studies: Science and Engineering (UG Common)	3	Prof. A.K.Dikshit Prof. R.S. Patil Prof. S. Mukherji	25% sharing
	ES 668: Environmental Computation Laboratory	2 (Lab)	None	Full

Academic year & Semester	Course (number and name)	Credits	Co-instructors (if any)	Remarks
2008-2009 Spring	ES 600: Environmental Science and Engineering (PG Institute Elective)	6	Prof. A. Garg	50% sharing
2008-2009 Autumn	ES 655: Environmental Management	6	Prof. S.R.Asolekar	50% sharing
	ES 651: Environmental Monitoring Laboratory	6 (Lab)	Prof. A. Garg Prof. S.Suresh	33.3% sharing
2007-2008 Spring	ES 680: GIS for Environmental Planning and Management	6	Prof. A.K.Dikshit	50% sharing
	ES 664: Environmental Systems Modelling	6	Prof. R.S.Patil	50% sharing

ADMINISTRATIVE ACTIVITIES

Sl. No.	Category	Function
1	Research Infrastructure Funding Committee (RIFC), IRCC, IIT Bombay	2020 – <u>till date</u>
2	Member, Undergraduate Academic Performance Evaluation Committee (UGAPEC), IIT Bombay	Jan 2021 – <u>till date</u>
3	Joint Convener, Faculty Search Committee (at ESED)	April 2019 – <u>till date</u>
4	Member of Department Policy Committee (at ESED)	Participation in department policy decisions (Aug. 2013 – Dec. 2016; May 2019 – <u>till date</u>).
5	Member of Post-graduate Committee (at CUSE)	Jan 2019 – <u>till date</u>
6	M.Sc. - Ph.D. programme Coordinator & Faculty Advisor (at ESED)	Continuing participation (past and present) from 2010 <u>till date</u> in all activities related to M.Sc.-Ph.D. dual degree programme with Prof. Sumathi Suresh (two years) and Prof. L. P. Padhye (ten months), Prof. S. Mukherjee (three years), Prof. S P Singh (since 2019).
7	Member of Interdisciplinary Programmes Committee (IDPC) (at IDP in Climate Studies)	Continuing participation in department policy decisions during 2012-2014 and Jan 2017 to <u>till date</u> .
8	DST Project Coordination Committee member (at IDP in Climate Studies)	2012 to 2017, 2018 – <u>till date</u> (Convener of the committee)
9	Member of Post-graduate Committee (at ESED)	Jan. 2018 – Jan. 2021
10	Time Table Coordinator (at ESED)	Time-Table coordinator from 2009 till August 2020 [jointly worked with Prof. S. Mukherji for 1 year, Prof. S. R. Asolekar for 1 year and Prof. L. P. Padhye one year and Prof. V. Sethi 2 years].
11	IRCC Summer Internship Programme Coordinator (at ESED)	2012-2017

12	PhD Admission Coordinator (at IDP in Climate Studies)	Spring 2013, Autumn 2014
13	PhD Faculty Advisor (at IDP in Climate Studies)	2016
14	1st Summer School Coordinator (at IDP in Climate Studies)	July 2014
15	Computer Committee in-charge (at ESED)	Participated on all computer related issues at CESE jointly with Prof. S. Suresh (2 years) and Prof. S. K. Chaudhari (1 year) (Oct. 2009 – June 2013)
16	M.Tech. and Ph.D. Faculty Advisor (at ESED)	Faculty advisor for M.Tech. and Ph.D. students for a year.
17	ESEA Vice-President (at ESED)	Provided inputs for Environmental Science and Engineering Association (ESEA) at CESE for 1 year (2012-13).
18	Website interface coordinator (at ESED)	CESE website coordinator for a year, but finally could not complete updation of the website as the team outsourced suddenly dissolved and did not deliver the proposed work.
19	Publicity and Website coordinator (at IDP in Climate Studies)	2014-2017
20	Centre Representative and many institute-level responsibilities	in GATE, JAM, IITJEE (Old), and IITJEE Adv.
21	Assoc. Warden, Hostel-1	Facilitating smooth function of hostel activities during 2009 - 2012

MAJOR PROFESSIONAL ACTIVITIES (Journal review, project assessments, membership of professional committees/bodies, conferences organized, etc.)

Sl. No.	Category	Function
1	Member, Editorial advisory board	Journal of Disaster Advances, India (2012-2015)
	Associate Editor	Frontiers in Water and Built Environment Journal (from 2019 till date)
	Managing Guest Editor	Special Issue (January 2021) - Water Security in Floodplains, Science of the Total Environment, Elsevier.
2	Membership	(1) American Geophysical Union, USA (2) International Society of Ecotoxicology and Environmental Safety, Germany (3) International Water Association (4) Institute of Engineers, India
3	Member, Technical committee	National Conference on Sustainable Water, Environmental Planning and Management (SWEPM-2010), BITS-Pilani, Hyderabad campus, 5-6 March 2010
4	Reviewer of Journals	Advances in Civil Engineering, Advances in Engineering Software, 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

Sl. No.	Category	Function
		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), and many more.
5	RPC member at IIT Bombay	RPC member (as examiner) of PhD students at IIT Bombay
6	IIT Bombay Golden Jubilee Year Activities – CESE event coordinator (2008)	<p>(1) Organized the lecture of Professor Rao Y. Surampalli, Engineer Director, USEPA, Kansas City on January 28, 2008, on Nanotechnology and the Environment.</p> <p>(2) Organized the lecture of Prof. Sherwood Rowland, Nobel Laureate, on Greenhouse Effect and Global Warming on February 11, 2008.</p> <p>(3) Organized WED-2008, for celebrating World Environment Day on June 5, 2008; and Tree Plantation Programme on June 4, 2008.</p>
7	Indo Australian Workshop on “Climate Change and Water Resources”	Organizing committee member
8	“External Reviewer” of Thesis	<p>M.Tech. (Walchand College of Engg., Shangli) (June 2010)</p> <p>Ph.D. (Jadavpur University, Kolkata) (July 2009, July 2015, Aug. 2020)</p> <p>Ph.D. (Jawaharlal Nehru Technological University, Hyderabad) (March 2016)</p> <p>Ph.D. (NIT, Rourkela) (January 2019)</p> <p>Ph.D. (IIT Kharagpur) (March 2021)</p>
9	Reviewer of Proposal	Reviewer of (1) DST, (2) MoWR, (3) MoES, (4) Environmental Biotechnology Division, Department of Biotechnology, Ministry of Science & Technology, Government of India proposals
10	Technical expert	<p>Served as an expert in the Regional Workshop on Training Need Assessment and PDS under “National Hydrology Project” at CWPRS, Pune, February 25, 2016 organized under National Hydrology Project, by National Institute of Hydrology, Roorkee under Ministry of Water Resources, Govt. of India.</p> <p>External Expert, IoE Proposal evaluation for the Department of Civil Engineering, IIT Delhi, 21st October, 2020.</p> <p>External Committee Member, Evaluation of a faculty member for regularization, Indian Institute of Technology Patna, Bihar, April 2020.</p>

MAJOR EXTENSION ACTIVITIES (Outreach activities under CEP/QIP/NPTEL etc)

Sl. No.	Category	Function
1	CEP and QIP course	<p>(1) Continuing Education and Quality Improvement Programme (CE&QIP) Short Term Course Advances in Urban Water Engineering and Management 10 – 14 December, 2018 Course Coordinators Prof. Pradip Kalbar, Centre for Urban Science and Engineering (CUSE), Prof. Subhankar Karmakar, Centre for Environmental Science and Engineering (CESE)</p> <p>(2) QIP and CEP short term course on “Hydro-climatic Modeling and Climate Change Impacts Assessment” 30 June 04 - July, 2014; Coordinators: Prof. S. Karmakar, Centre for Environmental Science and Engineering and Prof. Subimal Ghosh, Department of Civil Engineering, Indian Institute of Technology Bombay, Powai, Mumbai 400 076, India</p> <p>(3) QIP and CEP short term course on “Impacts of Climate Change, Urbanization and Land-Use-Land-Cover Change on Water Resources”, 30 May – 3 June, 2016; Coordinators: Prof. S. Karmakar, Centre for Environmental Science and Engineering and Prof. Subimal Ghosh, Department of Civil Engineering, Indian Institute of Technology Bombay, Powai, Mumbai 400 076, India</p> <p>(4) CEP on DESIGN & IMPLEMENTATION OF ONLINE MONITORING SYSTEM FOR ALL CYCLES OF SWM, jointly organized by Prof. Subhankar Karmakar, Centre for Environmental Science and Engineering, IIT Bombay and Prof. Munish Chandel during (i) 25-27 February (Session ES10A) 2015.</p> <p>(5) CEP on DESIGN & IMPLEMENTATION OF ONLINE MONITORING SYSTEM FOR ALL CYCLES OF SWM, jointly organized by Prof. Subhankar Karmakar, Centre for Environmental Science and Engineering, IIT Bombay and Prof. Munish Chandel during 9-11 March (Session ES10B) 2015.</p> <p>(6) QIP and CEP short term course on “<i>Advanced Hydrologic Modeling for Climate Change Impacts Assessment</i>” 18 – 22 February, 2013; Coordinators: Prof. S. Karmakar, Centre for Environmental Science and Engineering and Prof. Subimal Ghosh, Department of Civil Engineering, Indian Institute of Technology Bombay, Powai, Mumbai 400 076, India</p> <p>(7) QIP and CEP short term course on “<i>Hydrologic Impacts of Climate Change and Sustainable Development</i>” July 04 - 05, 2008; Coordinators: Prof. Subimal Ghosh, Department of Civil Engineering; Prof. S. Karmakar, Centre for Environmental Science</p>

Sl. No.	Category	Function
		<p>and Engineering; and Prof. R. Maity, (now at Indian Institute of Technology Kharagpur), Indian Institute of Technology Bombay, Powai, Mumbai 400 076, India</p> <p><i>Lectures in QIP-CEP</i></p> <p>(a) Delivered three lectures in the CEP course on Engineering Mechanics, organized by Prof. D. Choudhury, Department of Civil Engineering, IIT Bombay. Organized at Government Polytechnic, Ahmedabad on April 24, 2008.</p> <p>(b) An invited talk in a CEP on REGIONAL MODELING OF CLIMATE CHANGE, organized by Prof. Subimal Ghosh, Civil Engineering, IIT Bombay, Mumbai, 3 March 2015.</p>
3	NPTEL web course	<p>Developed a web course on “Advanced Hydrology” under National Programme on Technology Enhanced Learning (NPTEL), funded by MHRD (2011-12).</p> <p>Prepare total 40 lectures note divided into 9 modules.</p> <p>The course emphasizes on the computational aspects of advanced hydrology at a post-graduate level, and provides a balanced approach to important applications in hydrologic engineering and science. The fundamental mechanisms of hydrologic cycle with the probabilistic approaches are discussed in a logical progression. The concept of watershed modeling has been discussed in detail along with a few selected watershed models. The slides have been designed in a self-explanatory fashion so as to facilitate the learning process easier and more interesting.</p> <p>For further detail please visit: <http://nptel.iitm.ac.in/downloads/105101002/></p>
4	MoU between IIT Bombay and Thane Municipal Corporation (TMC)	An MoU was signed between IIT Bombay and TMC for research collaborations through my initiative. Signed and submitted on 28-05-2012
5	MoU between IIT Bombay and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	An MoU was signed between IIT Bombay and ICRISAT for research collaborations through my initiative. Signed and submitted on 16-11-2017

Sl. No.	Category	Function
6	Webinars and virtual meetings (from DST-CoECS, IIT Bombay)	<p>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.</p> <p>e-School on Climate Science & Policy, 17-28 August 2020, Interdisciplinary Programme in Climate Studies (IDPCS), IIT Bombay.</p> <p>Webinar on "Scope for Technology Development & Entrepreneurship in Climate Studies" on 17 March 2021, Interdisciplinary Programme in Climate Studies (IDPCS), IIT Bombay.</p> <p>Webinar on "Climate Resilient Engineering Design" on 24 March 2021, Interdisciplinary Programme in Climate Studies (IDPCS), IIT Bombay.</p>

RESEARCH GUIDANCE

i. Doctoral research guidance (completed 11 Students as main supervisor and 4 as co-supervisor)

Sr. No.	Name	Completed/ongoing	Other guides, if any	Thesis topic
1	Dr. Pradip P. Kalbar (at CESE)	Completed (2013)	Prof. S. R. Asolekar, CESE (main supervisor)	Life Cycle Based Decision Support Tool for Selection of Wastewater Treatment Alternative (Received Excellence in Ph.D. thesis Award 2014, IIT Bombay)
2	Dr. Tejaswini B. Kurwatti (CT category) (at CESE)	Completed (2015)	None	Comprehensive Evaluation of Trophic States of Lentic Water Bodies
3	Dr. Vikas B. Varekar (at CESE)	Completed (2016)	None	Design and Evaluation of Surface Water Quality Sampling Locations
4	Dr. Sherly M.A. (at IITB-Monash Academy)	Completed (2016)	Prof. Chan, Monash University, Australia Prof. Rau, Shantau University, China (Co-supervisors)	Using GIS and other Methods to Understand and Quantify the Vulnerability of a Megacity like Mumbai to Floods
5	Dr. Vittal. H. (at CESE)	Completed (2017)	Prof. Subimal Ghosh, Civil Engg. (Co-supervisor)	Spatial and Temporal Variations of Hydrologic Extremes over India (Received Excellence in Ph.D. thesis Award 2017, IIT Bombay)
6	Dr. Harshit Mishra (at CESE)	Completed (2017)	Prof. Rakesh Kumar, CESE and NEERI (Co-supervisor)	Assessment and Management of Risk to Landfill Leachate Contamination

Sr. No.	Name	Completed/ongoing	Other guides, if any	Thesis topic
7	Dr. Hiteshri Shastri (at IDP Climate studies)	Completed (2016)	Prof. Subimal Ghosh, Civil Engg. (main supervisor)	Understanding Impacts of Urbanization on Rainfall patterns in India
8	Dr. Vinay Yadav (at CESE)	Completed (2018)	Prof. A. K. Dikshit (Co-Supervisor)	Interval Optimization Approach for Solid Waste Management <u>(Received Excellence in Ph.D. thesis Award 2020, IIT Bombay)</u>
9	Dr. Jitendra Singh (at CESE)	Completed (2018)	None	Nonstationary analysis of hydroclimatic extremes
10	Dr. Swati Singh (at IDP Climate studies)	Completed (2019)	Prof. Subimal Ghosh, Civil Engg. (main supervisor)	Revisiting the Association of Indian Monsoon with Oceanic Circulation
11	Dr. Tarul Sharma (at IDP Climate studies)	Completed (2019)	Prof. Subimal Ghosh, Civil Engg. (Co-supervisor)	Agricultural Risk Assessment under Climate Change Scenario
12	Dr. Mohit Prakash Mohanty (at CESE)	Completed (2019)	Prof. Subimal Ghosh, Civil Engg. (Co-supervisor)	A Comprehensive mapping of flood risk under changing climate
13	Dr. Aditya Gusain (at CESE)	Completed (2020)	Prof. Subimal Ghosh, Civil Engg. (Co-supervisor)	Understanding precipitation-flood flow association under changing climate
14	Dr. Anjana Devanand (at IDP Climate studies)	Completed (2020)	Prof. Subimal Ghosh, Civil Engg. (main supervisor)	Feedback from Human-Natural Land Processes to the Indian Summer Monsoon
15	Dr. Pratiman Patel (at IDP Climate studies)	Completed (2021)	Prof. Subimal Ghosh, Civil Engg. (Co-supervisor)	Rainfall Forecasting through Regional Weather Modelling: An Application to Near Real-Time Flood Forecasting
16	Ms. Mousumi Ghosh (at IDP Climate studies)	Ongoing	Prof. Subimal Ghosh, Civil Engg. (Co-supervisor)	Flood forecasting for Mithi River catchment, Mumbai using 3-way coupled approach with MIKE model
17	Mr. Naveen S. (at CESE)	Ongoing	Prof. Subimal Ghosh, Civil Engg. (Co-supervisor)	Impacts of climate change on human health risks
18	Ms. Anokha S.	Ongoing	Prof. Pradip Kalbar, CUSE, and Prof. Arpita Mondal, Civil Engg. (Co-supervisors)	Understanding atmospheric processes in hydroclimatic extreme events and hazard mapping (tentative title)
19	Ms. Sonali Kadam	Ongoing	Prof. Subimal Ghosh, Civil Engg. (Co-supervisor)	Developing Climate Change Impact Metrics for Indian Agriculture (tentative title)
20	Mr. Kaustav Mondal	Ongoing	None	Urban flood process modeling (tentative title)

ii. Masters' and Bachelor's research guidance (All students were/are from ESED)

Sr. No.	Type M.Tech. M.Sc. etc	Name	Completed/ ongoing	Other guides, if any	Thesis topic
1.	M.Tech.	Mr. M. Rupas Kumar	Completed	None	A Multiobjective Optimization Model for Lake Eutrophication Control
2.	M.Tech.	Mr. N. Subrahmanyam	Completed	None	Impact of Skeletonization on Uncertainty Modeling of Water Distribution Networks
3.	M.Tech.	Mr. Rahul B. Kumbhar	Completed	Prof. S. R. Asolekar, CESE (main supervisor)	Experimental Study of Bilge Water Treatment Using coagulation and Optimization
4.	M.Tech.	Ms. Gunjan Chandel	Completed	None	Vulnerability Assessment to Natural and Environmental Hazards
5.	M.Tech.	Mr. Sohom Mandal	Completed	None	River Water Quality Management: An Interval Optimization Approach
6.	M.Tech.	Mr. Soumyajit Sen	Completed	None	Estimation of Design Rainfall and Comparative Rainfall Data Analysis from Two Gauging Stations in Mumbai City, India
7.	M.Tech.	Mr. Sumit Kumar Jha	Completed	None	Urban Flood Modelling Considering Spatial Variability of Rainfall over Mumbai City
8.	M.Tech.	Mr. Tilik Tena (from Ethiopia)	Completed	Prof. RAAJ Ramsankaan, Civil Engg. (co-supervisor)	A Holistic Geospatial Approach to Select Suitable Site for Wastewater Treatment Plant at Bahir Dar City, Ethiopia
9.	M.Tech.	Mr. Rathod Merwan Kishanrao	Completed	None	A Framework for Characterization and Assessment of Municipal Solid Waste Landfill Leachate: An Application to Turbhe Landfill, Navi Mumbai, India
10.	M.Tech.	Mr. Roshan Appa	Completed	Prof. Subimal Ghosh, Civil Engg. (co-supervisor)	Projection of Hydro-Climatic Extremes with New Generation Climate Models
11.	M. Tech.	Mr. Amul Patwal	Completed	None	Multi-model Ensemble of CMIP5 Simulation to Project all India Rainfall
12.	M. Tech.	Mr. Murari Harsha Vardhan	Completed	None	Modelling crop yield under climate change scenarios: A nation-wide study
13.	M. Tech.	Mr. Kadambala Praneeth	Completed	None	Quantification of Human Health Risk to MSW Landfill Leachate Contamination under Different Liner Scenarios
14.	M. Tech.	Mr. Saurabh Gairola	Completed	None	Understanding the Effects of Human Intervention, Calibration and Climate Change on Hydrological Variables in India

Sr. No.	Type M.Tech. M.Sc. etc	Name	Completed/ ongoing	Other guides, if any	Thesis topic
15.	M. Tech.	Mr. Shrey Pathak	Completed	None	Understanding the impacts of climate change and LULC change on hydrologic variables in india
16.	M. Tech.	Mr. Nikhil Pratap Saini	Completed	None	Drought Risk Mapping Under Changing Climate for Indian Subcontinent: A Nonstationary Modelling Approach
17.	M. Tech.	Mr. Pushpendra Kishore	Completed	None	Flood Hazard Mapping for a Coastal Urban Catchment: A 3-way Coupled Modelling Approach
18.	M. Tech.	Mr. Prakhar Deroliya	Completed	None	Mapping Flood Risk in Data-Poor Regions Enforcing Combined Geomorphic and Socio-economic Indicators
19.	M. Tech.	Mr. Govind Kumar Vaishnav	Completed	None	Drought Risk Mapping Under Changing Climate for Indian Subcontinent
20.	M.Sc.-Ph.D.	Mr. Jitendra Singh	Completed	None	Nonstationary Frequency Analysis for Flood Risk Management
21.	M.Sc.-Ph.D.	Mr. Vinay Yadav	Completed	Prof. A. K. Dikshit, CESE (co-supervisor)	An Interval Optimization Approach to Municipal Solid Waste Management
22.	M. Phil.	Ms. Surbhi Chhabra	Completed	None	Hydrologic Modelling using Variable Infiltration Capacity Model (Tentative)
23.	M.Sc. (ASI, IIT Bombay)	Mr. Pankaj Kumar	Completed	None	Bivariate Flood Frequency Analysis: A Comparative Study of Nonparametric, Parametric and Copula-based Approaches
24.	M.Sc. (ASI, IIT Bombay)	Mr. Tarkeshwar Singh	Completed	None	Nonstationary flood Frequency Analysis
25.	M.Sc. (ASI, IIT Bombay)	Ms. Shivani Mudgal	Completed	None	A Nonstationary Approach to Drought Frequency Estimation
26.	M.Sc. (ASI, IIT Bombay)	Mr. Dileep Vishwakarma	Completed	None	A Statistical Approach to Toxicological Risk Assessment
27.	M.Sc. (ASI, IIT Bombay)	Mr. Love Gupta	Completed	None	Nonstationary Modeling of Long Records of Rainfall and Temperature over India
28.	M.Sc. (external, Cochin University)	Mr. Musthafa, O. M.	Completed	None	Evaluation of River Water Quality Monitoring Networks: A Multivariate Statistical Approach on Indian Case Studies
29.	M.Sc. (external, Indian Institute of Information Technology)	Ms. Varsha Vijaykumar M.	Completed	None	Assessment of Vulnerability to Natural or Human-induced Hazards in an Overpopulated Urban Region

Sr. No.	Type M.Tech. M.Sc. etc	Name	Completed/ ongoing	Other guides, if any	Thesis topic
	&Management, Kerala)				
30.	B.Tech. (external, Chemical Engineering at Univ. Inst. of Chemical Tech. in NMU, Jalgaon	Mr. Shahrukh Sheikh	Completed	None	Induced Impact of Climate Change on Quality of Fresh Water: A Data Driven Analysis on Major Indian River.
31.	M.Sc. (External)	Ms. Nithya S.	Completed	None	A comparative assessment of 1D 2D coupled flood inundation modelling for data scarce regions using DEM from different sources
32.	M.Sc.	Mr. Sahil Mudgil	Completed	None	A Computational Framework to create a Flood Inundation Library for Real-Time Forecasting
33.	M.Sc.	Mr. Saurabh Kumar	Completed	None	Understanding the Principal Mechanism of Heat Waves over India

Summer internship students (through IIT Bombay and IRCC internship schemes):

Supervised 01 (in 2008), 06 (in 2009), 02 (in 2010), 02 (in 2011), 01 (in 2012), 02 (in 2013), 01 (in 2014), 01 (2015), 01 (2017), 01 (2018). 01 (2019)

COMPUTING SKILLS

Operating Systems - UNIX, LINUX and Windows; *Programming Language* - C++, Visual Basic; *Modeling and Analysis Tools* - MATLAB, R, Hyper LINGO (Language for INteractive General Optimization), Statistica, LandSIM, MIKE Flood and SPSS.

Subhankar Karmakar

May' 2021

Subhankar Karmakar