ABHISHEK CHATTERJEE

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EDUCATION

University of Michigan, Ann Arbor, MI	Environmental Engineering	PhD 2012
University of Michigan, Ann Arbor, MI	Environmental and Water Resources Engineering	MSE 2007
Delhi College of Engineering, New Delhi	Civil and Environmental Engineering	BE 2006

POSITIONS HELD

Postdoctoral Fellow, NOAA Climate and Global Change Fellowship, 01/2013 – Present
Data Assimilation Research Section (DAReS)
Institute for Mathematics Applied to Geosciences (IMAGe)
National Center for Atmospheric Research, Boulder, Colorado

- Developing an ensemble smoother data assimilation system for a fully coupled atmosphere-ocean model
- Developing a multi-species hybrid data assimilation system for carbon flux attribution
- Developing analytical tools to reduce predictable physical inconsistencies within geophysical data assimilation systems

Visiting Investigator, Department of Global Ecology, 07/2011 – 12/2012
Carnegie Institution for Science, Stanford, California

- Developed prototype of a large-scale parallel geostatistical CO_2 data assimilation system for inferring sources and sinks of CO_2 using satellite CO_2 concentrations

Graduate Student Research Assistant, Environmental and Water Resources, 01/2008 – 12/2012
Department of Civil and Environmental Engineering, University of Michigan,
Ann Arbor, Michigan

- Developed geostatistical techniques for solving large scale geophysical inverse problems associated with remote sensing data
- Developed geostatistical tools for integrating remote sensing data at different spatial scales

Graduate Student Instructor, Department of Civil and Environmental 09/2008 – 12/2008
Engineering, University of Michigan, Ann Arbor, Michigan

- Course Taught: CEE 270 – Statistical Methods for Data Analysis and Uncertainty Modeling
- Responsibilities include teaching MINITAB for the laboratory section, holding office hours, grading midterm and final examination papers.

Summer Fellow, Great Lakes Environmental Research Laboratory, 05/2007 - 08/2007
The National Oceanic and Atmospheric Administration (NOAA),
Ann Arbor, Michigan

- Developed improved data fusion methods for estimating over-lake precipitation.

Intern, Environmental Division, National Productivity Council, 12/2005 - 02/2006
New Delhi

- Developed waste minimization techniques for a medium scale textile processing plant; Carried out water and ETP audit for the same.

Intern, Environmental Internship Program, Environmental Management Centre, Mumbai 06/2005 - 07/2005

- Developed strategies and a comprehensive toolbox to facilitate waste management and air quality control in industries.

Intern, Biomedical Waste Management, Jaipur Golden Hospital, 06/2004 - 07/2004
New Delhi

- Helped analyze and implement technologies for proper handling and disposal of biomedical waste in the hospital premises.

PROFESSIONAL MEMBERSHIP AND SERVICE

National Service

- *Scientific Research Proposal Review Panel Member*, NOAA Atmospheric Chemistry, Carbon Cycle and Climate (AC4), Climate Program Office, 2013 – present
- *Journal Reviewer,* 2012 - present
  - Journal of Geophysical Research – Atmospheres, Atmospheric Chemistry and Physics, Practical Uses of Math and Science (On-line Journal for Pre-College Education, NASA GSFC initiative)
- *Co-organizer and convener*, with M. Goeckede (MPI-BGC) and A. Schuh (CSU), American Geophysical Union Fall Meeting, 2011 - present
  - Session entitled "*Advances in Atmospheric Inverse Modeling of Land Atmosphere Exchange Processes"*

University Of Michigan Service

- *Co-chair*, Engineering Graduate Symposium 2009, College of Engineering.
- *Co-chair*, Engineering Departmental Visitation 2009, College of Engineering.
- *Organizing Committee Member*, New Graduate Student Welcome Day 2009, College of Engineering.
- *I-Connect Graduate Volunteer*, Rackham I-Connect Program, 2009-2010, Rackham Graduate School.
- *Organizer,* ASEE Summer Seminar Series 2009 and 2008*,* U-M chapter of American Society for Engineering and Education (ASEE).
- *Session Co- Chair*, Civil, Environmental and Atmospheric Sciences Session, Engineering Graduate Symposium 2008, College of Engineering.

- *Member,* Student Award (Hugh Rumler Prize) Committee 2008, College of Engineering.
- *Member*, Engineering Departmental Visitation Committee 2008, College of Engineering.
- *Session Moderator and Organizing Committee Member*, New Graduate Student Welcome Day 2008, College of Engineering.
- *Member*, Planning Committee, Energy Day 2007, Michigan Memorial Phoenix Energy Institute.
- *International Student Mentor,* 2007-2009, Rackham Graduate School.
- *Department of Civil and Environmental Engineering Representative*, 2006-2010, College of Engineering Graduate Student Advisory Committee (GSAC), under the Associate Dean for Graduate Education.
- *Student Leader,* Deans' Forum Luncheon 2009, College of Engineering
- *Student Leader,* Communicating with your Advisor Workshop 2008, College of Engineering.
- *Student Leader*, Academic Career in Engineering and Science (ACES) Workshop 2007, College of Engineering.
- *Student Leader,* Fellowship Application Workshop 2007, College of Engineering.
- *Student Leader,* Effective Presentations Workshop 2007, College of Engineering.
- *Volunteer,* Engineering Graduate Symposium 2010, College of Engineering.
- *Volunteer,* Engineering Graduate Symposium 2007, College of Engineering.

Delhi College of Engineering Service

- *Editor*, 'Reverie-the continuum', Delhi College of Engineering Magazine, 2005-2006
- *Chief Organizer*, 'TECHNODROME 2004', Annual Technical Festival of the Department of Civil and Environmental Engineering, 2004
- *Co-Editor, '*Epicenter*',* Souvenir of TECHNODROME 2004
- *Member*, Organizing Committee, National Conference on Innovative Approaches in the Management of Environment (IAME), 2003

Community Service

- *Volunteer and Donor*, American Red Cross, 2010-present.
- *Volunteer*, Humane Society of Boulder Valley, 2013-present.
- *Volunteer*, Humane Society of Huron Valley, 2010-2011.
- *Volunteer*, United Nation Development Programmes (UNDP) and Team DIPTI, 2004-2005. Involved in raising environmental awareness in rural districts dealing with plastic waste in and around New Delhi.
- *Volunteer*, Help Age India and Missionaries of Charity, 1989-1999. Service in an old age home and rehabilitation center for children to help them prepare for a better brighter future.

Member

- American Association for the Advancement of Science (AAAS)
- American Geophysical Union (AGU)
- American Metereological Society (AMS)
- Royal Meteorological Society (RMetS)
- Society of Industrial and Applied Mathematics (SIAM)
- American Society for Engineering Education (ASEE)
- American Red Cross
- Student Sustainability Initiative, The University of Michigan (UMSSI)

HONORS AND AWARDS

- AAAS/Science Program for Excellence in Science Recipient, 2012-2014
- NOAA Postdoctoral Program in Climate and Global Change Fellowship, *University Corporation for Atmospheric Research*, 2013 - 2015
- International Summer School on Advanced Data Assimilation for Geosciences, *École De Physique des Houches*, 2012
  - Competitively selected for attending the summer school in France with full funding, May 28 - June 15, 2012
- NASA Earth and Space Science Fellowship, *National Aeronautics and Space Administration*, 2009-2012
- Summer Colloquium on Data Assimilation, *Joint Centre for Satellite Data Assimilation*, 2009
  - Competitively selected for attending the colloquium in Washington with full funding, July 7-17, 2009
- Rackham International Student Fellowship, *University of Michigan*, 2009
- Distinguished Leadership Award, *College of Engineering*, *University of Michigan*, 2008
- Great Lakes Summer Student Fellowship, *University of Michigan,* 2007
- College of Engineering Fellowship, *University of Michigan,* 2006-2007
- Lieutenant Governor's Gold Medal, *Delhi University*, 2006.
  - Awarded to the best student (Class of 2006) on the basis of his overall performance in academics, co-curricular and professional activities
- Pandit C. L. Shukla Gold Medal**,** *Delhi University,* 2006.
  - Awarded to an outgoing male student of the final year (Class of 2006) securing the highest marks in B.E courses irrespective of any branch of Engineering
- Merit cum Means Scholarship, *Delhi College of Engineering*, 2003- 2005.
  - Awarded annually to the top ten students in the College in any branch of Engineering
- First Place in Life Cycle Analysis Student Paper Competition, 'Vivre-2005', *Delhi College of Engineering*, 2005
- Third Place in National Level Student Technical Paper Competition, 'Tryst-2005', *Indian Institute of Technology*, 2005
- Third Place in National Level Student Technical Paper Competition, 'Papyrus-2004', *Delhi College of Engineering,* 2004

FUNDING HISTORY

Current Funding

- *Carbon Flux Attribution through an Innovative Multi-species Carbon Data Assimilation System*
  Principal Investigator, UCAR Visiting Scientist Programs, NOAA Postdoctoral Program in Climate & Global Change, University Corporation for Atmospheric Research (UCAR), $115,000, January 1, 2013, to December 31, 2014

Prior Funding

- *Geostatistical Data Assimilation for Atmospheric CO_2*
  Student Principal Investigator, with N. G. Love (PI, U. Michigan), A. M. Michalak (Science PI, CIS/Stanford Univ.), NASA Earth and Space Science Fellowship Program, National Aeronautics and Space Administration (NASA), $90,000, September 1, 2009, to August 31, 2012

- *Spatiotemporal Mapping of Global CO_2 from the Orbiting Carbon Observatory*
  Student Principal Investigator, with A. M. Michalak (PI, U. Michigan/CIS/Stanford Univ.), Rackham International Student Fellowship, Rackham Graduate School, University of Michigan, $9000, May 1, 2008, to August 31, 2008

- *Improving Estimation of Overlake Precipitation in Lake Erie*
  Student Principal Investigator, with C. DeMarchi (PI, NOAA-GLERL/Case Western Univ.), A. M. Michalak (Co-I, U. Michigan/CIS/Stanford Univ.), Great Lakes Summer Student Fellowship, Cooperative Institute for Limnology and Ecosystems Research (CILER), University of Michigan, $8400, May 1, 2007, to August 31, 2007

PUBLICATIONS

Journal Papers (submitted or in preparation**)**

1. Chatterjee, A. and A. M. Michalak (*in prep.*), Inter-comparison of ensemble and variational data assimilation in the context of CO_2 flux estimation.
2. Chatterjee, A., R. J. Engelen, S. R. Kawa, C. Sweeney and A. M. Michalak (*in review*), Background error covariance estimation for atmospheric CO_2 data assimilation, *Journal of Geophysical Research-Atmospheres,* XXX, XXXXXX, doi:10.1029/2013JD019592
3. Chatterjee, A., A. M. Michalak, J. L. Anderson, K. L. Mueller, V. Yadav (2012), "Towards reliable ensemble Kalman filter estimates of CO_2 fluxes", *Journal of Geophysical Research – Atmospheres*, 117, D22306, doi:10.1029/2012JD018176
4. Chatterjee, A., A. M. Michalak, R. S. Kahn, S. Paradise, A. J. Braverman, C. E. Miller (2010), "A geostatistical data fusion technique for merging remote-sensing and ground-based observations of aerosol optical thickness", *J. Geophys. Res.*, 115, D20207, doi:10.1029/2009JD013765
5. Chatterjee, A., C. DeMarchi, A.M. Michalak (2009), "Estimating over-lake precipitation in the Great Lakes combining radar and rain gages," Proceedings of the International Conference of Science and Information Technologies for Sustainable Management of Aquatic Ecosystems, A joint meeting of the 7th International Symposium on Ecohydraulics, and the 8th International Conference on Hydroinformatics, Concepción, Chile.

Published Abstracts and Conference Presentations (* denotes presenter**)**

1. Chatterjee, A.*, A. M. Michalak, C. O'Dell, S. R. Kawa, V. Yadav (2013), "Role of GOSAT total column CO_2 observations for the estimation of CO_2 surface fluxes", OCO2 Science Team Meeting, Pasadena, California, March 25th-27th
2. Chatterjee, A.*, R. J. Engelen, S. R. Kawa, C. Sweeney, A. M. Michalak (2013), "Background error statistics for assimilation of atmospheric CO_2", 4th North American Carbon Program - All Investigators Meeting, Albuquerque, New Mexico, February 4th - 7th
3. Chatterjee, A.*, R. J. Engelen, S. R. Kawa, C. Sweeney, A. M. Michalak (2012), "Background error statistics for assimilation of atmospheric CO_2", Abstract A11E-0093, 2012 Fall American Geophysical Union Meeting, San Francisco, California, December 3rd-7th.
4. Shiga, Y. P.*, A. M. Michalak, A. Chatterjee, D. Hammerling, K. L. Mueller, S. M. Gourdji, V. Yadav, S. R. Kawa, R. J. Engelen (2012), "*In Situ* CO_2 Monitoring Network Evaluation and Design: A Criterion Based on Atmospheric CO_2 Variability", Global Monitoring Annual Conference, NOAA-ESRL, Boulder, Colorado, May 15th – 17th.

5. Chatterjee, A.*, J. L. Anderson, V. Yadav, K. L. Mueller, A. M. Michalak (2011), "Sensitivity Tests for an ensemble square root filter for CO_2 assimilation", Abstract A43H-04, presented at the 2011 Fall American Geophysical Union Meeting, San Francisco, California, December 5th-9th.
6. Chatterjee, A.*, R. J. Engelen, A. M. Michalak (2011), "Background error statistics for assimilation of atmospheric CO_2", Abstract A33A-0175, presented at the 2011 Fall American Geophysical Union Meeting, San Francisco, California, December 5th-9th. (http://eposters.agu.org/abstracts/background-error-statistics-for-assimilation-of-atmospheric-co2/?from_search=true)
7. Shiga, Y. P.*, A. M. Michalak, A. Chatterjee, D. Hammerling, K. L. Mueller, S. M. Gourdji, V. Yadav, S. R. Kawa, R. J. Engelen (2011), "A monitoring network design tool for atmospheric carbon dioxide: Validation over North America", Abstract A31B-0073, presented at the 2011 Fall American Geophysical Union Meeting, San Francisco, California, December 5th-9th,
8. Mueller, K. L.*, S. M. Gourdji, V. Yadav, M. E. Trudeau, A. Chatterjee, D. N. Huntzinger, A. E. Andrews, Y. P. Shiga, K. J. Davis, B. B. Stephens, B. E. Law, M. L. Fischer, D. Dragoni, D. Worthy, M. Parker, M. Goeckede, S. Richardson, N. L. Miles, A. M. Michalak (2011), "Assessing the impact of the expanding continuous measurement network in North America on carbon budgeting with an atmospheric inversion", Abstract A31B-0077, presented at the 2011 Fall American Geophysical Union Meeting, San Francisco, California, December 5th-9th.
9. Chatterjee, A.*, V. Yadav, K. L. Mueller, S. M. Gourdji, A. M. Michalak (2011), "A geostatistical ensemble square root filter for estimating surface fluxes of CO_2", SIAM Conference on Mathematical and Computational Issues in the Geosciences, Long Beach, California, March 21st-24th.
10. Gourdji, S. M.*, K. L. Mueller, V. Yadav, A. Chatterjee, D. N. Huntzinger, A. E. Andrews, A. M. Michalak (2011), " What can we learn about fossil fuel emissions across North America from a Geostatistical atmospheric CO_2 inversion using ground-based continuous measurement data?", SIAM Conference on Mathematical and Computational Issues in the Geosciences, Long Beach, California, March 21st-24th.
11. Mueller, K. L.*, S. M. Gourdji, V. Yadav, M. Trudeau, A. Chatterjee, D. N. Huntzinger, A. E. Andrews, A. Schuh, Y. Shiga, K. J. Davis, B. B. Stephens, B. E. Law, C. Sweeney, M. Fischer, D. Dragoni, D. Worthy, M. Parker, A. M. Michalak (2011), "Impact of the expanding measurement network on top-down budgeting of CO_2 surface fluxes in North America", AmeriFlux Science Meeting and 3rd NACP All-Investigators Meeting, New Orleans, LA, 31st Jan – Feb 4th.
12. Shiga, Y. P.*, A. M. Michalak, D. M. Hammerling, A. Chatterjee, S. R. Kawa, R. J. Engelen (2010), "Evaluating the North American in-situ carbon dioxide monitoring network", Abstract GC13D-0726, presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 December.
13. Yadav, V., C. J. Antonelli*, S. M. Gourdji, K. L. Mueller, A. Chatterjee, A. M. Michalak (2010), "Design Framework for a Real-Time Large-Scale, Parallel, Intelligent, CO_2 Data Assimilation System", Computational Discovery and Cyber-Infrastructure at University of Michigan, Ann Arbor, Michigan.
14. Gourdji, S. M.*, A. Chatterjee, V. Yadav, K. L. Mueller, D. N. Huntzinger, A. E. Andrews, M. Trudeau, G. Petron, A. M. Michalak (2010), "Estimating regional-scale CO_2 fluxes over North America within a geostatistical atmospheric inversion framework", *Eos Transactions*, American Geophysical Union, 91(26), Meeting of the Americas Supplement, Abstract A13H-05.

15. Michalak, A. M., D. M. Hammerling, A. Chatterjee*, S. M. Gourdji, K. L. Mueller, V. Yadav, D. N. Huntzinger (2010), "Geostatistical Analyses for XCO2: Mapping and Modeling Global CO_2," Invited Talk at OCO2-ACOS Science Team Meeting, California Institute of Technology, Pasadena, California.
16. Michalak, A. M.*, A. Chatterjee, S. Paradise, A. Braverman, C. Miller (2009), "A Geostatistical Data Fusion Technique for Merging Remote-sensing and Ground-based Observations of Aerosol Optical Thickness," *Eos Transactions*, American Geophysical Union, 90(52), Fall Meeting Supplement, *Invited Talk*.
17. Hammerling, D.M.*, A. M. Michalak, N. A. Cressie, A. Chatterjee, M. S. Katzfuss, A. A. Alkhaled, A. J. Braverman (2009), "Mapping Global CO_2: Impact of Temporal Variability on Geostatistical Gap-filling for the Orbiting Carbon Observatory," Geophysical Research Abstracts, 11, EGU2009-11407.
18. Chatterjee, A.*, A.M. Michalak, S. Paradise, A. Braverman, C. Miller (2008), "A geostatistical data fusion technique for merging MISR and MODIS Aerosol Optical Thickness (AOT) retrievals with AERONET AOT measurement," *Eos Transactions*, American Geophysical Union, 89(53), Fall Meeting Supplement, Abstract A23B-0286.
19. Michalak, A.M., A. A. Alkhaled, N. A. Cressie, A. Chatterjee*, D. M. Hammerling, A. J. Braverman (2008), "Mapping Global CO_2: Geostatistical Gap Filling and Uncertainty Assessment for the Orbiting Carbon Observatory," Eos Transactions, American Geophysical Union, 89(53), Fall Meeting Supplement, Abstract A43F-05.
20. Chatterjee, A., C. DeMarchi*, and A. M. Michalak (2008), "Improving Estimation of over Lake Precipitation-An Application to Lake Erie", International Association for Great Lakes Research's 51st Annual Conference, May 2008, Peterborough, Ontario.
21. Chatterjee, A.*, C. DeMarchi, and A. M. Michalak (2007), "Improving Estimation of Over Lake Precipitation-An Application to Lake Erie", *Eos Transactions*, American Geophysical Union, 88(52), Fall Meeting Supplement, Abstract H33A-0972.
22. Chatterjee, A.* and Y. Zhou (2007), "Spatial and Temporal Analysis of Sea Surface Temperature (SST) in the Great Lakes," Poster presented at the Challenges of Climate Change in the Great Lakes Region Summit, U M Biological Station, Pellston, Michigan.
23. Chatterjee, A.* and Y. Zhou* (2007), "Spatial Analysis of Sea Surface Temperature (SST) Distribution in Lake Ontario," Poster presented at the Michigan Geophysical Union (MGU) Conference, The University of Michigan, Ann Arbor, Michigan.
24. Chatterjee, A. and S. Anbu Kumar* (2006), "Agrichemical Contamination of Groundwater", Poster Presented at the International Perspectives on Environmental and Water Resources Conference, New Delhi.
25. Anbu Kumar, S., A. Chatterjee* and N. Anand* (2006), "Agricultural Approaches to Reduce Agrichemical Contamination of Groundwater", Proceedings of the International Groundwater Conference, Jawaharlal Nehru University, New Delhi.
26. Chatterjee, A.* and N. Anand* (2005), "Biomedical Waste", Paper Presented at the National Level Student Technical Paper Meet – Tryst, Indian Institute of Technology Delhi, New Delhi.
27. Chatterjee, A.* and K. Soni* (2004), "E-Waste", Paper Presented at the National Level Student Technical Paper Meet – Papyrus, Delhi College of Engineering, New Delhi.
28. Chatterjee, A. and K. Soni (2003), "River, Soil & Groundwater: Contamination and its Remediation", Proceedings of the National Conference on the Innovative Approaches in the Management of Environment, Delhi College of Engineering, New Delhi.

Technical Reports and Seminar Presentations

1. Chatterjee, A.* (2011), "Quantifying CO_2 flux variability using geostatistical ensemble filters: current challenges and future potential", CGD 2011-2012 CGD Seminar Series, National Center for Atmospheric Research, Boulder, Colorado, December 13th.
2. Chatterjee, A.* and A. M. Michalak (2010), "Geostatistical Data Assimilation for Atmospheric CO_2 Estimation," Internal Seminar Series at the NOAA-ESRL, Global Monitoring Division, Boulder, Colorado.
3. Chatterjee, A. (2007), "Improving Estimation of Over Lake Precipitation-An Application to Lake Erie", Technical Report Submitted to the Great Lakes Environmental Research Laboratory (GLERL), Ann Arbor, Michigan.
4. Chatterjee, A.*, C. De Marchi, and A. M. Michalak (2007), "Over Lake Precipitation Estimation," Summer Fellow Presentation at the Great Lakes Environmental Research Laboratory (GLERL), Ann Arbor, Michigan.
5. Kumar, N., A. Chatterjee*, K. Soni, and S. Khan (2005), "Learning to Live with Plastics", Invited Talk at the Student Technical Paper Meet – Papyrus, Delhi College of Engineering, New Delhi.
6. Anand, N.* and A. Chatterjee* (2005), "I.V. Cannula", Talk Presented at the Life Cycle Analysis Competition – Vivre, Delhi College of Engineering, New Delhi.