

Education

Ph.D., Mechanical Engineering, Carnegie Mellon University, Pittsburgh, PA, 2004. Doctoral Thesis: “Sampling, Analysis and Source-Apportionment of Ambient Carbonaceous Aerosols.”

M. Tech., Energy Systems Engineering, Indian Institute of Technology–Bombay, Mumbai, India, 1999. Master’s Dissertation: “Simulation of a Hybrid Electric Vehicle.”

B.E., Automobile Eng., University of Mumbai (formerly Bombay), Mumbai, India, 1996.

Research Experience

Feb 2013 to date. Carnegie Mellon University, Pittsburgh, PA

Nov 2017 to date. Kigali Collaborative Research Center, Kigali, Rwanda

Research Scientist

- Proposal development, leading teams, mentoring students and postdoctoral researchers
- Led the development of the Real-time, Affordable, Multi-Pollutant (RAMP) sensor, a low-cost air quality monitor, in collaboration with SenSevere LLC. Over 50 RAMPs have been deployed in Pennsylvania, Puerto Rico, and Africa (Rwanda, Malawi, Kenya)
- Studies of aerosol optical properties and black carbon (BC) through field experiments (SOAS, SOAS-2) and lab studies (SAAS-PNNL, SAAS-CMU)
- Measured methane and associated air pollutant emissions from the US natural gas sector

Jan 2012 to Jan 2013. RTI International, Research Triangle Park, NC

Research Environmental Scientist

- Proposal development
- Set up a new Atmospheric Chemistry Lab, including acquisition of aerosol characterization instrumentation and a new Linux computing cluster for regional air quality modeling

Jan 2007 to Dec 2011. Droplet Measurement Technologies (DMT), Boulder, CO

Research Scientist (2009 to 2011); Postdoctoral Research Scientist (2007 to 2009).

- Studied BC aging during atmospheric transport and aerosol-cloud interactions using the DMT single particle soot photometer (SP2) in various field campaigns (MILAGRO, CARES, ICE-L, ICE-T, PacDEX)
- Proposal development, sales and customer service, development of data analysis tools.

Nov 2004 to Dec 2006. University of Illinois at Urbana–Champaign, Urbana, IL

Postdoctoral Research Associate. Characterized diesel vehicle emissions in Thailand, and particulate emissions from biomass combustion. Studied morphology of organic aerosol collected on filter samples for subsequent optical and thermal analysis.

July 2000 to Sept 2004. Carnegie Mellon University, Pittsburgh, PA

Graduate Research Assistant. Source-receptor modeling of ambient organic aerosol. Instrument response of carbonaceous aerosol under different analytical protocols. Evaluation of sampling artifacts associated with organic aerosol measurement.

4/1999 to 10/1999. Department of Mechanical Engineering, IIT-Bombay, Project Engineer.

7/1996 to 7/1997. Mahindra & Mahindra Ltd, Nashik, India. Trainee Engineer.

Teaching Experience

Spring 2004 Department of Mechanical Engineering, Carnegie Mellon University
Graduate Teaching Assistant. Evaluation of CyclePad, an intelligent tutor for thermodynamics.

Fall 2003 Department of Mechanical Engineering, Carnegie Mellon University
Graduate Teaching Assistant. Thermodynamics: Grading, laboratory instruction, teaching.

Aug 1997–Jan 1999 Department of Mechanical Engineering, IIT-Bombay
Teaching Assistant. Thermodynamics and heat transfer: Setting & grading tests, lab instruction.

Current Grants as Principal Investigator (PI) or Co-PI

- **PI**, “Democratization of Measurement and Modeling Tools for Community Action on Air Quality, and Improved Spatial Resolution of Air Pollutant Concentrations.” US Environmental Protection Agency, \$749,945 (2016-2019)
- **Co-PI**, “Expanding the RAMP network in Southwestern PA: New sources, data gaps, and community group support.” Heinz Endowments, \$250,000 (2018-2019)
- **Co-PI**, “Aerosol Optical Properties and Biogenic SOA: Effect on Hygroscopic Properties and Light Absorption.” US EPA, \$398,318 (CMU total \$141,000; 2012-2017; Lead PI: Andrey Khlystov, Desert Research Institute, Nevada)

Past Funding

- **Lead PI**, “Collaborative Research: Aging of Black Carbon During Atmospheric Transport: Understanding Results From the DOE's 2010 CARES and 2012 ClearLo Campaigns.” US Department of Energy-ASR. \$397,000 (CMU total \$227,000; 2012-2016)
- **Co-PI**, “Measurement of Methane Emissions and Leakage from Natural Gas Extraction and Processing Facilities in Appalachia, the Rockies, and the Gulf Coast.” NOAA. \$600,000 (2014-2017; Lead PI: Allen Robinson)
- **Co-PI**, “Measurements and modeling to quantify emissions of methane and VOCs from shale gas operations.” DOE-NETL. \$1,001,990 (2013-2016; Lead PI: Albert Presto)
- **Co-PI**, “ICE-T: In-cloud BC and dust over the Caribbean Sea.” NSF (2011-2013). \$204k
- “Development of a real-time, low-cost sensor package for distributed measurement of ambient air quality.” Heinz Endowments, \$15,000 (2016)
- “Measurement of BC from Associated Natural Gas Flaring.” CATF (2014). \$15,000
- “Measurement of BC in and downwind of Sacramento, CA during CARES.” US DOE-ARM (2010-2011). \$56,000
- “Measurement of Black Carbon emissions from Combustion Sources using a Single Particle Soot Photometer (SP2) and a Photoacoustic Soot Spectrometer (PASS-3).” US Environmental Protection Agency, (2009-2010). \$44,969

Refereed Publications

1. **Subramanian, R.**, A. Ellis, E. Torres-Delgado, C. Malings, R. Tanzer, F. Rivera, M. Morales, D. Baumgardner, A. Presto, O.L. Mayol-Bracero (2017). “Impact of ULSD waiver on air quality in Puerto Rico in the aftermath of Hurricane Maria: A case study on the use of lower-cost air quality monitors.” *Submitted* to Plos Currents: Disasters.
2. Gyawali, M., W.P. Arnott, R.A. Zaveri, C. Song, B. Flowers, M.K. Dubey, A. Setyan, Q. Zhang, S. China, C. Mazzoleni, K. Gorkowski, **R. Subramanian**, H. Moosmüller (2017). “Evolution of Multispectral Aerosol Absorption Properties in a Biogenically-Influenced Urban Environment during the CARES Campaign.” *Atmosphere*, 8(11), <http://dx.doi.org/10.3390/atmos8110217>
3. Zimmerman, N., A.A. Presto, S.P.N. Kumar, J. Gu, A. Hauryliuk, E.S. Robinson, A.L. Robinson, and **R. Subramanian** (2017). “A machine learning calibration model using random forests to improve sensor performance for lower-cost air quality monitoring.” *Atmospheric Measurement Techniques*, <https://doi.org/10.5194/amt-11-291-2018>
4. Tasoglou, A., G. Saliba, **R. Subramanian**, and S.N. Pandis (2017). “Absorption of chemically aged biomass burning carbonaceous aerosol.” *Journal of Aerosol Science*, **113**: 141-152, <https://doi.org/10.1016/j.jaerosci.2017.07.011>
5. Ahern, A.T., **R. Subramanian**, G. Saliba, E.M. Lipsky, N.M. Donahue, R.C. Sullivan (2016). “Effect of Secondary Organic Aerosol Coating Thickness on the Real-Time Detection and Characterization of Biomass Burning Soot by Two Particle Mass Spectrometers.” *Atmospheric Measurement Techniques*, 9(12): 6117–6137.
6. Ellis, A.; R. Edwards, M. Saunders, R. K. Chakrabarty, **R. Subramanian**, N. E. Timms, van Riessen, A. M. Smith, D. Lambrinidis, L. J. Nunes, P. Vallelonga, I. D. Goodwin, A. D. Moy, M. A. J. Curran, and T. D. van Ommen (2016). “Individual particle morphology, coatings, and impurities of black carbon aerosols in Antarctic ice and tropical rainfall.” *Geophysical Research Letters*, doi: 10.1002/2016GL071042
7. Saliba, G., **R. Subramanian**, R. Saleh, A.T. Ahern, E.M. Lipsky, A. Tasoglou, R.C. Sullivan, J. Bhandari, C. Mazzoleni, and A.L. Robinson (2016). “Optical Properties of Black Carbon in Cook Stove Emissions Coated with Secondary Organic Aerosols: Measurements and Modeling.” *Aerosol Science & Technology*, 50(11): 1264-1276.
8. Omara, M., M. R. Sullivan, X. Li, **R. Subramanian**, A. L. Robinson and A. A. Presto (2016). “Methane Emissions from Conventional and Unconventional Natural Gas Production Sites in the Marcellus Shale Basin.” *Environmental Science & Technology*, 50(4): 2099-2107
9. Weyant, C.L., P. B. Shepson, **R. Subramanian**, M. O. L. Cambaliza, A. Heimbürger, D. McCabe, E. Baum, B. H. Stirm and T. C. Bond (2016). “Black Carbon Emissions from Associated Natural Gas Flaring.” *Environmental Science & Technology*, 50(4): 2075-2081
10. Marchese, A.J., T.L. Vaughn, D.J. Zimmerle, D.M. Martinez, L.L. Williams, A.L. Robinson, Mitchell, A.L., **R. Subramanian**, D.S. Tkacik, J.R. Roscioli, and S.C. Herndon (2015). “Methane emissions from United States natural gas gathering and processing.” *Environmental Science & Technology*, 49(17): 10718-10727. doi: 10.1021/acs.est.5b02275
11. Zimmerle, D.J., L.L. Williams, T.L. Vaughn, C. Quinn, **R. Subramanian**, G.P. Duggan, B. Wilson, J.D. Opsomer, A.J. Marchese, D.M. Martinez, and A.L. Robinson (2015). “Methane emissions from the natural gas transmission and storage system in the United States.” *Environmental Science & Technology*. 49(15): 9374-9383. doi:

- 10.1021/acs.est.5b01669
12. **Subramanian, R.**, L.L. Williams, T.L. Vaughn, D.J. Zimmerle, J.R. Roscioli, S.C. Herndon, T.I. Yacovitch, C. Floerchinger, D.S. Tkacik, A.L. Mitchell, M.R. Sullivan, T.R. Dallmann, and A.L. Robinson (2015.) "Methane Emissions from Natural Gas Compressor Stations in the Transmission and Storage Sector: Measurements and Comparisons with the EPA Greenhouse Gas Reporting Program Protocol." Environmental Science & Technology, 49 (5), pp 3252–3261. DOI: 10.1021/es5060258.
 13. Roscioli, J.R., T.I. Yacovitch, C. Floerchinger, A.L. Mitchell, D.S. Tkacik, **R. Subramanian**, D.M. Martinez, T.L. Vaughn, L.L. Williams, D.J. Zimmerle, A.L. Robinson, S.C. Herndon, and A.J. Marchese (2015.) "Measurements of methane emissions from natural gas gathering facilities and processing plants: measurement methods." Atmospheric Measurement Techniques, **8**, pp 2017-2035, DOI:10.5194/amt-8-2017-2015.
 14. Mitchell, A.L., D.S. Tkacik, J.R. Roscioli, S.C. Herndon, T.I. Yacovitch, D.M. Martinez, T.L. Vaughn, L.L. Williams, M.R. Sullivan, C. Floerchinger, M. Omara, A.L. Robinson, **R. Subramanian**, D.J. Zimmerle, A.J. Marchese, and A.L. Robinson (2015.) "Measurements of Methane Emissions from Natural Gas Gathering Facilities and Processing Plants: Measurement Results." Environmental Science & Technology, 49 (5), pp 3219–3227. DOI: 10.1021/es5052809.
 15. Ellis, A.; R. Edwards, M. Saunders, R. K. Chakrabarty, **R. Subramanian**, A. van Riessen, A. M. Smith, D. Lambrinidis, L. J. Nunes, P. Vallelonga, I. D. Goodwin, A. D. Moy, M. A. J. Curran, and T. D. van Ommen (2015). "Characterizing black carbon in rain and ice cores using coupled tangential flow filtration and transmission electron microscopy." Atmospheric Measurement Techniques, 8(9): 3959-3969, doi:10.5194/amt-8-3959-2015
 16. Takahama, S., L.M. Russell, C.A. Shores, L.C. Marr, J. Zheng, M. Levy, R. Zhang, E. Castillo, J.G. Rodriguez-Ventura, P.J.E. Quintana, **R. Subramanian**, M. Zavala, and L.T. Molina (2014.) "Diesel vehicle and urban burning contributions to black carbon concentrations and size distributions in Tijuana, Mexico, during the Cal-Mex 2010 campaign." Atmospheric Environment, 88:341-352, doi:10.1016/j.atmosenv.2013.09.057
 17. Torres, A., T.C. Bond, C.M.B. Lehmann, **R. Subramanian**, and O.L. Hadley (2014.) "Measuring Organic Carbon and Black Carbon in Rainwater: Evaluation of Methods." Aerosol Science and Technology, 48:3, 239-250, DOI: 10.1080/02786826.2013.868596
 18. Phillips, V. T. J., P. J. Demott, C. Andronache, K. A. Pratt, K. A. Prather, **R. Subramanian** and C. Twohy (2013). "Improvements to an Empirical Parameterization of Heterogeneous Ice Nucleation and Its Comparison with Observations." Journal of the Atmospheric Sciences, 70(2): 378-409
 19. Baumgardner, D., O. Popovicheva, J. Allan, V. Bernardoni, J. Cao, F. Cavalli, J. Cozic, E. Diapouli, K. Eleftheriadis, P. J. Genberg, C. Gonzalez, M. Gysel, A. John, T. W. Kirchstetter, T. A. J. Kuhlbusch, M. Laborde, D. Lack, T. Mueller, R. Niessner, A. Petzold, A. Piazzalunga, J. P. Putaud, J. Schwarz, P. Sheridan, **R. Subramanian**, E. Swietlicki, G. Valli, R. Vecchi and M. Viana (2012). "Soot reference materials for instrument calibration and intercomparisons: a workshop summary with recommendations." Atmospheric Measurement Techniques **5**(8): 1869-1887.

20. Cappa, C. D., T. B. Onasch, P. Massoli, D. R. Worsnop, T. S. Bates, E. S. Cross, P. Davidovits, J. Hakala, K. L. Hayden, B. T. Jobson, K. R. Kolesar, D. A. Lack, B. M. Lerner, S.-M. Li, D. Mellon, I. Nuaaman, J. S. Olfert, T. Petaja, P. K. Quinn, C. Song, **R. Subramanian**, E. J. Williams and R. A. Zaveri (2012). "Radiative Absorption Enhancements Due to the Mixing State of Atmospheric Black Carbon." *Science* **337**(6098): 1078-1081.
21. Setyan, A., Q. Zhang, M. Merkel, W. B. Knighton, Y. Sun, C. Song, J. E. Shilling, T. B. Onasch, S. C. Herndon, D. R. Worsnop, J. D. Fast, R. A. Zaveri, L. K. Berg, A. Wiedensohler, B. A. Flowers, M. K. Dubey and **R. Subramanian** (2012). "Characterization of submicron particles influenced by mixed biogenic and anthropogenic emissions using high-resolution aerosol mass spectrometry: results from CARES." *Atmospheric Chemistry and Physics* **12**(17): 8131-8156.
22. Zaveri, R. A., W. J. Shaw, D. J. Cziczo, B. Schmid, R. A. Ferrare, M. L. Alexander, M. Alexandrov, R. J. Alvarez, W. P. Arnott, D. B. Atkinson, S. Baidar, R. M. Banta, J. C. Barnard, J. Beranek, L. K. Berg, F. Brechtel, W. A. Brewer, J. F. Cahill, B. Cairns, C. D. Cappa, D. Chand, S. China, J. M. Comstock, M. K. Dubey, R. C. Easter, M. H. Erickson, J. D. Fast, C. Floerchinger, B. A. Flowers, E. Fortner, J. S. Gaffney, M. K. Gilles, K. Gorkowski, W. I. Gustafson, M. Gyawali, J. Hair, R. M. Hardesty, J. W. Harworth, S. Herndon, N. Hiranuma, C. Hostetler, J. M. Hubbe, J. T. Jayne, H. Jeong, B. T. Jobson, E. I. Kassianov, L. I. Kleinman, C. Kluzek, B. Knighton, K. R. Kolesar, C. Kuang, A. Kubatova, A. O. Langford, A. Laskin, N. Laulainen, R. D. Marchbanks, C. Mazzoleni, F. Mei, R. C. Moffet, D. Nelson, M. D. Obland, H. Oetjen, T. B. Onasch, I. Ortega, M. Ottaviani, M. Pekour, K. A. Prather, J. G. Radney, R. R. Rogers, S. P. Sandberg, A. Sedlacek, C. J. Senff, G. Senum, A. Setyan, J. E. Shilling, M. Shrivastava, C. Song, S. R. Springston, **R. Subramanian**, K. Suski, J. Tomlinson, R. Volkamer, H. W. Wallace, J. Wang, A. M. Weickmann, D. R. Worsnop, X. Y. Yu, A. Zelenyuk and Q. Zhang (2012). "Overview of the 2010 Carbonaceous Aerosols and Radiative Effects Study (CARES)." *Atmospheric Chemistry and Physics* **12**(16): 7647-7687.
23. Gysel, M., M. Laborde, J. S. Olfert, **R. Subramanian** and A. J. Groehn (2011). "Effective density of Aquadag and fullerene soot black carbon reference materials used for SP2 calibration." *Atmospheric Measurement Techniques* **4**(12): 2851-2858.
24. Maimone, F., B. J. Turpin, P. Solomon, Q. Meng, A. L. Robinson, **R. Subramanian** and A. Polidori (2011). "Correction Methods for Organic Carbon Artifacts When Using Quartz-Fiber Filters in Large Particulate Matter Monitoring Networks: The Regression Method and Other Options." *Journal of the Air & Waste Management Association* **61**(6): 696-710.
25. Popovicheva, O., D. Baumgardner, **R. Subramanian**, G. Kok, R. Cary, E. Vlasenko, T. Khokhlova, N. Shonija and E. Kireeva (2011). "Tailored graphitized soot as reference material for EC/OC measurement validation." *Atmospheric Measurement Techniques* **4**(5): 923-932.
26. Pratt, K. A., S. M. Murphy, **R. Subramanian**, P. J. DeMott, G. L. Kok, T. Campos, D. C. Rogers, A. J. Prenni, A. J. Heymsfield, J. H. Seinfeld and K. A. Prather (2011). "Flight-based

- chemical characterization of biomass burning aerosols within two prescribed burn smoke plumes." *Atmospheric Chemistry and Physics* **11**(24): 12549-12565.
27. Cross, E. S., T. B. Onasch, A. Ahern, W. Wrobel, J. G. Slowik, J. Olfert, D. A. Lack, P. Massoli, C. D. Cappa, J. P. Schwarz, J. R. Spackman, D. W. Fahey, A. Sedlacek, A. Trimborn, J. T. Jayne, A. Freedman, L. R. Williams, N. L. Ng, C. Mazzoleni, M. Dubey, B. Brem, G. Kok, **R. Subramanian**, S. Freitag, A. Clarke, D. Thornhill, L. C. Marr, C. E. Kolb, D. R. Worsnop and P. Davidovits (2010). "Soot Particle Studies Instrument Inter-Comparison Project Overview." *Aerosol Science and Technology* **44**(8): 592-611.
 28. Oanh, N. T. K., W. Thiansathit, T. C. Bond, **R. Subramanian**, E. Winijkul and I. Pawarmart (2010). "Compositional characterization of PM_{2.5} emitted from in-use diesel vehicles." *Atmospheric Environment* **44**(1): 15-22.
 29. Pratt, K. A., A. J. Heymsfield, C. H. Twohy, S. M. Murphy, P. J. DeMott, J. G. Hudson, **R. Subramanian**, Z. Wang, J. H. Seinfeld and K. A. Prather (2010). "In Situ Chemical Characterization of Aged Biomass-Burning Aerosols Impacting Cold Wave Clouds." *Journal of the Atmospheric Sciences* **67**(8): 2451-2468.
 30. **Subramanian, R.**, G. L. Kok, D. Baumgardner, A. Clarke, Y. Shinozuka, T. L. Campos, C. G. Heizer, B. B. Stephens, B. de Foy, P. B. Voss and R. A. Zaveri (2010). "Black carbon over Mexico: the effect of atmospheric transport on mixing state, mass absorption cross-section, and BC/CO ratios." *Atmospheric Chemistry and Physics* **10**(1): 219-237.
 31. Twohy, C. H., P. J. DeMott, K. A. Pratt, **R. Subramanian**, G. L. Kok, S. M. Murphy, T. Lersch, A. J. Heymsfield, Z. Wang, K. A. Prather and J. H. Seinfeld (2010). "Relationships of Biomass-Burning Aerosols to Ice in Orographic Wave Clouds." *Journal of the Atmospheric Sciences* **67**(8): 2437-2450.
 32. Eidhammer, T., P. J. DeMott, A. J. Prenni, M. D. Petters, C. H. Twohy, D. C. Rogers, J. Stith, A. Heymsfield, Z. Wang, K. A. Pratt, K. A. Prather, S. M. Murphy, J. H. Seinfeld, **R. Subramanian** and S. M. Kreidenweis (2010). "Ice Initiation by Aerosol Particles: Measured and Predicted Ice Nuclei Concentrations versus Measured Ice Crystal Concentrations in an Orographic Wave Cloud." *Journal of the Atmospheric Sciences* **67**(8): 2417-2436.
 33. **Subramanian, R.**, E. Winijkul, T. C. Bond, W. Thiansathit, N. T. K. Oanh, I. Pawarmart and K. G. Duleep (2009). "Climate-Relevant Properties of Diesel Particulate Emissions: Results from a Piggyback Study in Bangkok, Thailand." *Environmental Science & Technology* **43**(11): 4213-4218.
 34. Baumgardner, D., **R. Subramanian**, C. Twohy, J. Stith and G. Kok (2008). "Scavenging of black carbon by ice crystals over the northern Pacific." *Geophysical Research Letters* **35**(22).
 35. Shrivastava, M. K., **R. Subramanian**, W. F. Rogge and A. L. Robinson (2007). "Sources of organic aerosol: Positive matrix factorization of molecular marker data and comparison of results from different source apportionment models." *Atmospheric Environment* **41**(40): 9353-9369.
 36. **Subramanian, R.**, N. M. Donahue, A. Bernardo-Bricker, W. F. Rogge and A. L.

- Robinson (2007). "Insights into the primary-secondary and regional-local contributions to organic aerosol and PM_{2.5} mass in Pittsburgh, Pennsylvania." Atmospheric Environment **41**(35): 7414-7433.
37. **Subramanian, R.**, C. A. Roden, P. Boparai and T. C. Bond (2007). "Yellow beads and missing particles: Trouble ahead for filter-based absorption measurements." Aerosol Science and Technology **41**(6): 630-637.
38. Polidori, A., B. J. Turpin, H.-J. Lim, J. C. Cabada, **R. Subramanian**, S. N. Pandis and A. L. Robinson (2006). "Local and regional secondary organic aerosol: Insights from a year of semi-continuous carbon measurements at Pittsburgh." Aerosol Science and Technology **40**(10): 861-872.
39. Robinson, A. L., **R. Subramanian**, N. M. Donahue, A. Bernardo-Bricker and W. F. Rogge (2006). "Source apportionment of molecular markers and organic aerosol. 3. Food cooking emissions." Environmental Science & Technology **40**(24): 7820-7827.
40. Robinson, A. L., **R. Subramanian**, N. M. Donahue, A. Bernardo-Bricker and W. F. Rogge (2006). "Source apportionment of molecular markers and organic aerosol. 2. Biomass smoke." Environmental Science & Technology **40**(24): 7811-7819.
41. Robinson, A. L., **R. Subramanian**, N. M. Donahue, A. Bernardo-Bricker and W. F. Rogge (2006). "Source apportionment of molecular markers and organic aerosols-1. Polycyclic aromatic hydrocarbons and methodology for data visualization." Environmental Science & Technology **40**(24): 7803-7810.
42. **Subramanian, R.**, N. M. Donahue, A. Bernardo-Bricker, W. F. Rogge and A. L. Robinson (2006). "Contribution of motor vehicle emissions to organic carbon and fine particle mass in Pittsburgh, Pennsylvania: Effects of varying source profiles and seasonal trends in ambient marker concentrations." Atmospheric Environment **40**(40): 8002-8019.
43. **Subramanian, R.**, A. Y. Khlystov and A. L. Robinson (2006). "Effect of peak inert-mode temperature on elemental carbon measured using thermal-optical analysis." Aerosol Science and Technology **40**(10): 763-780.
44. Cabada, J. C., S. N. Pandis, **R. Subramanian**, A. L. Robinson, A. Polidori and B. Turpin (2004). "Estimating the secondary organic aerosol contribution to PM_{2.5} using the EC tracer method." Aerosol Science and Technology **38**: 140-155.
45. **Subramanian, R.**, A. Y. Khlystov, J. C. Cabada and A. L. Robinson (2004). "Positive and negative artifacts in particulate organic carbon measurements with denuded and undenuded sampler configurations." Aerosol Science and Technology **38**: 27-48.

Invited presentations

American Meteorological Society's 18th Conference on Atmospheric Chemistry (Jan 2016)

"Emissions of Methane, Volatile Organic Compounds, and Black Carbon from Natural Gas and Oil Development, and an Examination of the Fat-Tail Problem." New Orleans, LA

Pipeline Safety Trust Conference (November 2015) "Methane emissions from the US Natural Gas Infrastructure." New Orleans, LA

Applied Physics, Curtin University (Jan 2015) “Research on black carbon and brown carbon at Carnegie Mellon University.” Perth, Australia.

Centre for Environmental Science & Engineering, IIT-Bombay (May 2009) “Carbonaceous aerosols at the source and in the atmosphere.” Mumbai, India.

Atmospheric Sciences Division, Brookhaven National Laboratory (Jan 2009) “Atmospheric aging and aerosol-cloud interactions of strongly-Light Absorbing Carbon (LAC) particles: Measurements with the Single Particle Soot Photometer (SP2).” Long Island, NY.

Professional activities and service

- Reviewer for *Aerosol Science & Technology*, *Atmospheric Chemistry & Physics*, *Atmospheric Measurement Techniques*, *Atmospheric Environment*, *Environmental Science & Technology*, *Journal of Aerosol Science*, *Journal of Geophysical Research-Atmospheres*, *Nature*, *Science of the Total Environment*, and more.
- Co-lead of discussion session on “LII Technique Extensions: Coating and Mixing State” at the 7th International Workshop on Laser-Induced Incandescence, Tahoe City, CA (June 2016)
- Co-chair of the AAAR Instrumentation Working Group (2007-2008) and member of the Technical Program Committee, AAAR Annual Conference 2008.
- Initiated, and co-organizer of, “Black carbon measurements in air, water and other media”, a symposium at the 235th ACS National Meeting, New Orleans, LA (April 2008).
- Member of the American Association for Aerosol Research, the American Geophysical Union, and the Air & Waste Management Association.