

DR ANURADHA SHUKLA

Former Chief Scientist & Acting Director
Central Road Research Institute, (CSIR-CRRI),
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SUMMARY

- I have superannuated recently on 31/08/2020 from the position of Chief Scientist & Acting Director from Central Road Research Institute, (CSIR-CRRI), New Delhi, was also Honorary Professor AcSIR
- Joined CRRI in 1986 as a scientist B and have more than 34 years of extensive multidisciplinary research and management experience
- I am recipient of the prestigious **Fulbright Fellowship for Environmental Leadership Programme**, have been awarded **India short-term visiting fellowship by University of Birmingham**. Received **Indian Roads Congress Commendation Certificate** for the Paper entitled "Procedure for Green Highways Rating System in India (GHRSI). Visiting Scientist, **International Scientist Exchange Programme** under Indo-Hungarian S&T Program of Cooperation
- **Area of expertise:** Environmental Aspects of Roads & Transportation and Management; Carbon Footprints of Road & Transportation Sector; Green Roads; Sustainable Road Transportation; Waste Material Utilization in Road Construction
- Member, **Technical Committee** on Reduction of Carbon Footprint in Road Construction and Environment, **Indian Roads Congress (IRC)**; Member of **Expert Appraisal Committee** for Infrastructure Development, Building/Construction and Miscellaneous Projects, **Ministry of Environment and Climate Change**; Member of Technical Committee Indian Roads Congress (IRC) for Environment for almost two decades; **Chairperson of BIS Committee** on Solid Waste Management
- Published more than 140 papers in journals and conferences, frequent speaker at national and international conferences and meetings, and have organized several workshops/seminars to promote S&T interaction. In addition, actively involved in collaboration and networking with various international and national organizations.
- Having extensive research and management experience, I am a visionary and dynamic professional, armed with demonstrated leadership qualities, and capability of sharing responsibility for decision making.

PROFESSIONAL EXPERIENCE

Research Experience: 34+ years

Academic Experience: 20+ years

Administrative Experience: 20+ years on various senior positions

EMPLOYMENT DETAILS

Chief Scientist	30.12.2011-	31.08.2020	Central Road Research Institute, New Delhi
Senior Principal Scientist	30.12.2006-	30.12.2011	Central Road Research Institute, New Delhi
Scientist E-II	30.12.2001-	30.12.2006	Central Road Research Institute, New Delhi
Scientist E-I	30.12.1996-	30.12.2001	Central Road Research Institute, New Delhi
Scientist C	8.8.1991-	30.12.1996	Central Road Research Institute, New Delhi
Scientist B	8.8. 1986-	8.8. 1991	Central Road Research Institute, New Delhi
Research Scholar	1.1.1985-	31.7.1986	Indian Institute of Technology, Delhi

EDUCATION

PhD	2011	Jamia Millia Islamia- Central University, New Delhi	Real world on-road vehicular emissions from different types of fuels	Environmental Science & Engineering
M. Tech	1985	Indian Institute of Technology, Bombay	First (9.67/10) CGPA(first position in class) Awarded GATE Scholarship by Ministry of HRD, Govt. of India (GATE Score: 98.63 percentile)	Corrosion Sc. & Engineering
M. Sc.	1983	Indian Institute of Technology, Delhi	First	Chemistry
P G. Diploma Ecology & Environment	1989	Indian Institute of Ecology & Environment, Delhi	First	Environment & Ecology
B.Sc.	1981	Delhi University	First	Chemistry

AWARDS/RECOGNITION

- Prestigious **Fulbright-Nehru Environmental Leadership Program Fellowship** 2009-2010
- **India Short-term Visiting Fellowship** by the University of Birmingham, U.K from 25th June 2014 to July 2014
- **IRC Commendation Certificate** during 79th Annual Session held at Nagpur (Maharashtra) Paper entitled "Procedure for Green Highways Rating System in India (GHRSI) 2018
- **OLF Travel Award** from the Council for International University (Virginia Tech, Blacksburg, VA) 2009

- **IUSSTF (Indo-USS&T Forum) award for Indo-US workshop** on “Road Transport & Climate Change” through competitive process, based on joint reviews in US & India. (total budget grant: Rs 11,50,000 including travel support for 6US & \$ Indian delegates) 2010-2011
- Visiting Scientist, **International Scientist Exchange Programme** under Indo-Hungarian S&T Program of Cooperation 1990.

HONOURS

- Member, Expert Appraisal Committee (EAC) for Infrastructure Development, Building/Construction and Miscellaneous Projects. Ministry of Environment, Forests and Climate Change, Government of India. Sept.2013 -till 31.08.2020
- Member, Technical Committee on Reduction of Carbon Footprint in Road Construction and Environment (G-3), Indian Roads Congress (IRC). January 2012- till date
- Chairperson, Subcommittee on Guidelines on Noise Barriers, (G-3), Indian Roads Congress (IRC). January 2018- till date
- Member of the Technical Committee of Indian Roads Congress IRC on Environment (G -3) January 2009 – December2011, (H-7) January 2003 - December2005,(H-7) January 2006 - December2008
- Chairperson, Solid Waste Management Sectional Committee CHD- 33, Bureau of Indian Standards (BIS) Govt. of India. Sept.2014 -till date
- Member, Environment protection and waste management sectional committee CHD- 32, Bureau of Indian Standards (BIS) Govt. of India. Jan 2006 -till 2014
- Chairperson, Sub-Committee on Environment, International Road Federation (IRF), (India Chapter). 2011
- Member, Committee on Clearance of Road Projects Passing through Forest Area, Ministry of Environment & Forest (MOEF), 2006

RESEARCH PROFILE

Publications

Peer-reviewed Journals: 48

Conference/Symposia: 101

Book Chapters: 8

Articles in Science Magazine: 13

Keynote/Invited Lectures Delivered

India: 34

Abroad: 8

Major Events Organized

Organized several Workshops/Seminars/Training Programs to promote S&T interaction, highlighting R&D strength & achievements of the institute

Workshops/Seminars

- *Indo-US Workshop on Transport and Greenhouse Gases Emissions* sponsored by Indo-US S& T Forum (IUSSTF), 8th -10th February 2011, at CRRRI New Delhi.
- Workshop on *Development of Greener Roads* in association with International Road Federation (India Chapter) and MoRTH, 15th October 2014, at CRRRI New Delhi.

- Workshop on *Alternative Pavement Materials and Application of GHG Assessment Tool* in association with International Road Federation (India Chapter) 28th January 2014, at CRRRI New Delhi.
- National Conference on *Status of Vehicular Pollution in Delhi* organized jointly by CRRRI and Indian Association for air Pollution Control, 2nd October 2008, at CRRRI, New Delhi.
- Workshop on *Environmental Impact of Road Transport*, 26th April 2007, at CRRRI New Delhi.
- Workshop on *Energy Conservation in Road Transport* sponsored by PCRA. 19th January 2007, at CRRRI New Delhi.

Training Programs

- Training-cum-Workshop on Use of “CHANGER”-Greenhouse Gas Calculator in association with International Road Federation (India Chapter) on 23rd May 2014 at CRRRI New Delhi.
- *Environmental Impact Assessment (EIA) and Environmental Clearance (EC) Process for Road/Highway Projects in India* from 15-19 February 2011, at CRRRI New Delhi.
- Training Program on *Aspects of Transportation Planning and Environmental Impact Assessment Studies for Road Projects* from Feb. 14- 20, 2008 & 15-19, February 2010 at CRRRI New Delhi.

International

- Training Programme on *Air Quality Monitoring and Systems* for the Officials of the Ministry of Environment, Government of Iraq. 17-29 October 2011, CRRRI, New Delhi.
- International Training Program on *IVEM (International Vehicle emissions Model)* in collaboration with CECRT Riverside, California, USEPA & USEP 28th August 2004, at CRRRI New Delhi, India

International Scientific Collaboration

Established scientific collaborations with several renowned International Institutes and organizations such as Texas Transport Institute, USA; International Research Centre for Sustainable Transport and Cities, Nagoya University, Japan; SINTEF Building and Infrastructure, Norway; Department of Transport and Environment, LEEDS University, UK etc.,

Professional Memberships

- Indian Associations of Air Pollution Control (IAPC)
- Indian Road Congress (IRC)
- Indian Association of Environmental Management (IAEM)
- Institute of Urban Transport (IUT)
- Women in Science & Engineering (WISE) part of International Network of Women Engineers and Scientists (INWES)

Significant Projects

Some of the Significant Sponsored and Consultancy Projects Undertaken as Project/Activity Leader

Urban road traffic and air pollution in major metropolitan cities of India at the behest of National Auto Fuel Policy Committee	Centre for High Technology, MoPNG, Govt. of India	Sponsored
Development of Thermoplastic Material as a Substitute to Road Marking Paint	Ministry of Road Transport & Highways (MORTH), Govt. of	Sponsored

	India	
Effect of Overloading on Road Infrastructure-Study on overloading of trucks & real world emissions & fuel consumption	Ministry of Road Transport & Highways (MORTH), Govt. of India	Sponsored
Estimation of Carbon Footprints in the Road Construction Process	CSIR-CRRI	Network project
Assessment of Vehicular Pollution in Underground Car Parking Garage	Delhi Traffic Police and CPCB	Collaborative
Sustainable Ground Water Management: Assessment of Pollution Loads from Road runoff	CSIR-NEERI (Nagpur)	Network project
Effect of Environmental Pollution Due to Road Traffic on Health of Delhi Traffic Policemen	Delhi Traffic Police and All India Institute of Medical Sciences	Collaborative
Utilization of Municipal Solid Wastes from Ghazipur dumpsite, East Delhi in Road Embankment- Leachate study	EDMC	Sponsored
Feasibility of Municipal Solid Wastes (MSW) from Ramana Dump Site, Varanasi for Road Embankment Construction- Leachate study	UPWD	Sponsored
Impact of Traffic on Health amongst School Children in Delhi	International Institute of Health Management (IIHM) & CPCB	Sponsored
Pollution Exposure and Traffic Studies to Quantify the Health Impact Assessment of Delhi Metro	International Institute of Health Management (IIHM) & DMRC	Sponsored
Study of Non-Methane Hydrocarbons in the Atmospheric Environment of Delhi Region	Department of Science & Technology (DST)	Sponsored
Role of carbonaceous aerosols in the formation of South Asian brown clouds from Indo-Gangetic Region: Characterization and source apportionment by using radiocarbon	(Extra Mural Research Funding by SERB-DST)	Collaborative Central University of South Bihar, Patna
Development of Speed Dependent Emission Factors Using On-board Emissions Monitoring	IIT Bombay	Collaborative
EIA Study of Delhi-Gurgaon Section of NH-8	Kadyali Associates	Consultancy
EIA Study for Preparation of Detailed Report for Metro Phase-III Corridors	Delhi Metro Rail Corporation DMRC, New Delhi	Consultancy
Development of Speed Dependent Emission Factors Using On-Board Emission Monitoring System	IIT Bombay	Consultancy
EIA Study for Construction of International Terminal 2B of IGI Airport, New Delhi	ICT Pvt. Ltd.	Consultancy

Impact Assessment of Vehicular Pollution Between Mathura-Delhi and Mathura-Agra Corridors	Indian Oil Corporation Ltd.	Consultancy
Noise/vibration assessment in central Sec-Kashmiri gate corridor of phase-III of MRTS project	DMRC, Delhi	Consultancy
Noise & Vibration Study along the Metro corridor in Salt Lake City, Kolkata	KMRC, Kolkata	Consultancy
Noise & Vibration Study at Tapan Sinha Memorial Hospital near Tolly Ganj, Kolkata	KMRC, Kolkata	Consultancy
Traffic, Noise & Air Pollution Assessment on Road Network Connecting Darlaghat - Ropar and Darlaghat- Naragarh (HP)	M/s Gujrat Ambuja Cements Limited	Consultancy

Setting Up of Major Research Laboratory/ Facilities

- Air & Noise Laboratories
- Mobile Air Pollution Monitoring Facility (comprising of CO, NO_x, SO₂, O₃, HC & SPM (Suspended Particulate Matter) Analyzers and Meteorological System
- Aerosol Measurement Laboratory including O₃, PM_{2.5}, NO_x, & VOC real time monitors
- State of Art Sound, Vibration & Harshness Laboratory
- Environmental Chemistry & Water Testing Laboratory
- Fuel Consumption Meter with Data Acquisition System

Mentoring Young Scientists

Encouraging, supporting and mentoring young scientists especially women scientists, to establish young scientific leaders as is evident from the many international and national laurels to scientists during my tenure as Head of Transport Planning and Environment Division

ACADEMIC PROFILE

Ph.D. Students Supervised: 2

Post-Doctoral Fellow Supervised: 3

Dissertation Supervised

Postgraduate students: 36

B.Tech Students: 14

ADMINISTRATIVE PROFILE

Leadership Positions

- Acting Director, CSIR-CRRI from August 2019-August 2020
- Head Transport Environment Division 2017-2018
- Advisor R&D, CRRI 2013-2016
- Head Transport Planning & Environment Division 2009-2011;
- Leading Environment Group 2007-2008
- Group Leader (Transport Environment) 2002-2006, 2008-2009
- Environment Subgroup Leader (Environment & Road Safety Division) 1987-2000

Chairperson of various Internal Committees of CRRI undersigned successfully fulfilled administrative responsibilities through strategic planning and effective execution.

Member Secretary Research Council CRRI and Member of Management Council of CRRI

OTHER SIGNIFICANT CONTRIBUTION

Media interaction

- Participation in television and radio programmes and panel discussions with experts from various scientific verticals to generate science-based knowledge among all sectors of the society.
- Dissemination of Information through Newspaper articles and creating awareness on road traffic and environmental issues.

Social Responsibility

- Holding regular Environmental awareness and training programmes for school children and general public such as environment quiz, debate, campaigns, tree plantation etc. and regularly organizing the celebration of World Environment Day.

PUBLICATIONS

Peer-reviewed Journals

1. Saurabh Sonwani, Pallavi Saxena & **Anuradha Shukla** (2021). Carbonaceous Aerosol Characterization and Their Relationship with Meteorological Parameters during Summer Monsoon and Winter Monsoon at an Industrial Region in Delhi, India. *Earth and Space Science*. 8, e2020EA001303.
2. Arti Chaudhary, Sharad Gokhale & **Anuradha Shukla**. (2021). Traffic-flow characterization to quantify the real-world driving profile. *Bulletin of Environmental and Scientific Research*, Volume 7, Issue (1), pp. 15-24. available online at <https://www.besr.org.in>
3. A. Goel, P. Saxena, S. Sonwani, S. Rathi, A. Srivastava, A. K. Bharti, S. Jain, S. Singh, **A. Shukla**, and A. Srivastava. (2021) Health benefits due to reduction in respirable particulates in COVID-19 lockdown in India. *Aerosol and air Quality Research*, Article in press, available online at <https://doi.org/10.4209/aaqr.200460>
4. Kar, S. S., Behl, A., Kumar, Binod., **Shukla, A.** (2020). Development of Methodology for Quantification of GHG Emission During Construction of Flexible and Rigid Pavement: A Case Study. *Indian Highways*, 48 (10), 17-23.
5. Pradeep, Kumar., Vineet, Pratap., Akhilesh, Kumar., Arti, Choudhary., Rajendra, Prasad., **Anuradha Shukla**, R.P. Singh., Abhay, Kumar Singh. (2020). Assessment of atmospheric aerosols over Varanasi: Physical, optical and chemical properties and meteorological implications. *Journal of Atmospheric and Solar-Terrestrial Physics*. <https://doi.org/10.1016/j.jastp.2020.105424>
6. Amrendra, Kumar., Ishwar, Chandra. Yadav., **Anuradha Shukla**., Ningombam, Linthoingambi., Devi (2020). Seasonal Variation of PM_{2.5} In The Central Indo-Gangetic Plain (Patna) Of India: Chemical Characterization And Source Assessment. *SN Applied Sciences* 2, 1366 (2020). <https://doi.org/10.1007/s42452-020-3160-y> © Springer Nature Switzerland AG 2020
7. Mehrotra, T., Zaman, M.N., Prasad, B.B., **Shukla, A.**, Aggarwal. S., & Singh, R. (2020). Rapid immobilization of viable *Bacillus pseudomycolides* in polyvinyl alcohol/glutaraldehyde hydrogel for biological treatment of municipal wastewater. *Environ Science Pollution Research*. <https://doi.org/10.1007/s11356-019-07296-z>
8. Mehrotra, T., **Shukla, A.**, & Singh, R. (2019). In vitro toxicological evaluation of domestic effluent treated by formulated synthetic autochthonous bacterial consortium. *World J Microbiol Biotechnology*, 35, 184. <https://doi.org/10.1007/s11274-019-2756-0>

9. Gaur, M., Bhandari, K., &**Shukla, A.** (2018). Monitoring of total volatile organic compounds and particulate matter in an indoor environment. *Current Science*, 115(9).
10. Kar, S. S., Behl, A., &**Shukla, A.**, & Jain, P. K. (2017). Greenhouse gases (GHG) impact assessment tools: A review. *Indian Highways*, 45 (3), 19-28.
11. Bhandari, K., Singh, R., &**Shukla, A.** Site-Specific Variational Study of Particulate Matter with Traffic. *Indian Association for Air Pollution Control*, 16 (1), 21-26.
12. Pant, P., Baker, S. J., Goel, R., Guttikunda, S., Goel, A., **Shukla, A.**, and Harrison, R. M. (2016). Analysis of size-segregated winter season aerosol data from New Delhi, India. *Atmospheric Pollution Research*, 7, 100-109.
13. Gaur, M., Singh, R., &**Shukla, A.** (2016). Variability in the Levels of BTEX at a Pollution Hotspot in New Delhi, India. *Journal of Environmental Protection*, 7 (10), 1245-1258.
14. Singh, R., Gaur, M., &**Shukla, A.** (2016). Seasonal and Spatial Variation of BTEX in Ambient Air of Delhi. *Journal of Environmental Protection*, 7 (05), 670-688.
15. Gaur, M., Singh, R., &**Shukla, A.** (2016). Volatile Organic Compounds in India: Concentration and Sources. *Journal Civil Environ Engineering*, 6 (251), 1-7.
16. Mishra, D., &**Shukla, A.** (2016). Air quality due to day wise odd-even vehicle movement in Delhi, India. *International Journal of Earth and Atmospheric Science*, 3 (4), 73-81.
17. Bhattacharya, T., &**Shukla, A.** (2016). Proposed green guidelines for highway projects: dry semi-arid region of India. *Journal of the Indian Roads Congress*, 652, 303-314.
18. Pant, P., Baker, S. J., **Shukla, A.**, Maikawa, C., Pollitt, K. J. G., & Harrison, R. M. (2015). The PM10 fraction of road dust in the UK and India: Characterization, source profiles and oxidative potential. *Science of the Total Environment*, 530, 445-452.
19. Pant, P., **Shukla, A.**, Kohl, S. D., Chow, J. C., Watson, J. G., and Harrison, R. M. (2015). Characterization of ambient PM 2.5 at a pollution hotspot in New Delhi, India and inference of sources. *Atmospheric Environment*, 109, 178-189.
20. Pant, P., Baker, S. J., **Shukla, A.**, Maikawa, C., Pollitt, K. J. G., and Harrison, R. M. (2015). The PM10 fraction of road dust in the UK and India: Characterization, source profiles and oxidative potential. *Science of the Total Environment*, <http://dx.doi.org/10.1016/j.scitotenv.2015.05.084>.
21. Pant, P., **Shukla, A.**, Kohl, S. D., Chow, J. C., Watson, J. G., and Harrison, R. M. (2015). Characterization of ambient PM 2.5 at a pollution hotspot in New Delhi, India and inference of sources. *Atmospheric Environment*, 109, 178-189.
22. Kar, S., Behl, A., Jain, P. K., &**Shukla, A.** (2015). Estimation of Carbon Footprints in Bituminous Road Construction: A Case Study. *Indian Highways*, 43(12), 33-37.
23. Azad, F., **Shukla, A.**, and Sarkar, P.K. (2015). Critical review of freight transport problems in Delhi-NCR and their possible solutions. *Journal of Development, Management and Communication*, 2(4), 2348-7739.
24. Chaudhary, N., Sharma, N., &**Shukla, A.** (2015). Environmental impact of black carbon (soot particles) emitted from diesel engine motor vehicles. *Journal of Indian Scientific and Industrial Research*, 23 (1), 54-58.
25. Chauhan, S. K., **Shukla, A.**, Singh, R. and Singh, V. (2014). Source apportionment for lower non methane hydrocarbons in the ambient air of Delhi – A mega city in India, *Indian Journal of Environmental Protection*, 34(8), 682 – 688.
26. Chauhan, S. K., Singh, V., **Shukla, A.**, and Prakash, O. (2014). Impact of construction ingredients on environment. ISSN: 0975-2412, [BVAAP, 22\(1\), 66-71](#).
27. Chauhan, S. K., **Shukla, A.**, and Gupta, P. K. (2013). Non methane hydrocarbons-their sources/sinks: A review. *Indian Journal of Air Pollution Control*, 13 (1), 1-10.
28. Chauhan, S. K., Singh, V., **Shukla, A.**, and Prakash, O. (2013). Impacts of bituminous fumes on the workers of road construction industry. [BVAAP, 21\(2\), 161-165](#), ISSN: 0975-2412.

29. Velmurugan, S., Seetharaman, P., Madhu, E., **Shukla, A.**, &Gangopadhyay, S. (2013). A study of factors influencing the severity of road crashes involving drunk drivers and non drunk drivers. *Research in Transportation Economics*, 38(1), 78-83.
30. Adhikary, S., **Shukla, A.**, & Singh, R. (2012). Role of trees in air pollution reduction and improvement of air quality. *Indian Journal of Air Pollution Control*, 12(1), 14-23.
31. Padma, S., Errampalli, M., Senathipati, V., **Shukla, A.**, &Gangopadhyay, S. (2011). Modeling time mean speed and space mean speed for heterogeneous traffic conditions. *Transportation Planning and Technology*, 34(8), 823-838.
32. Bhandari, K., **Shukla, A.**, and Gangopadhyay, S. (2011). Carbon footprint: a tool to aquantify the impact of road construction on the environment. *Journal of the Eastern Asia Society for Transportation Studies*, 9, 740-755.
33. Padma, S., Asani, L.R., &**Shukla, A.** (2011). Atmospheric dispersion modelling of pollutant at selected urban corridor in Delhi using ADMS. *Indian Journal of Air Pollution Control*, 11(1), 69-74. ISSN: 0250-5231.
34. Padma, S., Madhu, E., Shah, P.M., **Shukla, A.**, &Gangopadhyay, S. (2011). A Study of road crashes along the high-speed corridors of India. *Journal of Road Transport*, 3, 1-14.
35. Tarsolia, N., Chauhan, S. K., and **Shukla, A.** (2011). Excessive emission of non-methane hydrocarbons in Delhi. *BVAAP*, 19 (2), 188-193.
36. Chauhan, S. K., Sharma, S., **Shukla, A.**, &Gangopadhyay, S. (2010). Recent trends of the emission characteristics from the road construction industry. *Environmental Science and Pollution Research*, 17(9), 1493-1501.
37. **Shukla, A.**, &Alam, M. (2010). Assessment of real world on-road vehicle emissions under dynamic urban traffic conditions in Delhi. *International Journal of Urban Sciences*, 14(2), 207-220.
38. Singh, R., **Shukla, A.**, &Gangopadhyay, S. (2010). Heath impacts of VOCs (Volatile organic compounds). *Indian Journal of Air Pollution Control*, Vol. 10 (2), 49-58.
39. **Shukla, A.**, & Masood, A. (2010). Real world on road In-use vehicle emissions in Delhi: A pilot study using portable emission measurement system. *Indian Journal of Air Pollution Control*, 10 (2), 49-58. ISSN: 0250-5231.
40. Singh, R., **Shukla, A.**, &Gangopadhyay, S. (2010). A pilot study of benzene in Delhi. *Indian Journal of Air Pollution Control*, 10 (1), 21-24. ISSN 0250-5231.
41. Sharma, N., **Shukla, A.**, Dhyani, R., and Gangopadhyay, S. (2010). Environmental impact assessment and environmental clearance process for road and highway projects in India, *Civil Engineering and Construction Review*, 23: 86-96.
42. Chauhan, S. K., Gupta, P. K., **Shukla, A.**, &Gangopadhyay, S. (2009). Recent developments of certified reference materials for road transportation. *Environmental Monitoring and Assessment*, 156 (1-4), 407-418.
43. **Shukla, A.**, Shukla, R., Rana, N., &Gangopadhyay, S. (2009). [Road traffic and noise pollution](#). *BVAAP*, 17(2), 108-116.
44. **Shukla, A.**, **Shukla, R.**, Rana, N., Chaudhary, M., &**Gangopadhyay, S.** (2007). [Road transport and green house emission in India](#). *BVAAP*, 15 (2), 144-151.
45. **Shukla, A.** (2007). Status of Noise levels due to increase in vehicular traffic. *Indian Journal of Air Pollution Control*, 7(2), 61-78.
46. **Shukla, A.**, Akhtar, N., &Gangopadhyay, S. (2006). Mass and concentration of respirable particulate matter in the ambient environment of Delhi. *Indian Journal of Air Pollution Control*, 6(1), 44-55.
47. Bhandari, K., Bansal, A., **Shukla, A.**, &Khare, M. (2005). Performance and emissions of natural gas fueled internal combustion engine: A review. *Journal of Scientific and Industrial Research*, 64(5), 333-338.

48. Singh, A., Shanmugam, P., Sharma, N., **Shukla, A.**, & Sarin, S. M. (1998). Diurnal variation of pollutants in the urban atmosphere of Delhi during winter months. *Indian Journal of Environmental Protection*, 18(2), 115-122.

Conference/Symposia

1. Saxena, P., **Shukla, A.**, & Srivastava, A. (2019). Assessment of black carbon profiles and on-road emission factors at busy traffic intersection site of capital city of India. *ATMOS 2019 Conference E-proceedings* (e-ISBN: 978-975-561-482-3), 571-579.
2. Saxena, P., & **Shukla, A.** (2019). Impact of Particulate Matter on Lung Functions at residential locations of Delhi, India, CIAAS, IIT, Delhi.
3. **Shukla, A.** (2018, April). Environmental Consideration in Road Transportation for Smart Cities", International Conference on "Smart Cities with Focus on Environmental Challenges, ABES Engineering College, Ghaziabad.
4. Choudhary, A., Kumar, P., Gaur, M., **Shukla, A.**, & Singh, A.K. (2018). Year-Long Trends and Variability of Atmospheric Aerosols: at Local Scale for Mega-city New Delhi, AGU 2018, USA.
5. Choudhary, A., Kumar, P., Gaur, M., & **Shukla, A.**, (2018) Trends and seasonal variability of PM₁₀, PM_{2.5} and black carbon in megacity Delhi: impacts on radiative forcing, COSPAR 2018, USA.
6. Choudhary, A., Kumar, P., & **Shukla, A.** (2018, October). Estimate the influence of aerosols optical properties its radiative effects and seasonal variability in megacity Delhi, India, SPARC General Assembly, Kyoto, Japan.
7. Choudhary, A., Kumar, P., & **Shukla, A.** (2018, November). Climate change and air pollution: A hidden threat to the agricultural crops, Indo-US bilateral workshop on water-food-energy-climate nexus: A perspective towards a sustainable future, IESD-BHU, Varanasi.
8. Choudhary, A., Kumar, P., **Shukla, A.**, & Singh, A.K. (2018). Atmospheric aerosols variation and its correlation with meteorological and optical parameters, TROPMET-2018, BHU, Varanasi.
9. Choudhary, A., Kumar, P., **Shukla, A.**, & Singh, A.K., Tiwari, S. (2018). Urban emissions load from passenger transportation to the atmosphere, IASTA-2018, IIT Delhi, New Delhi.
10. Choudhary, A., Kumar, P., Gaur, M., **Shukla, A.** (2017, November). CO₂ emissions from in-use vehicles and opportunities for urban transport carbon mitigation, Workshop and Science-Policy Dialogue on Air Pollution, Climate, and Health in South Asia and the Hindu Kush Himalaya, ICIMOD and the Government of Nepal's Ministry of Population and Environment.
11. Thoyyeti, S.T., Sewaram, **Shukla, A.** (2017, November). Environment Consideration in Assessing level of Service of Signalized Intersections. The 10th Urban Mobility India (UMI) International Convention Centre (HICC) in collaboration with CODATU, holding its joint XVIIth Conference, and Government of Telangana, Hyderabad.
12. Gaur M., Singh R. and Shukla A. (2016, August). VOCs Concentration in an Area with Heterogeneous Traffic: A Pilot Study. International Conference on "Trends and Recent Advances in Civil Engineering", Amity University, Noida.
13. Gaur, M., Rao, M., Singhal, G.D., and **Shukla, A.** (2016, March). Impact of urban air quality on workers in the vicinity of construction site in Greater Noida. National Conference on Advances in Sciences and Technology, Punjab.
14. Gaur, M. and **Shukla, A.** (2016, March). Solid Waste Management: A Pilot Study to Create Awareness in a Rural Village of Uttar Pradesh, India. National Conference on Environmental Concerns of 21st Century: Indian and Global Context, Delhi.
15. Pant, P., **Shukla, A.**, Goel, A., Kohl, S. D., Chow, J. C., Watson J.D., and Harrison, R.M. (2015, September). Source Estimation for PM_{2.5} at a Pollution Hot Spot in New Delhi, India European Aerosol Conference (EAC 2015) City of Milan, Italian Republic.

16. Swaroopa, S., Behl, A., Jain, P.K., **Shukla, A.** (2015, December). Estimation of Carbon footprints as Bituminous Road Construction Process 76th IRC Annual Session at Indore.
17. Pant, P., Baker, S. J., **Shukla, A.**, Kohl, S.D., Watson, J. D., Chow, J.C., and Harrison, R. M. (2014, November). Chemical characterization of particulate matter in New Delhi, India. In: Better Air Quality (BAQ) conference, Colombo, Sri Lanka.
18. Pant, P., Baker, S.J., **Shukla, A.**, and Harrison, R. M. (2014, June). Road dust source profiles for India and UK. In: Urban Environmental Pollution Climate Change and Urban Environment (UEP 2014), Sheraton Centre, Toronto, Canada.
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(A letter of appreciation was sent by Dr. P.R. Garekhan, Member Secretary, and Central Board for the Prevention and Control of Water Pollution, Govt. of India)
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4. **Shukla, A.** (2014). Road Traffic and Air pollution in Delhi In Rumi Aijaz (Ed.), *Transportation Sector in India and EU: Problems, Prospects and Opportunities for Development* (pp. 87-102). New Delhi, Delhi: Academic Foundation in association with Observer Research Foundation.
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Articles in Science Magazine

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2. Article in Indian Science News, कार्यालयों के भीतर पड़ रही है वायु प्रदूषण की मार, वास्को गामा-द- (गोवा) बुधवार, नवंबर 14, 2018 Indian Science News, इंडिया साइंस वायर. <http://vigyanprasar.gov.in/isw/air-pollution-hit-within-offices-hindi-story.html>

3. Singh, R., **Shukla, A.**, Chaudhary, N. (2017, December) इंजीनियरी अनुप्रयोगों के लिए नैनो तकनीक की संभावनाएं, सड़क दर्पण अंक 15, पृष्ठ 33-42
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5. Chauhan, S. K., Singh, V., **Shukla, A.** (2014), Determination of trace metals in the road runoff of Delhi. *ISH News, The India Society for Hydraulics*, 23 (1), 1- 4, ISSN: 0971-5002.
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KEYNOTE/INVITED LECTURES DELIVERED

1. Scientific expert panellist and speaker at e - Conference on Environmental Determinants of Infectious Diseases in India (Focus COVID-19) on Indoor Air Pollution & its impact on COVID 19, Organized by NIH-National Institute of Environmental Health Sciences USA and International Institute of Health Management Research, India December 7th – 10th, 2020
2. Swachh Bharat Abhiyan Initiatives at Amity University on 02-10-2020
3. Invited speaker on "Air Pollution due to Road Traffic and its Health Impacts" at the Webinar Series Organized by The Kerala Highway Research Institute (KHRI) in association with IIT Madras on 05-09-2020.
4. TRG Webinar Series: Transportation Research Group of India (TRG), TCT-E01: Environment (including energy) and sustainability in transportation on Thursday, 4th June 2020 at 3:30 pm IST.
5. Invited speaker and expert panelist under the Green Fulbright Forum webinar on Environment and COVID-19: Exploring bidirectional linkages organized by Fulbright India Commission on Friday, June 5, 2020 6:00 PM - 7:00 PM IST
6. International Expert Group Meeting on Space-derived Data for Air Pollution Monitoring, 7 August 2020, 9:00-12:30 hrs. (UTC+7, Bangkok time), Virtual meeting on MS Teams, organized by United Nations Economic and Social Commission for Asia and the Pacific UNESCAP
7. Workshop on "Addressing Transport and Air Quality in India: Towards a Healthier Future" co-sponsored by Johns Hopkins Alliance for a Healthier World, Initiative for Sustainable Energy Policy, and the, IIHMR Delhi, on 14th January, 2020 International Institute of Health Management and Research (IIHMR), Dwarka, New Delhi

8. Session Chair on Emissions of Air Pollutants from the Transport Sector of the conference on "Opportunities with Biofuel - Co-benefits of Air Quality" "Opportunities with Biofuel - Co-benefits of Air Quality" at the Magnolia Hall of the India Habitat Center, New Delhi, India on 3rd December, 2019 (Tuesday) under the Indo-Finnish bilateral program with TERI.
9. Stakeholder Consultation Workshop for Scoping Study for Air Pollution in India' on 15th January 2019 at TERI office, India Habitat Centre, Lodhi Road, New Delhi
10. Chief Guest and Keynote Speaker at TEQIP Twinning Workshop on "Structural Design and Project Management" from March 13-14, 2019 at J C Bose University of Sc & Technology, **University Auditorium** of Sector-6, Faridabad-121006
11. Workshop on "Tackling the Challenges of Urban Air Pollution – Linking Research and Policy for Air Quality Improvement" jointly organized by University of Birmingham and partners including Indian Institute of Technology Delhi, All India Disaster Mitigation Institute, Population Council India and Urban Management Centre organized a global workshop on air pollution held at the India Habitat Centre, Lodhi Road, New Delhi from 6-7 March 2019.
12. Workshop on "Green and Resilient Roads/Highways Infrastructure". May 22, 2018, Venue: The World Bank Office, Hindustan Times House, 11th Floor, 18-20, Kasturba Gandhi Marg, Connaught Place, New Delhi – 110001
13. Workshop on "Environmental Protection and Safety during Construction" on 13th – 14th July 2018 at Main Auditorium, India International Centre, Max Mueller Marg, New Delhi, organized by Indian Roads Federation India Chapter.
14. Dust and air pollution in the NCR on 16 July 2018 at the Centre for Policy Research, New Delhi.
15. U.S. Embassy Workshop on Confronting Air Pollution at its Source: Vehicular Movement Workshop on March 18 and 19th 2019 at American Centre. New Delhi
16. Invited Talk on "Air Pollution due to Vehicular Road Traffic in Delhi on 6th Sept. 2017 at Hindu College, University of Delhi.
17. Surrey-TERI University International Workshop on Emerging Socio-economic and Environmental Challenges in Developing Countries on 10th March 2017.
18. Indo-US workshop to explore bilateral research opportunities to address air quality and health issues, USIEF Halley Road, 11th November 2016
19. National convention on "Innovations in Green Highways" Madhyanchal Bhawan, New Delhi, 7th -9th November 2016
20. Mentor and Keynote Speaker at Newton Researcher Links workshop titled "Urban air Pollution in Indian and UK cities: Characterization and Prediction of Chemically Reactive Air Pollutants" at IIT, Delhi, from 28th Nov-1st December 2016.
21. Expert talk on Climate Change and Co-Benefits of Road Transport Policies at the training workshop Understanding Climate and Health Associations in India held in New Delhi from 22nd to the 24th of September 2016.
22. Conference on "Need of Environmentally Sustainable Urban Transport System in India" held on 2nd March 2016 at PHD House, New Delhi.
23. National Conference on Challenges and Issues faced by the Working Women Engineers of India at Stein Auditorium, India Habitat Center on 8th March 2015.
24. Ecologically Sustainable Road Development in National Seminar on Sustainable Development with Ecological Balance 15th September 2013 organized by The Institution of Civil Engineers (India), SCOPE Complex, New Delhi.
25. Chaired a session on 'Solar Energy Issues & Challenges' in a National Seminar on Challenges & Issues in Renewable Energy during March 15, 2012 at Power Management Institute, NTPC
26. Integrating Research, Technology and Innovation to Meet the Challenges of the Roads and Transportation Sector: An Approach in the International Conclave on "Innovation and Entrepreneurship in 21st Century Higher Educational Institutes" held on November 09 - 10, 2013 at IIT Roorkee.

27. "On being a woman and a scientist "at Lecture Series BEACON organized by Women in Science & Engineering (WISE) on 27th July 2015 at India International Centre IIC, Delhi.
28. Distinguished Speaker at the Workshop on Transportation Practices in India and the European Union organized by Observer Research Foundation (ORF) and the Rosa Luxemburg Stiftung (RLS) on 2 Feb. 2012, New Delhi.
29. 2nd Annual ITS India Conference on Planning and Designing the Functional Aspects of ITS with a Green Mindset, New Delhi, India 27 – 28 February 2012.
30. 14th Annual International Conference **India Geospatial Forum on Role of Geospatial Technologies in Sustainable Road Transportation, 7 - 9 February 2012 at Epicenter, Gurgaon, India**
31. IRF Policy Statement on Environment on Environmental Safeguards for Future 24th January 2011 Main Auditorium, India International Centre, New Delhi
32. National Workshop on Life Cycle Assessment for Construction Industry on Concrete vis-à-vis Asphalt Road organized by National Council for Cement and Building Materials (NCB) on 20th September 2011 at India International Centre, New Delhi.
33. IRF Sub-Committee on Environment Sustainable Road Transport Scenario for the Indian Situation, Tuesday 4th October, 2011 Meeting Room, Hall 8 Pragati Maidan New Delhi
34. Planning and Management of Environmentally Sustainable Roads and Highways, at Road Planning Designing and construction Summit India held at Le Meridian Delhi 13 & 14 December 2010
35. Contribution of Vehicles to Overall Air pollution at the Symposium on "DIESEL IS CLEAN" sponsored by Society of Indian Automobile Manufacturers (SIAM), New Delhi (Feb. 7th, 2007)
36. Factors Contributing to Air Quality Improvements in Delhi at National Workshop on Auto Fuel Policy – Way Forward organized by the Petroleum Federation of India at New Delhi (Nov. 20th, 2006)

USA

1. Invited Lecture on *Status of Road Transportation and Air Pollution in Delhi*. Virginia Tech Transportation Institute US, 16th October, 2009 (under OLF travel award)
2. Invited Lecture on *Climate Change and Transportation: US and Indian Perspectives*, CVEN 681-Seminars in Transportation Engineering. Texas A & M University, US. November 18th, 2009
3. Invited Lecture on *Air Quality Issues in Delhi, India*. Department of Environmental Engineering, Mercer University, Atlanta Georgia, US. December 4th, 2009
4. Invited speaker at 'Real World On Road Emissions of In-Use Vehicles running on Diesel, Gasoline and CNG' Presented in 18th CRC On-Road Vehicle Emissions Workshop, San Diego, California March 31-April 2, 2008, sponsored by US Environmental Protection Agency (US EPA), and California Air Resources Board.
5. Invited speaker at *PEMS Measurement & Monitoring in India*. PEMS Testing, Sensors' 6th Annual 2009 SEMTECH User Network (SUN) Conference, September 24 - 25th 2009, Ann Arbor, MI, USA.