CURRICULUM VITAE

I. Personal

Name	VIJAY NATRAJ
Date Of Birth	February 2, 1976
Nationality	Indian (US Permanent Resident)
Contact Address	1990 N Altadena Dr, Pasadena, CA 91016, USA
Phone No.	(Cell) +1.626.437.6772 (Home) +1.626.358.7570
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II. Degrees

Ph.D. (Chem. Eng.), California Institute of Technology, Pasadena, USA, 2008 (defended June 11, 2007); *Thesis:* Radiative Transfer Modeling for the Retrieval of CO_2 from Space

M.S. (Chem. Eng.), California Institute of Technology, Pasadena, USA, 2004 (GPA: 4.1/4)

M.Eng. (Chem. Eng.), National University of Singapore, Singapore, 2001; *Thesis:* Rheology and Sedimentation of Charged Porous Spheres

B.Eng. (Chem. Eng.), National University of Singapore, Singapore, 1998

III. Research and Work Experience

Nov 2014 – Present	Associate Project Scientist, Joint Institute for Regional Earth System Science and Engineering, University of California at Los Angeles, Westwood, USA
May 2012 – Oct 2014	Visiting Assistant Researcher, Joint Institute for Regional Earth System Science and Engineering, University of California at Los Angeles, Westwood, USA
Mar 2010 – Present	Visitor in Planetary Science, California Institute of Technology, Pasadena, USA
Feb 2010 – Present	Scientist, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, USA
Jul 2007 – Jan 2010	Researcher, California Institute of Technology, Pasadena, USA

Jun 2006 – Present	Co-mentor, Summer Undergraduate Research Fellowship (SURF) Program
Oct 2001 – Jun 2007	Research Assistant, California Institute of Technology, Pasadena, USA
Aug 1998 – Jun 2001	Research Engineer, National University of Singapore (NUS), Singapore
Jan 1997 – Jun 1997	Internship Trainee, ESSO Singapore Pte. Ltd., Singapore

IV. Relevant Projects

Level 2 Algorithm Development: The Orbiting Carbon Observatory (OCO-2) Mission
Retrieval Algorithm Lead: GEO-CAPE, PanFTS
Co-principal investigator: Comparing climate performance of operational retrieval algorithms and spectral fingerprints
Co-investigator: Cirrus cloud property retrieval from ATTREX measurements, Tropospheric BrO retrieval from OMI measurements
Co-investigator: Extrasolar planet characterization studies
Principal Investigator: Aerosol profile retrieval using O_2 *A* band and O_2-O_2 absorption measurements

V. Professional Activities

Reviewer: Journal of Quantitative Spectroscopy and Radiative Transfer, Journal of Geophysical Research — Atmospheres, Journal of Atmospheric and Oceanic Technology, Measurement, Remote Sensing, Atmospheric Environment, Icarus, IEEE Transactions on Geoscience and Remote Sensing
Co-Convener: European Geophysical Union (EGU) General Assembly session on Spectroscopy and Radiative Transfer in Planetary Atmospheres, Asia-Oceania Geosciences Society (AOGS) session on Polarimetry of Planetary Systems: Observations, Theory and Models

VI. Achievements and Awards

1. JPL Voyager award for contributions to the field of Atmospheric Radiation and Remote Sensing, 2015.
2. JPL team award for essential contributions to the success of the OCO-2 mission, 2015.
3. Richard M. Goody award for Atmospheric Radiation and Remote Sensing, 2014.
4. JPL bonus award for work on OCO-2, 2014.
5. JPL bonus award for work on Earth Venture proposal, 2012.
6. Selected for inclusion in Marquis Who's Who in America, 2011.
7. NASA team bonus award, 2010, 2012.
8. Best JQSRT reviewer of the year, 2009.
9. Travel grant for Gordon Research Conference on Radiation and Climate, 2005, 2007.
10. "Turning Coal into Diamonds" award for OCO retrieval algorithm development, 2003.
11. Departmental Fellowship for a doctoral program in Chemical Engineering at the California Institute of Technology, Pasadena, CA, USA, 2001.
12. Citation Letter from the Professor and Head, Department of Chemical and Environmental Engineering, National University of Singapore, for outstanding academic excellence, 1994.
13. Singapore Airlines-Neptune Orient Lines (SIA-NOL) scholarship for undergraduate studies at the National University of Singapore, Singapore, 1994–98.
14. Certificate of Participation in the American Invitational Mathematics Examination (AIME), after qualifying through the American High School Mathematics Examination, 1992 and 1993.
15. Certificate of Merit with Honorable Mention (ranks 6 to 10) in the Singapore Chemistry Olympiad, 1992.
16. Promotional Examination Academic Award for outstanding performance in the Raffles Junior College Promotional Examinations, 1992.
17. Runner-Up in the Hewlett Packard Technology Quiz, Singapore, 1992.
18. Singapore Airlines (SIA) Youth scholarship to pursue a two-year junior college course in Raffles Junior College, Singapore, 1992–93. The scholarship was awarded to 20 students from India.
19. National Finalist with Honorable Mention in the H. Dudley Wright International Student Contest, on the theme *Together to Mars*, organized by the Planetary Society, Pasadena, CA, USA, 1991. This competition involved qualifying through a written test, submission of a 10,000-word report on some aspect of exploration of Mars and presentation of the report before a panel of judges.

20. National Talent Search Examination scholarship, 1991. This award carried a stipend and book grant for every year throughout my education up to undergraduate degree and was given to about 750 high school students after two written rounds and an interview.
21. First prize in the Srinivasa Ramanujam Memorial Mathematics Olympiad for the states of Kerala and Tamil Nadu, India, 1990.

VII. Peer-Reviewed Publications

1. Colosimo, S. F., **V. Natraj**, S. P. Sander, and J. Stutz (2015), A Sensitivity Study on the Retrieval of Aerosol Vertical Profiles Using the Oxygen A-band, under review, *Atmos. Meas. Tech.*
2. Kopparla, P., **V. Natraj**, R. J. D. Spurr, R.-L. Shia, Y. L. Yung, and D. Crisp (2015), A Fast and Accurate PCA Based Radiative Transfer Model: Extension to the Broadband Shortwave Region, under review, *J. Quant. Spectrosc. Radiat. Transfer*.
3. Kopparla, P., **V. Natraj**, X. Zhang, M R. Swain, S. J. Wiktorowicz, and Y. L. Yung (2015), A Multiple Scattering Radiative Transfer Model for Interpreting Exoplanetary Polarimetric Observations, under review, *Astrophys. J.*
4. Bousserez, N., **V. Natraj**, et al. (2015), Constraints on Methane Emissions in North America from Future Geostationary Remote Sensing Measurements, under review, *Atmos. Chem. Phys.*
5. Su, Z., X. Xi., **V. Natraj**, K.-F. Li, R.-L. Shia, C. E Miller, and Y. L. Yung (2015), Information-Rich Channels for Simulated Retrievals of Partial Column-Averaged Methane, under review, *Earth Space Sci.*.
6. Xi, X., **V. Natraj**, et al. (2015), Simulated Retrievals for the Remote Sensing of CO_2, CH_4, CO and H_2O from Geostationary Orbit, accepted, *Atmos. Meas. Tech.*
7. Zhang, Q., **V. Natraj**, et al. (2015), Accounting for Aerosol Scattering in the CLARS Retrieval of Column Averaged CO_2 Mixing Ratios, *J. Geophys. Res.*, *120*(14), 7205–7218, doi:10.1002/2015JD023499.
8. Kokhanovsky, A. A., A. B. Davis, **V. Natraj**, et al. (2015), Space-Based Remote Sensing of Atmospheric Aerosols: The Multi-Angle Spectro-Polarimetric Frontier, *Earth Sci. Rev.*, doi:10.1016/j.earscirev.2015.01.012.

9. Hache, E., J.-L. Attié, **V. Natraj**, et al. (2014), The Added Value of a Visible Channel to a Geostationary Thermal Infrared Instrument to Monitor Ozone for Air Quality, *Atmos. Meas. Tech.*, *7*(7), 2185–2201, doi:10.5194/amt-7-2185-2014.
10. O'Brien, D. M., I. Polonsky, **V. Natraj**, et al. (2013), Testing the Polarization Model for TANSO-FTS on GOSAT against Clear-sky Observations of Sun-glint over the Ocean, *IEEE Trans. Geosci. Remote Sens.*, *51*(12), 5199–5209, doi:10.1109/TGRS.2012.2232673.
11. **Natraj, V.** (2013), A Review of Fast Radiative Transfer Techniques (**invited review paper**), in Light Scat. Rev. 8, 475–504, Springer: Berlin, doi:10.1007/978-3-642-32106-1_10.
12. Spurr, R. J. D., **V. Natraj**, C. Lerot, M. Van Roozendael, and D. Loyola (2013), Linearization of the Principal Component Analysis Method for Radiative Transfer Acceleration: Application to Retrieval Algorithms and Sensitivity Studies, *J. Quant. Spectrosc. Radiat. Transfer*, *125*, 1–17, doi:10.1016/j.jqsrt.2013.04.002.
13. Sanghavi, S., and **V. Natraj** (2013), Using Analytical Derivatives to Assess the Impact of Phase Function Fourier Decomposition Technique on the Accuracy of a Radiative Transfer Model, *J. Quant. Spectrosc. Radiat. Transfer*, *119*, 137–149, doi:10.1016/j.jqsrt.2012.12.028.
14. Fu, D., J. R. Worden, X. Liu, S. S. Kulawik, K. W. Bowman, and **V. Natraj** (2013), Characterization of Ozone Profiles Derived from Aura TES and OMI Radiances, *Atmos. Chem. Phys*., *13*(6), 3445–3462, doi:10.5194/acp-13-3445-2013.
15. Kuai, L., J. Worden, **V. Natraj**, et al. (2013), Profiling Tropospheric CO_2 using the Aura TES and TCCON instruments, *Atmos. Meas. Tech.*, *6*(1), 63–79, doi:10.5194/amt-6-63-2013.
16. Thompson, D. R., **V. Natraj**, et al. (2012), C. E. Miller, Atmospheric Validation of High Accuracy CO_2 Absorption Coefficients for the OCO-2 Mission, *J. Quant. Spectrosc. Radiat. Transfer*, *113*(17), 2265–2276, doi:10.1016/j.jqsrt.2012.05.021.
17. Crisp, D., B. M. Fisher, C. O'Dell, C. Frankenberg, **V. Natraj**, et al. (2012), The ACOS CO_2 Retrieval Algorithm – Part II: Global X_{CO2} Data Characterization, *Atmos. Meas. Tech.*, *5*(4), 687–707, doi:10.5194/amt-5-687-2012.
18. O'Dell, C. W., B. Connor, H. Bösch, D. O'Brien, C. Frankenberg, **V. Natraj**, et al. (2012), The ACOS CO_2 Retrieval Algorithm – Part 1: Description and Validation against Synthetic Observations, *Atmos. Meas. Tech.*, *5*(1), 99–121, doi:10.5194/amt-5-99-2012.

19. Fishman, J., L. T. Iraci, **V. Natraj**, et al. (2012), The United States' Next Generation of Atmospheric Composition and Coastal Ecosystem Measurements: NASA's Geostationary Coastal and Air Pollution Events (GEO-CAPE) Mission, *Bull. Am. Meteorol. Soc.*, doi:10.1175/BAMS-D-11-00201.1.
20. Line, M. R., X. Zhang, G. Vasisht, **V. Natraj**, P. Chen, and Y. L. Yung (2012), Information Content of Exoplanetary Transit Spectra: An Initial Look, *Astrophys. J.*, *749*(1), 93, doi: 10.1088/0004-637X/749/1/93.
21. **Natraj, V.**, and J. W. Hovenier (2012), Polarized Light Reflected and Transmitted by Thick Rayleigh Scattering Atmospheres, *Astrophys. J.*, *748*(1), 28, doi: 10.1088/0004-637X/748/1/28.
22. **Natraj, V.**, X. Liu, et al. (2011), Multi-spectral Sensitivity Studies for the Retrieval of Tropospheric and Lowermost Tropospheric Ozone from Simulated Clear-sky GEO-CAPE Measurements, *Atmos. Environ.*, *45*(39), 7151–7165, doi: 10.1016/j.atmosenv.2011.09.014.
23. Zoogman, P., D. J. Jacob, **V. Natraj**, et al. (2011), Ozone Air Quality Measurement Requirements for a Geostationary Satellite Mission, *Atmos. Environ.*, *45*(39), 7143–7150, doi: 10.1016/j.atmosenv.2011.05.058.
24. Spurr, R. J. D., and **V. Natraj**, (2011), A Linearized 2-Stream Radiative Transfer Code for Fast Approximation of Multiple-Scatter Fields, *J. Quant. Spectrosc. Radiat. Transfer*, *112*(16), 2630–2637, doi: 10.1016/j.jqsrt.2011.06.014.
25. Kuai, L., **V. Natraj**, R.-L. Shia, C. E. Miller, and Y. L. Yung (2010), Channel Selection using Information Content Analysis: A Case Study of CO_2 Retrieval from Near Infrared Measurements, *J. Quant. Spectrosc. Radiat. Transfer*, *111*(9), 1296–1304, doi: 10.1016/j.jqsrt.2010.02.011.
26. **Natraj, V.**, R.-L. Shia, and Y. L. Yung (2010), On the use of Principal Component Analysis to Speed up Radiative Transfer Calculations, *J. Quant. Spectrosc. Radiat. Transfer*, *111*(5), 810–816, doi: 10.1016/j.jqsrt.2009.11.004.
27. **Natraj, V.**, K.-F. Li, and Y. L. Yung (2009), Rayleigh Scattering in Planetary Atmospheres: Corrected Tables Through Accurate Computation of *X* and *Y* Functions, *Astrophys. J.*, *691*(2), 1909–1920, doi: 10.1088/0004-637X/691/2/1909.
28. **Natraj, V.**, H. Bösch, R. J. D. Spurr, and Y. L. Yung (2008), Retrieval of X_{CO_2} from Simulated Orbiting Carbon Observatory Measurements using the Fast Linearized R-2OS Radiative Transfer Model, *J. Geophys. Res.*, *113*, D11212, doi: 10.1029/2007JD009017.

29. **Natraj, V.**, and R. J. D. Spurr (2007), A Fast Linearized Pseudo-Spherical Two Orders of Scattering Model to Account for Polarization in Vertically Inhomogeneous Scattering-Absorbing Media, *J. Quant. Spectrosc. Radiat. Transfer*, *107*(2), 263–293, doi: 10.1016/j.jqsrt.2007.02.011.
30. **Natraj, V.**, R. J. D. Spurr, H. Bösch, Y. Jiang, and Y. L. Yung (2007), Evaluation of Errors from Neglecting Polarization in the Forward Modeling of O_2 *A* Band Measurements from Space, with Relevance to CO_2 Column Retrieval from Polarization-Sensitive Instruments, *J. Quant. Spectrosc. Radiat. Transfer*, *103*(2), 245–259, doi: 10.1016/j.jqsrt.2006.02.073.
31. Guo, X., **V. Natraj**, D. R. Feldman, R. J. D. Spurr, S. P. Sander, R.-L. Shia, and Y. L. Yung (2007), Retrieval of Ozone Profile from Ground-Based Measurements with Polarization: A Synthetic Study, *J. Quant. Spectrosc. Radiat. Transfer*, *103*(1), 175–192, doi: 10.1016/j.jqsrt.2006.05.008.
32. Bösch, H., G. C. Toon, **V. Natraj**, et al. (2006), Space-based Near-infrared CO_2 Measurements: Testing the Orbiting Carbon Observatory Retrieval Algorithm and Validation Concept using SCIAMACHY Observations over Park Falls, Wisconsin, *J. Geophys. Res.*, *111*, D23302, doi: 10.1029/2006JD007080.
33. **Natraj, V.**, X. Jiang, R.-L. Shia, X. Huang, J. S. Margolis, and Y. L. Yung (2005), Application of Principal Component Analysis to High Spectral Resolution Radiative Transfer: A Case Study of the O_2 *A* Band, *J. Quant. Spectrosc. Radiat. Transfer*, *95*(4), 539–556, doi: 10.1016/j.jqsrt.2004.12.024.
34. **Natraj, V.**, and S. B. Chen (2003), Diffusion Coefficient of a Charged Porous Sphere, *Chem. Eng. Sci.*, *58*(16), 3621–3628, doi: 10.1016/S0009-2509(03)00252-5.
35. **Natraj, V.**, and S. B. Chen (2002), Primary Electroviscous Effect in a Suspension of Charged Porous Spheres, *J. Coll. Interface Sci.*, *251*(1), 200–207, doi: 10.1006/jcis.2002.8434.

VIII. Oral Presentations

1. Ozone and NO_2 OSSEs on a Regional/Urban Scale for GEO-CAPE, *GEO-CAPE Open Community Workshop*, Durham, USA, 2015.
2. An Overview of CO_2 Retrievals from the Recently Launched Orbiting Carbon Observatory-2 (OCO-2), *AOGS 12th Annual Meeting*, Singapore, 2015.

3. Application of Principal Component Analysis for Narrow and Broadband Radiance and Flux Calculations, *15th Electromagnetic and Light Scattering Conference*, Leipzig, Germany, 2015.
4. Assessing Aerosol and Surface BRDF-Related Biases Using Target Mode Retrievals from the Orbiting Carbon Observatory-2 (OCO-2), *11th International Workshop on Greenhouse Gas Measurements from Space*, Pasadena, USA, 2015.
5. Use of the Oxygen A-band to Retrieve Aerosol Vertical Profiles, *3rd ISSI Workshop on Aerosol Remote Sensing from Space*, Bern, Switzerland, 2014.
6. Influence of Aerosol Scattering on the Retrieval of CO_2 Mixing Ratios: A Case Study Using Measurements from the California Laboratory for Remote Sensing (CLARS), *10th International Workshop on Greenhouse Gas Measurements from Space*, Noordwijk, Netherlands, 2014.
7. The Potential of Passive VNIR Observations in Gaseous Absorption Regions to Retrieve Aerosol Vertical Profiles, *2nd ISSI Workshop on Aerosol Remote Sensing from Space*, Bern, Switzerland, 2013.
8. Linearized Principal Component Analysis as a Tool to Speed up Remote Sensing Retrievals, *14th Electromagnetic and Light Scattering Conference*, Lille, France, 2013.
9. Simulated Atmospheric Composition Retrievals for the Panchromatic Fourier Transform Spectrometer (PanFTS), *GEO-CAPE Team Meeting*, Moffett Field, USA, 2013.
10. Simulated Atmospheric Composition Retrievals for the Panchromatic Fourier Transform Spectrometer (PanFTS), *AGU Fall Meeting*, San Francisco, USA, 2012.
11. The Orbiting Carbon Observatory (OCO-2) L2 Retrieval Algorithm: First Tests with Greenhouse Gases Observing SATellite (GOSAT) Data, *International Radiation Symposium*, Berlin, Germany, 2012.
12. Using Principal Component Analysis to Speed Up Radiative Transfer Calculations, *1st ISSI Workshop on Aerosol Remote Sensing from Space*, Bern, Switzerland, 2012.
13. **(Invited)** Utility of Multispectral Measurements to Improve Atmospheric Composition Retrievals, *Atmospheric Chemistry and Radiation Seminar*, UCLA, USA, 2012.
14. On the Intensity and Polarization of Radiation Emerging from a Thick Rayleigh Scattering Atmosphere, *13th Electromagnetic and Light Scattering Conference*, Taormina, Italy, 2011.
15. Tropospheric Ozone Profiling Using Simulated GEO-CAPE Measurements, *2nd GEO-CAPE Community Workshop*, Boulder, USA, 2011.

16. A Two Orders of Scattering Approach to Account for Polarization in CO_2 Retrievals from Space, *NATO Advanced Study Institute on Polarimetry and Remote Sensing*, Kyiv, Ukraine, 2010.
17. **(Invited)** Polarimetry as a Tool for Remote Sensing of Planetary Atmospheres, *University College*, London, UK, 2010.
18. **(Invited)** Polarization as a Tool for Remote Sensing of Planetary Atmospheres, *EGU Annual General Meeting*, Vienna, Austria, 2009.
19. Simulations of Space-Based Near IR CO_2 Observations over Ground Target, *EGU Annual General Meeting*, Vienna, Austria, 2009.
20. Glint and Target Mode Simulations for the Orbiting Carbon Observatory, *AGU Fall Meeting*, San Francisco, USA, 2008.
21. Sensitivity Studies for the OCO Glint Mode of Operation, *5th International Workshop on Greenhouse Gas Measurements from Space*, Pasadena, USA, 2008.
22. Atmospheric Effects on Surface Polarimetric Signatures, *30th Review of Atmospheric Transmission Models Meeting*, Lexington, USA, 2008.
23. **(Invited)** The Orbiting Carbon Observatory Mission, *International Symposium on Aerosol-Chemistry-Climate Interactions*, Ahmedabad, India, 2007.
24. The Fast Two Orders of Scattering Linearized Vector Radiative Transfer Model: A Case Study of CO_2 Retrieval from Simulated Orbiting Carbon Observatory Measurements, *29th Review of Atmospheric Transmission Models Meeting*, Lexington, USA, 2007.
25. Radiative Transfer Modeling for the Retrieval of CO_2 from Space, *Thesis Defense Seminar*, Pasadena, USA, 2007.
26. The OCO Mission: Accounting for Polarization in Retrievals, *Planetary Sciences Seminar*, Pasadena, USA, 2006.
27. A Two Orders of Scattering Approach to Account for Polarization in NIR Retrievals, *28th Review of Atmospheric Transmission Models Meeting*, Lexington, USA, 2006.
28. A Two Orders of Scattering Approach to Account for Polarization in the OCO RT Model, *4th OCO Science Team Meeting*, Pasadena, USA, 2006.
29. Quantifying Aerosol Types and Their Impact on Trace Gas Retrievals from Satellite Measurements, *AGU Fall Meeting*, San Francisco, USA, 2005.
30. Extracting Atmospheric and Surface Information from Near Infrared (NIR) AVIRIS Spectra, *AVIRIS Science Workshop*, Pasadena, USA, 2005.
31. The Orbiting Carbon Observatory (OCO) Mission: Effects of Polarization on Retrievals, *Planetary Sciences Seminar*, Pasadena, USA, 2005.

32. Polarization in the OCO Retrieval Algorithm, *3rd OCO Science Team Meeting*, Pasadena, USA, 2005.
33. Empirical Orthogonal Function Analysis of the O_2 *A* Band, *2nd OCO Science Team Meeting*, Pasadena, USA, 2004.
34. Retrieval of Oxygen *A* band Spectra Using Airborne Measurements, *AGU Fall Meeting*, San Francisco, USA, 2003.

IX. Poster Presentations

1. Kopparla, P. **V. Natraj**, M. R. Swain, S. Wiktorowicz, and Y. L. Yung (2015), A Theoretical Study of Polarization in Scattered Light from Exoplanetary Atmospheres, *AOGS 12th Annual Meeting*, Singapore.
2. **Natraj, V.**, T. E. Taylor, et al. (2014), A First Look at Target Mode Retrievals of CO_2 from the Orbiting Carbon Observatory-2 (OCO-2), *AGU Fall Meeting*, San Francisco, USA.
3. **Natraj, V.**, S. S. Kulawik, M. Luo, and S. P. Sander (2013), CO_2, CH_4 and CO Retrievals for the Geostationary Carbon Process investigation, *Gordon Research Conference on Atmospheric Chemistry*, West Dover, USA.
4. **Natraj, V.**, and R. J. D. Spurr (2013), Linearization of the Principal Component Analysis Method for Radiative Transfer Acceleration: Application to Retrieval Algorithms and Sensitivity Studies in the Ultraviolet, Visible and Infrared, *Gordon Research Conference on Radiation and Climate*, New London, USA.
5. **Natraj, V.**, K. E. Pickering, et al. (2012), Trace Gas Retrievals for GEO-CAPE Using DISCOVER-AQ Measurements, *12th IGAC Open Science Conference*, Beijing, China.
6. **Natraj, V.**, J. L. Neu, et al. (2012), Simulated Atmospheric Composition Retrievals for the Panchromatic Fourier Transform Spectrometer (PanFTS), *12th IGAC Open Science Conference*, Beijing, China.
7. **Natraj, V.**, S. Kulawik, et al. (2012), Capability of the Panchromatic Fourier Transform Spectrometer (PanFTS) to Perform Atmospheric Composition Retrievals, *International Radiation Symposium*, Berlin, Germany.
8. **Natraj, V.**, S. S. Kulawik, et al. (2011), Atmospheric Composition Retrievals Using Simulated Panchromatic Fourier Transform Spectrometer (PanFTS) Measurements, *AGU Fall Meeting*, San Francisco, USA.

9. Eldering, A., **V. Natraj**, et al. (2011), Profiling of Lowermost Tropospheric Ozone from Simulated Geostationary Coastal and Air Pollution Events (GEO-CAPE) Measurements, *AGU Fall Meeting*, San Francisco, USA.
10. Su, Z., K.-F. Li, **V. Natraj**, R.-L. Shia, C. E. Miller, and Y. L. Yung (2011), Space-borne Measurements of Atmospheric CH_4 by High-resolution Near Infrared Spectrometry of Reflected Sunlight, *AGU Fall Meeting*, San Francisco, USA.
11. Irion, F. W., C. Frankenberg, **V. Natraj**, J. McDuffie, and C. W. O'Dell (2011), CO_2 Retrievals from GOSAT Glint Spectra, *AGU Fall Meeting*, San Francisco, USA.
12. Chatfield, R. B., R. F. Esswein, A. Fried, A. J. Weinheimer, **V. Natraj**, et al. (2011), Quantifying Smog Ozone Pollution and its Formation from Space: DISCOVER-AQ Measurements Connect the Retrievable to the Relevant, *AGU Fall Meeting*, San Francisco, USA.
13. **Natraj, V.**, D. Lafont, J. Worden, A. Eldering (2011), CO_2 Diurnal Profiling Using Simulated Multispectral Geostationary Measurements, *7th International Workshop on Greenhouse Gas Measurements from Space*, Edinburgh, UK.
14. O'Brien, D. M., I. Polonsky, **V. Natraj**, and the ACOS team (2011), In-orbit Test of the ACOS Implementation of the Polarization Model for TANSO-FTS on GOSAT, *7th International Workshop on Greenhouse Gas Measurements from Space*, Edinburgh, UK.
15. Irion, F. W., **V. Natraj**. J. McDuffie, and C. O'Dell (2010), ACOS Glint-Mode Total Column CO_2 Retrievals from GOSAT, *AGU Fall Meeting*, San Francisco, USA.
16. **Natraj, V.**, H. Bösch, R. J. D. Spurr, and Y. L. Yung (2010), Polarization Effects on Column CO_2 Retrievals from GOSAT Measurements, *EGU Annual General Meeting*, Vienna, Austria.
17. Kuai, L., **V. Natraj**, R.-L. Shia, C. E. Miller, and Y. L. Yung (2010), Channel Selection for CO_2 Retrieval from GOSAT Measurements Using Information Content Analysis, *6th International Workshop on Greenhouse Gas Measurements from Space*, Kyoto, Japan.
18. O'Brien, D. M., A. Kuze, C. W. O'Dell, **V. Natraj**, and the ACOS team (2010), Polarization Model for GOSAT and its Impact upon Retrievals, *6th International Workshop on Greenhouse Gas Measurements from Space*, Kyoto, Japan.
19. **Natraj, V.**, H. Bösch, R. J. D. Spurr, and Y. L. Yung (2009), Polarization Effects on Column CO_2 Retrievals from Non-Nadir Satellite Measurements in the Short-Wave Infrared, *AGU Fall Meeting*, San Francisco, USA.

20. Kuai, L., **V. Natraj**, R.-L. Shia, C. E. Miller, and Y. L. Yung (2009), Channel Selection for CO_2 Retrieval Using Near Infrared Measurements, *AGU Fall Meeting*, San Francisco, USA.
21. Fu, D., S. P. Sander, **V. Natraj**, et al. (2009), Spectropolarimetric Measurements of Scattered Sunlight in the Huggins Bands: Retrieval of Tropospheric Ozone Profiles, *AGU Fall Meeting*, San Francisco, USA.
22. Kuai, L., **V. Natraj**, et al. (2009), Channel Selection for CO_2 Retrieval Using Near Infrared Measurements, *EGU Annual General Meeting*, Vienna, Austria.
23. Bösch, H., B. Connor, **V. Natraj**, et al. (2009), Error Characterization of CO_2 Retrievals from SWIR Satellite Observations, *EGU Annual General Meeting*, Vienna, Austria.
24. Kuai, L., **V. Natraj**, et al. (2008), CO_2 Vertical Profile Constraints from OCO and Thermal IR Measurements, *AGU Fall Meeting*, San Francisco, USA.
25. Kuai, L., **V. Natraj**, et al. (2008), CO_2 Vertical Profile Constraints from OCO and Thermal IR Measurements, *5th International Workshop on Greenhouse Gas Measurements from Space*, Pasadena, USA.
26. **Natraj, V.**, H. Bösch, R. J. D. Spurr, and Y. L. Yung (2008), Fast Polarized Radiative Transfer Calculations for the Orbiting Carbon Observatory Mission, *EGU Annual General Meeting*, Vienna, Austria.
27. **Natraj, V.**, H. Bösch, R. J. D. Spurr, and Y. L. Yung (2007), The Orbiting Carbon Observatory Mission: Fast Polarization Calculations Using the R-2OS Radiative Transfer Model, *AGU Fall Meeting*, San Francisco, USA.
28. **Natraj, V.**, R. J. D. Spurr, H. Bösch, and Y. L. Yung (2007), The Fast Linearized R-2OS Model to Account for Polarization in Trace Gas Retrievals from Satellite Measurements, *Gordon Research Conference on Radiation and Climate*, New London, USA.
29. **Natraj, V.**, R. J. D. Spurr, H. Bösch, and Y. L. Yung (2006), A Fast and Accurate Two Orders of Scattering Model to Account for Polarization in Trace Gas Retrievals From Satellite Measurements, *AGU Fall Meeting*, San Francisco, USA.
30. Feldman, D. R., **V. Natraj**, L. Kuai, and Y. L. Yung (2006), Introductory Tools for Radiative Transfer Models, *AGU Fall Meeting*, San Francisco, USA.
31. Nair, H., H. Bösch, **V. Natraj**, et al. (2006), A Fast and Accurate Retrieval Algorithm for Near-Infrared CO_2 Observations, *AGU Fall Meeting*, San Francisco, USA.
32. **Natraj, V.**, H. Bösch, and Y. L. Yung (2006), Identifying Aerosol Parameters for Trace Gas Retrievals from NIR Satellite Measurements, *EGU Annual General Meeting*, Vienna, Austria.

33. Guo, X., **V. Natraj**, D. R. Feldman, R.-L. Shia, S. P. Sander, and Y. L. Yung (2005), Retrieval of Ozone Profile from Ground-based Measurements with Polarization, *AGU Fall Meeting*, San Francisco, USA.
34. **Natraj, V.**, R. J. D. Spurr, Y. Jiang, and Y. L. Yung (2005), Analysis of Errors from Neglecting Polarization in the O_2 *A* Band, *Gordon Research Conference on Radiation and Climate*, Waterville, USA.
35. **Natraj, V.**, X. Jiang, R.-L. Shia, X. Huang, J. S. Margolis, and Y. L. Yung (2004), Application of Principal Component Analysis to High Spectral Resolution Radiative Transfer: A Case Study of the O_2 *A* Band, *AGU Fall Meeting*, San Francisco, USA.
36. Bösch, H., **V. Natraj**, et al. (2004), The Orbiting Carbon Observatory (OCO) Mission: Validation Strategy and First Retrieval Results, *AGU Fall Meeting*, San Francisco, USA.

X. Other Publications

1. *"Sustainable Industrial Development vis-à-vis Pollution in the Indian Subcontinent"*, (being published).
2. *"Global Funding Options for Ganga-Cauvery Link"*, Saket Industrial Digest, Vol. 9, No. 10, 34–36, Oct 2003.
3. *"Air Pollution Due to Automobile Emissions"*, Motor India, Jul 2003.
4. *"Government Assistance for Pollution Control of Industrial Units"*, Indian Chemical Manufacturers Association, Mar 2003.
5. *"South Asian Environmental Evaluation in the Context of the World Bank Assistance"*, The Hindu, Jan 2003.
6. *"World Bank's Role in Tackling Environmental Problems of Developing Countries"*, Industrial Herald, Vol. 38, No. 1, 42–44, Jan 2003.
7. *"Impact of Power Law Constants on the Viscosity of PVC Solutions in Cyclohexanone and its Blends with Xylene"*, Industrial Herald, Vol. 36, No. 1, 69–72, Jan 2001.
8. *"Design Considerations for the Penicillin-V Production Plant"*, Chemical Weekly, Mumbai, Vol. XLVI, No. 11, 163–164, Nov 2000.
9. *"Computer Aided Design of Solvent Recovery Unit"*, Industrial Herald, Chennai, Vol. 35, No. 9, 9–12, 2000.

10. *"Preliminary Design of a Penicillin-V Production Plant"*, Thesis submitted in partial fulfillment of the degree of B.Eng. (Chemical), National University of Singapore, Singapore, 1998.
11. *"Thermo-Welded Plastics Products Have Good Growth Potential''*, Kerala Industry, Vol. XXXIX, No. 1, 17–18, Jun 1991.
12. *"Surface Exploration of Mars"*, Report Submitted to: H. Dudley Wright International Student Contest: Together to Mars, Planetary Society, Pasadena, USA, 1991.
13. *"The Mysterious Loyola Numbers"*, The Loyolite, Loyola School Magazine, Trivandrum, India, 15–16, 1990.

XI. Patents

1. *Corrosion Inhibitor Compound for Boilers VN-CIC-101*, published 2007-07-27, filed 2003-02-10.

XII. Languages

(fluent) English, Tamil, Malayalam; (moderate) Hindi; (basic) French, Spanish

XIII. Computer Literacy

Software Proficiency: Mathematica, MATLAB, Fortran, Origin, IDL
Platforms: UNIX, Linux, Windows