Asha B. Chelani

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Place of Work
Air Pollution Control Division, CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur

Job Profile
- Application of statistical techniques to understand environmental problems.
- Handling R&D projects related to nonlinear analysis and modeling of air pollutant concentrations.
- Handling consultancy projects related to source apportionment of particulate matter in urban cities.
- Satellite data retrieval and validation using advanced algorithms.
- Development of statistical models to forecast the air pollution levels in advance.
- Application of chaos theory to study the persistence property and complexity in air quality data.
- Publication : 37 papers in international SCI journals, 2 chapters in books and 22 papers in conferences and national journals.

Research Interests
Statistical data analysis, data mining, forecasting using statistical modeling, artificial neural network for pattern recognition and forecasting, grey theory for pattern identification

Experience

July 1998 - Oct 2000	Junior Project Fellow, National Environmental Engineering Research Institute (NEERI), Nagpur
Nov 2000 – Nov 2006	Tech. Gr. III(1), National Environmental Engineering Research Institute (NEERI), Nagpur
Nov 2006 –Nov 2009	Scientist Gr. IV(1), National Environmental Engineering Research Institute (NEERI), Nagpur
Nov 2009 –Nov 2013	Scientist Gr. IV(2), National Environmental Engineering Research Institute (NEERI), Nagpur
Nov 2013 –till date	Scientist Gr. IV(3), National Environmental Engineering Research Institute (NEERI), Nagpur

Education
- Ph.D. in Statistics – Awarded on 30th November 2005, RTM Nagpur University, Nagpur
- **Title:** Some contributions to Secretary problem and its generalization
- M.Sc. in Statistics - 1995-97, Nagpur University, Nagpur
- B.Sc. in Mathematics, Physics and Statistics -1993-95, Nagpur University, Nagpur
- Advance Diploma in Computer Software System Analysis and Applications - 1996-97, Maharashtra Technical Board, Nagpur
- B.Ed (Bachelor in Education) - 1997-98, Nagpur University, Nagpur

Awards and prizes

- Recipient of the 61st Nagpur Session of Indian Science Congress Commemoration Prize
- Recipient of the Balwantrao Mahajan Prize
- Recipient of gold medal for obtaining the highest percentage in M.Sc. (Statistics) Examination in university
- Recipient of gold medal for obtaining the highest percentage of marks in M. Sc. for topping all the subjects

Computer Skills

Operating Systems: DOS, Windows NT, 95, 98, Windows XP, Windows 7, 8, 10
Languages: C Programming, BASIC, R, MATLAB, Octave
Softwares: Statistica, SPSS, FoxPro, FCM (Forecast Master), RATS (Regression Analysis for Time Series), Dataplore

Major Involvement in Consultancy and R&D Projects

1. Source Apportionment of Particulate Matter and Emission Inventory Study of Twin Cities Kolkata and Howrah
   Source apportionment of particulate matter
2. National Clean Air Mission
   Statistical data analysis of ambient air quality
3. Source apportionment of air pollutants in Mithapur region
   Source apportionment of particulate matter
4. Study of Surface Ozone Dynamics and Development of Prediction Model using Nonlinear Dynamical Systems Theory
   Study of complex dynamics involved in surface ozone concentrations
5. Air Quality Modeling using Artificial Neural Networks
   Application of time series analysis, application and development of neural network modeling, statistical modeling, nonlinear techniques based on chaos theory
6. Air Quality Monitoring and Emission Source Apportionment Study in Ten Cities of Maharashtra
   Emission inventory study for Amravati
7. Evaluation of Zero Liquid Discharge (ZLD) Scheme at M/s Navin Fluorine International Ltd (NFIL), Surat
   Application of grey relational analysis and analytical hierarchy process for optimal treatment alternative selection
8. Strategically Designed Green Belt Development Along Highways And Its Performance Evaluation Towards Eco-Capital Build-up
   Design of sampling plan, statistical data analysis
9. Air Quality Assessment and Source Apportionment Study of Firozabad
   Source apportionment of particulate matter
10. Estimation of Fugitive Emissions and Source Apportionment Studies to Assess the Impact of Various Operations on Ambient Air Quality at Bhillai Steel Plant
    Source apportionment of particulate matter
11. Human Health Assessment Study to Assess the Air Pollution & Health Impacts at Wada Plant of Saint-Gobain India Pvt. Ltd., Palghar
    Statistical data analysis
12. Study of Effects Due to Ash Fill Sites of Talcher Thermal Power Plant on Flora and Fauna in the Surrounding Area of South Balanda Mine Pit and Jagannath Mine Pit
    Source apportionment of particulate matter

13. REMP based Carrying Capacity Study of Sambalpur- Jharsuguda Region
    Source apportionment of particulate matter
14. Micro Level EIA Study for Clusters of Iron Ore Mines in the State of Goa
    Source apportionment of particulate matter
15. Carrying Capacity Study for Environmentally Sustainable Iron Ore Mining Activity in Keonjhar, Sundargarh and Mayurbhanj Districts of Orissa State
    Source apportionment of particulate matter
16. Source Apportionment studies in Delhi city
    Source Apportionment of Particulate Matter
17. Source Apportionment Studies in Kanpur city
    Source Apportionment of Particulate Matter
18. Particulate Matter Reduction Action Plan for Greater Mumbai
    Receptor Modeling, Source Apportionment of Particulate Matter
19. National Ambient Air Quality Monitoring Project
    Statistical data analysis and modeling, neural network modeling, mathematical modeling
    Development of software for the statistical analysis & interpretation of data (Using C language),
    Development of Software for the construction of Wind rose diagram (using C Language)
20. Carrying Capacity Based Developmental Planning for Jamshedpur (An Industrial Area)
    Application of Neural network modeling for Environmental Impact Assessment
21. Regional Environmental Impact and Risk Assessment (REIRA) of Proposed Crude Oil Pipe Line from Jhatipadar, Orissa to Refinery Project at Lohgara, UP & from Shahdol to Refinery Project at Bina, MP
    Remote Sensing related work
22. Environmental Impact and Risk Assessment (EIRA) Studies For Expansion Activity Proposed By M/S Sterlite Industries (India) Ltd., at its Tuticorin Industries Unit
    Socio-Economic Component, Air Environment
23. Rapid Environmental Impact Assessment (REIA) Studies For The Proposed Storage Facility of LPG & Cross Country Pipeline at Dumad
    Socio-Economic Component, Air Environment

Publications: International Journals

1. A.B. Chelani, D.G. Gajghate and M.Z. Hasan, Airborne toxic metals in air of Mumbai city, India, Bulletin of Environmental Contamination and Toxicology 2000, 66, 2, 196-205.
2. A.B. Chelani and M.Z. Hasan, Forecasting nitrogen dioxide concentration using artificial neural networks, International J. of Environmental Studies A 2001, 58, 487-499.
3. A.B. Chelani, D.G Gajghate, S.M. Tamhane, M. Z. Hasan, Statistical modeling of air pollutants in ambient air of Delhi, Water, Air & Soil Pollution 2001, 132, 315-331.
4. A.B. Chelani, C.V. ChalapatiRao, K.M. Phadke and M.Z. Hasan, Formation of air quality index in India, International J. of Environmental Studies A 2002, 59(3), 331-342.
5. A.B. Chelani, C.V. ChalapatiRao, K.M. Phadke, M.Z. Hasan, Prediction of sulphur dioxide concentration using artificial neural-networks, Environmental Modeling & Software 2002, 17,161-168.
6. A.B. Chelani, D. G. Gajghate and M.Z. Hasan, Prediction of ambient PM10 and toxic metals using artificial neural networks, J. of Air & Waste Management Association 2002, 52, 805-813.

7. P. Nema, **A.B. Chelani**, C.S.P. Ojha, A. Kumar, P. Khanna, Utility of column lysimeter for design of SAT system for wastewater renovation using artificial neural networks, J. of Environmental Engineering (ASCE) 2004, 130(12), 1534-1542.
8. A.B. Chelani, D.G. Gajghate, K.M. Phadke, A.G. Gavane, M.Z. Hasan, P. Nema, Air quality status and sources of PM10 in Kanpur city, Bulletin of Environmental Contamination & Toxicology 2005, 74(2), 421-428.
9. A.B. Chelani, Predicting chaotic time series of PM10 concentration using artificial neural networks, International Journal of Environmental Studies A 2005, 62(2), 181-191.
10. A.B. Chelani and S. Devotta, Impact of change in fuel quality on PM10 in Delhi, Bulletin of Environmental Contamination & Toxicology 2005, 75(3), 600-607.
11. A.B. Chelani, R.N. Singh and S. Devotta, Nonlinear dynamical characterization and prediction of ambient nitrogen dioxide concentration, Water, Air & Soil Pollution 2005,166(1), 121-135.
12. A.B. Chelani and S. Devotta, Nonlinear analysis and prediction of PM10 concentration in ambient air, J. of Air & Waste Management Association 2006, 56(1), 78-84.
13. A.B. Chelani and S. Devotta, Air quality forecasting using a hybrid autoregressive and nonlinear model, Atmospheric Environment 2006, 40, 1774-1780.
14. A.B. Chelani and S. Devotta, Air quality assessment in Delhi: Before and after CNG as fuel, Environmental Monitoring & Assessment 2007, 125,257-263.
15. A.B. Chelani and S. Devotta, Prediction of ambient carbon monoxide concentration using nonlinear time series analysis technique, Transportation Research D 2007, 12 (8), 596-600.
16. A.Gautam, A.B. Chelani, V.K. Jain, S. Devotta, A new scheme to predict chaotic time series of air pollutant concentrations using artificial neural network and nearest neighbor searching, Atmospheric Environment 2008, 42(18), 4409-4417.
17. A.B. Chelani, D.G. Gajghate, S. Devotta, Source apportionment of PM10 in Mumbai, India using CMB model, Bull Environ Contam Toxicol 2008, 81,190–195.
18. A.B. Chelani, Statistical persistence analysis of hourly ground level ozone concentrations in Delhi, Atmospheric Research 2009, 92, 244–250.
19. D.V. Ramana, **A.B. Chelani**, R.K. Chadha, R.N. Singh, Deep bore well water level fluctuations in the Koyna region, India: the presence of a low order dynamical system in a seismically active environment, Nonlinear Processes in Geophysics 2009, 16, 393-397.
20. A.B. Chelani, Prediction of daily maximum ground ozone concentration using support vector machine, Environmental Monitoring & Assessment 2010, 162 (1-4), 169-176.
21. A.B. Chelani, D.G. Gajghate, C.V. ChalapatiRao, S. Devotta, Particle size distribution in ambient air of Delhi and its statistical analysis, Bulletin of Environmental Contamination and Toxicology 2010, 85(1), 22-27.
22. A.B. Chelani, Nonlinear dynamical analysis of ground level ozone concentrations at different temporal scales, Atmospheric Environment 2010, 44(34), 4318-4324.
23. A.B. Chelani, Complexity analysis of CO concentration time series at traffic site in Delhi, Transportation Research D 2011, 16(1), 57-60.
24. G.R. Pophali, A.B. Chelani, R.S. Dhodapkar, Using integrated AHP and GRA approach for optimal selection of full scale tannery effluent treatment alternative, Expert Systems with Applications 2011, 38(9), 10889-10895.
25. A. B. Chelani, C. Moghe, S. Nimsadkar, N. Thacker, S. Dhopte, G. Bodhe, Kavita Gandhi, Evaluation of bias, precision and systematic errors in proficiency testing of Cl^- and Cu concentration in water 2011, Journal of Accreditation and Quality Assurance 16, 379-382.

26. A.B. Chelani, Change detection using CUSUM and modified CUSUM method in air pollutant concentrations at traffic site in Delhi, Stochastic Environmental Research & Risk Assessment 2011, 25(6), 827-834.
27. A.B. Chelani, Persistence analysis of extreme CO, NO_2 and O_3 concentrations in ambient air of Delhi, Atmospheric Research 2012, 108, 128-134.
28. A.B. Chelani, Study of Extreme CO, NO2 and O3 Concentrations at a Traffic Site in Delhi: Statistical Persistence Analysis and Source Identification, Aerosol & Air Quality Research 2013, 13, 377–384.
29. A.B. Chelani, P.S. Rao, Temporal variations in surface air temperature anomaly in urban cities of India, Meteorology and Atmospheric Physics 2013, 121(3), 215-221.
30. A.B. Chelani, Statistical characteristics of ambient PM2.5 concentration at traffic site in Delhi: Source identification using persistence analysis and nonparametric wind regression, Aerosol & Air Quality Research 2013, 13(6), 1768-1778.
31. A.B. Chelani, Irregularity analysis of CO, NO_2 and O_3 concentrations at traffic, commercial and low activity sites in Delhi, Stochastic Environmental Research and Risk Assessment 2014, 28:921–925.
32. D.V. Ramana, J. Pavan Kumar, Asha Chelani, R.K. Chadha, M. Shekar, R.N. Singh, Complexity in hydro-seismicity of the Koyna–Warna region, India, Natural Hazards, 2015, 77:S109–S1.
33. A.B. Chelani, Nearest neighbour based forecast model for PM10 forecasting: Individual and combination forecasting, Aerosol & Air Quality Research 2015, 15(3): 1130-1136.
34. A.B. Chelani, Exceedance analysis of PM10 concentration in central Indian city: predicting time between two exceedances, Aerosol & Air Quality Research 2015, 15(5): 2158-2167.
35. A.B. Chelani, Long memory in air pollutant concentrations, Atmospheric Research 2016, 171: 1-4.
36. A.B. Chelani, Long-range correlations in air quality time series: effect of differencing and shuffling, Aerosol and Air Quality Research 2016, 16(9): 2302-2313.
37. A.B. Chelani, Study of Local and Regional Influence on PM2.5 Concentration during Odd-Even Rule in Delhi Using Causal Analysis, Aerosol and Air Quality Research 2017, 17: 1190–1203.

Publications: National Journals

38. A.B. Chelani, K.M. Phadke, M.Z. Hasan, Prediction of sulphur dioxide concentrations using stochastic models, Indian Association of Environmental Management (IAEM), Nagpur 2000, 27, No. 2, 111-117.
39. A.B. Chelani, D.G. Gajghate and M.Z. Hasan, Atmospheric toxic metal concentrations in urban area of Nagpur city, India, Indian J. of Environmental Protection, India 2001 March, 250-257.
40. S. Mishra, C. Chauhan, A. Chelani, A. Kumar, C.V. ChalapatiRao, Modeling the effect of wind speed and wind direction on RSPM concentrations in ambient air: A case study at urban areas in central India, Indian J. of Environmental Protection 2011, 1(3), 9-14.
41. A.B. Chelani, Study of temporal variations in aerosol optical depth over central India, International Journal of Environmental Protection, 2015, 5 (1), 25-31.

Chapters in Books

42. Asha Chelani, K.M. Phadke and P. Rambabu. Prediction of sulphur dioxide concentration using stochastic models, Environmental Pollution and Its Management, Eds. Pankaj Shrivastava, APH, 2000, ISBN : 81-7648-159-9.

43. Asha B. Chelani, D.G. Gajghate, S.D. Joshi and S. Devotta, Acid Rain, Environmental Security: Human and Animal Health, Eds. S R Garg, International Book Distributing Co. (IBDC), Lucknow (in press), 2010.

Papers Presented in National and International Conferences

44. A.B. Chelani, K.M. Phadke, K.E. Rosario, M.Z. Hasan, Statistical analysis and forecasting of suspended particulate matter time series using a recursive approach, Ninth National Symposium on Environment, Bangalore, 2000, June 5-7, 23-25.
45. A.B. Chelani, On estimating maximum of the random variable, 89th session of the Indian Science Congress Association, Lucknow, 2002, Part III, Section XIV, 69.
46. A.B. Chelani, K.M. Phadke, S.M. Tamhane, M.Z. Hasan, A recursive approach to identify time-series components of pollutant concentrations, 93rd International Conference on Air & Waste Management Association - 2000, Salt Lake City, Utah 2000, June 19-22.
47. A.B. Chelani, K.M. Phadke, C.V. ChalapatiRao and M.Z. Hasan, Statistical analysis and prediction of pollutant concentration time series, Annual Conf. on Mathematical Modeling and Computer Simulation, NEERI Nagpur, India 2000, October 23-24, 5.
48. A.B. Chelani, K.M. Phadke, M.Z. Hasan, Respirable suspended particulate matter prediction using artificial neural networks, 94th International Conference on Air & Waste Management Association - 2001, Salt Lake City, Utah, 2001, June 5-7.
49. A.B. Chelani, C.V. ChalapatiRao, K.M. Phadke, M.Z. Hasan, Artificial neural network for air quality prediction, National Conference on Mathematical and Applied Statistics, Nagpur University, Nagpur - 2001, 31.
50. A.B. Chelani, K.M. Phadke, D.G. Gajghate and M.Z. Hasan, Status of PM10 in four coastal cities of India, Proc. of National Conference on Pollution Prevention & Control in India: IAEM, Nagpur, 2002, 2-3 March, 59-63.
51. C.V. Chalapati Rao, K.V. George, **Asha Lalwani,** P. Nema, S. Devotta, Air quality modelling and simulation at NEERI – Past, present and future, Proceedings of Indo- US Workshop on Modelling of Transport of Air Pollutants organized by NEERI & Ohio Super Computing Centre (USA), NEERI, Nagpur, November 11-13, 2003.
52. J.A. Manuel, K.M. Phadke, S.D. Joshi, A. Lalwani, A. Kumar and M. Z. Hasan, Levels of Benzo-A-Pyrene (BAP) in ambient air of Indian metropolis (AQ-05), National Conference on Advances in Environmental Science and Engineering organized by IIT-Bombay, December 8-9, 2003.
53. A.B. Chelani and R.N. Singh, Statistical techniques for air quality prediction: From linear to nonlinear models – A technical discussion with case study, Presented at the International conference on 'Future of statistical theory, practice and education' held at Indian School of Business, Hyderabad during 28th December 2004 to 1st January 2005.
54. A.B. Chelani, Nonlinear dynamical characterization and prediction of ambient air pollutant concentration, Presented at SCOPE General Assembly, Indian National Science Congress, New Delhi during 7-11th February, 2005.
55. A.B. Chelani, Application of chaos theory to air pollution data analysis, National workshop on Urban Air Quality in India, Nagpur during 23-24th October, 2005.
56. A.B. Chelani and S. Devotta, Chaos theory for analysis and prediction of air pollution time series, National Conf. on Recent trends in estimation and optimization: theory and applications, Institute of Science, Nagpur, 1st-2nd January, 2006.
57. D.G. Gajghate, P. Nema and Asha Lalwani, Measurement of particulate matter and toxic metals at kerbside locations in an urban city, National Conference on Environmental Management, held at Hyderabad, during November 16-18, 2006.

58. A.B. Chelani, Uncertainty calculation of analytical measurements – Monte Carlo simulation approach, Indian Analytical Science Congress, Ramdeobaba Kamla Nehru Engineering College, Nagpur, 28-29th December, 2007.
59. A.B. Chelani, R.N. Singh, Scaling and persistence in ground level ozone concentrations in Delhi, AGU Chapman Conference on Complexity and Extreme Events in Geosciences organized by National Geophysical Research Institute, Hyderabad, India, 15–19 February 2010.
60. D.V. Ramana, Asha Chelani, R.K. Chadha and R.N.Singh, Hydrological complexity model of active upper crust under Koyna (India) region, AGU Chapman Conference on Complexity and Extreme Events in Geosciences organized by National Geophysical Research Institute, Hyderabad, India, 15–19 February 2010.
61. K.V. George, Asha P. Lalwani, Dinakar D. Patil, Babu J. Alappat, Source apportionment of particulate matter in coal mining area in India using CMB model, National Symposium on Environment (NSE-18) organized by BAARC, Mumbai at JNTUA, Anantapur, 11-13 March 2013.
62. A.B. Chelani, Validating satellite retrieved tropospheric column NO_2 with the ground NO_2 measurements over central urban city of India, Poster presentation in Symposium cum workshop on Air Pollution Induced Health Effects, Health Risk Assessment Software Development & Demonstration on 6-7 Aug, 2014 at CSIR-NEERI, Nagpur.