

# CURRICULUM VITAE

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Dr. Chandrakala Bharali

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## Research Interests

Regional Aerosol characterization, aerosol studies using field experiments, satellite data and modeling; characterization and modeling of trace gases with major focus on tropospheric ozone.

## Academic Qualifications

- Ph.D. from Dibrugarh University, Dibrugarh, Assam
- M.Sc. Physics from Dibrugarh University, Dibrugarh

## Professional Background

- Jan. 2017 - Present : DST SERB Post-Doctoral fellow , Space Physics Laboratory, VSSC
- Jan. 2012 - Aug. 2016 : Research Fellow, Dibrugarh University, Dibrugarh, Assam

## Fellowships/Awards

- ➔ DST SERB NPDF award (2017-2019)
- ➔ SRF under ISRO-ATCTM Project (2014-2016)
- ➔ JRF under ISRO-ATCTM Project (2012-2014)
- ➔ Student fellow under ISRO-SSPS program during M.Sc. (2010-2011)
- ➔ Merit Scholarship from Oil India Limited, Duliajan, Assam (2004)

## Research Experience

Pursued doctoral work on the characterization and modeling of trace gases with major focus on tropospheric ozone. Being a part of the national projects of ISRO (e.g., ARFI, ATCTM) during my research tenure, I had the opportunity of handling and developing technical skills by operating various scientific instruments for trace gas as well as aerosol monitoring and data analysis. In addition, I have also carried out preliminary simulation of trace gases/ BC over North East Indian region using WRF-Chem model.

### ➔ Atmospheric chemistry

- i. Observational study: Trace gases ( $O_3$ ,  $NO_x$ , CO,  $SO_2$ ), Aerosols (AOD, BC, PM) and meteorology
- ii. Model simulations: Simulation of trace gases with WRF-Chem Model.

### ➔ Technical expertise

- i. Trace gas analysis: experienced in handling teledyne analysers for surface  $O_3$ ,  $NO_x$ , CO,  $SO_2$  and M-NMHC.
- ii. Trace gas instrumentations: Monitoring of  $O_3$ ,  $NO_x$ , CO,  $SO_2$

- iii. Aerosol instrumentations: Operation and data analysis of aethalometer, Quartz crystal Microbalance Impactor, Microtops, Multi-wavelength solar radiometer and Integrated Nephelometer.
- iv. Meteorological study: Surface measurements of Temperature, Winds, Humidity, Atmospheric Pressure from Mini Boundary Layer Mast (MBLM) and Automated Weather Station (AWS).

#### ◆ Computational Skills

- Operating Systems: Windows, Linux
- Programming Languages: Fortran, Matlab
- Models: WRF/ WRF-Chem

#### Major Research Outcomes

- Surface O<sub>3</sub> at Dibrugarh shows pre-monsoonal peak which is attributed to enhanced photochemical production in presence of high solar insolation and enhanced precursor level from biomass burning during this season. Transportation is another major contributor.
- O<sub>3</sub> formation over this site comes under NO<sub>x</sub>-saturated (VOC-sensitive) regime.
- Lightning is found to be another important contributor to O<sub>3</sub> production both directly and indirectly. Lightning produced NO<sub>x</sub> contributes ~ 33% of the lightning induced O<sub>3</sub>. Lightning intensity determines O<sub>3</sub> production.
- Fireworks during Diwali is found to significantly affect the level of O<sub>3</sub>, NO<sub>x</sub>, SO<sub>2</sub>, CO and BC.

#### Workshop Attended

- ◆ Participated in the SERC School on "*Dynamics and Forecasting of Indian Summer Monsoon*" held at CAS, IIT Delhi from 27th June to 20th July, 2011.
- ◆ Participated in "*A 6-Days workshop on Matlab and its Application*" held at Guwahati University, 22-27 February, 2014.
- ◆ Participated in a "*Three day School on Foundation of Plasma Physics and Technology for Young Researchers of North-East India*" held at Department of Physics, Dibrugarh University, from 30 October-1st November, 2009.
- ◆ Participated in "*Capacity building workshop on climate modeling*" held in Centre for Atmospheric Studies, Dibrugarh University, 29<sup>th</sup> December- 3<sup>rd</sup> January, 2015.
- ◆ Participated in the national workshop on "*RF, Microwave Instrumentation for Atmospheric Research*" held in Department of Physics, Dibrugarh University, in collaboration with SAMEER, Mumbai, 9<sup>th</sup> -10<sup>th</sup> April, 2015.

#### Online Courses

- ◆ Regional Climate Modeling using WRF (Weather Research and Forecasting Model), May 9, 2014 ; conducted by M2LAB.ORG SCIENCE EDUCATION ([www.m2lab.org](http://www.m2lab.org))
- ◆ Hour of Code- an introduction to R , December 14, 2015; conducted by M2LAB.ORG SCIENCE EDUCATION ([www.m2lab.org](http://www.m2lab.org))

#### Presentations

- ◆ **Measurement and modeling of boundary layer Ozone at Dibrugarh, Assam science Society Technical session**, Guwahati University, Assam, March 16, 2012.
- ◆ **Temporal characteristics of Black Carbon and trace gases over Dibrugarh, North-East India**; poster presented in *Indian Aerosol Science and Technology Association (IASTA)*, held in Mumbai, 11-13 December, 2012.
- ◆ **Characteristics of ozone and precursor gases measured at a location in North East India**, poster presented in *Atmospheric composition and the Asian Summer Monsoon (ACAM)*, held in Kathmandu, Nepal, June 9-12, 2013.

- **Climatology of surface O<sub>3</sub> at a wet tropical location in North East India: Assessing the role of precursors and meteorology;** poster presented in *18th National Space Science Symposium(NSSS)*, held in Dibrugarh, India, January 29<sup>th</sup> -1<sup>st</sup> Feb 2014
- **Effect of meteorology on the growth and decay of Surface ozone;** poster presented in *18th National Space Science Symposium (NSSS)*, held in Dibrugarh, India, January 29<sup>th</sup> -1<sup>st</sup> Feb 2014.
- **Incidence of high ozone during spring nighttime at Dibrugarh and its association with lightning,** oral presented at *Second Annual Regional Atmospheric Science (SARAS) Workshop*, 7-9 June 2014, Pokhara, Nepal.

### List of Publications

1. **Bharali, C.**, Pathak, B., Bhuyan, P.K. (2015) *Spring and summer night-time high ozone episodes in the upper Brahmaputra valley of North East India and their association with lightning*, Atmospheric Environment 109 (2015) 234-250.
2. Bhuyan, P. K., **Bharali, C.**, Pathak,B., Kalita, G. (2014) *The role of precursor gases and meteorology on temporal evolution of O<sub>3</sub> at a tropical location in North East India*. Environmental Science and Pollution Research Volume 21, Issue 10, pp 6696-6713.
3. Pathak, B., **Bharali, C.**, Biswas, J., Bhuyan, P. K. (2013) *Firework Induced Large Increase in Trace Gas and Black Carbon at Dibrugarh, India*. Journal of earth science and Engineering, 3 (2013) 540-544
4. Pathak, B., Chutia, L., **Bharali, C.**, Bhuyan, P. K. (2015) *Continental export efficiencies and delineation of sources for gases and Black Carbon in North-East India: Seasonal variability*. Atmospheric Environment, Volume 125, Part B, January 2016, Pages 474–485.
5. Pathak, B., Biswas,J., **Bharali,C.**, Bhuyan P. K. (2014) *Short term introduction of pollutants into the atmosphere at a location in the Brahmaputra Basin: A case study*, Atmospheric Pollution Research 09/2014.
6. Pathak, B., Subba, T., Dahutia, P., Bhuyan, P. K., Moorthy, K. K., Gogoi, M.M., Babu, S. S., Chutia, L., Ajay P., Biswas, J., **Bharali,C.**, Borgohain, A., Dhar, P., Guha, A., De, B. K., Banik, T., Chakraborty, M., Kundu, S. S., Singh, S. B., Sudhakar, S., (2015) *Aerosol characteristics in North-East India using ARFINET spectral optical depth measurements*. Atmospheric Environment, Volume 125, Part B, January 2016, Pages 461-473.
7. **Bharali. C**, Pathak,B., Kalita, G. Bhuyan, P. K. (2012), *Temporal characteristics of particulates, black carbon and trace gases over Dibrugarh, north-east India*, Indian Science and Technology Association on Aerosols & Clouds: Climate Change Perspectives, ISSN NO-0971-4510, Vol 20, pp-117.