

ANNA M. MICHALAK

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RESEARCH INTERESTS

Dr. Michalak’s research interests focus on characterizing complexity and quantifying uncertainty in environmental systems with the goal of improving our understanding of these systems and our ability to forecast their variability. Current application areas include atmospheric greenhouse gas emission and sequestration estimation, understanding linkages between climate variability and water quality, and use of remote sensing data for earth system characterization. The common theme of her research is the development and application of statistical and geostatistical data fusion methods for optimizing the use of limited in situ and remote sensing environmental data.

EDUCATION

Stanford University, Stanford, California	Civil & Environmental Engineering	Ph.D. 2003
Stanford University, Stanford, California	Civil & Environmental Engineering	M.S. 1998
University of Guelph, Ontario, Canada	Environmental Engineering	B.Sc.(Eng.) 1997

POSITIONS HELD

<i>Faculty Member</i> Department of Global Ecology, Carnegie Institution for Science, Stanford, California	2011 – present
<i>Associate Professor, by courtesy</i> Department of Environmental Earth System Science, Stanford University, Stanford, California	2011 – present
<i>Affiliated Faculty</i> Emmett Interdisciplinary Program in Environment and Resources, Stanford University, Stanford, California	2011 – present
<i>ASP Faculty Fellow</i> Institute for Mathematics Applied to Geosciences (IMAGe), Computational and Information Systems Laboratory, National Center for Atmospheric Research (NCAR), Boulder, Colorado	2010 – 2011
<i>Adjunct Associate Professor</i> <i>Frank and Brooke Transue Faculty Scholar</i>	2011 – present
<i>Associate Professor, with tenure</i>	2010 – 2011
<i>Assistant Professor</i>	2009 – 2011
Environmental and Water Resources Engineering, Department of Civil and Environmental Engineering, University of Michigan, Ann Arbor, Michigan	2004 – 2009

<i>Associate Professor, with tenure</i>	2009 – 2011
<i>Assistant Professor</i>	2005 – 2009
Atmospheric Sciences, Department of Atmospheric, Oceanic and Space Sciences, University of Michigan, Ann Arbor, Michigan	
<i>NOAA Climate and Global Change Postdoctoral Fellow</i>	2003 – 2004
Climate Monitoring and Diagnostics Laboratory (CMDL) National Oceanic and Atmospheric Administration, Boulder, Colorado	
<i>Research Assistant</i> , Environmental Fluid Mechanics and Hydrology	1998 – 2003
Department of Civil and Environmental Engineering Stanford University, Stanford, California	
<i>Summer Fellow</i> , Property and Environment Research Center (PERC), Bozeman, Montana	2001

PROFESSIONAL SERVICE (selected)

Scientific advisory board and committee service

- *Scientific Advisory Board*, Max Planck Institute for Biogeochemistry, Jena, Germany, 2014 – present
- *Earth Sciences Division Director's Review Board*, Lawrence Berkeley National Laboratory, Berkeley, California, 2014
- *Scientific Advisory Board*, Oak Ridge National Laboratory Climate Change Science Institute, Oak Ridge, Tennessee, 2013 – present
- *External Advisory Committee*, Vermont (Experimental Program to Stimulate Competitive Research (EPSCoR), 2011 – present
- *North American Carbon Program Science Steering Group*, U.S. Global Change Research Program, 2010 – 2014
- *Earth Science Subcommittee*, NASA Advisory Council, 2009 – present
- *Body of Knowledge Second Edition (BOK2) task committee*, Committee on academic prerequisites for professional practice, American Society of Civil Engineers (ASCE), 2006 – 2008

Scientific community roles

- *Member*, Orbiting Carbon Observatory 2 (OCO-2) satellite science team, 2011 – present
- *Member*, NASA Carbon Monitoring System Science Definition Team, 2011 – present
- *University of Michigan Representative*, University Corporation for Atmospheric Research (UCAR), 2009 – 2011
- *Co-chair*, Steering Committee, ASCENDS (Active Sensing of CO₂ Emissions over Nights, Days, and Seasons) Satellite Mission, 2008 – 2011, *Member*, 2011 – present
- *Co-lead*, U.S. Carbon Cycle Science Working Group (CCS WG), U.S. Global Change Research Program, 2008 – 2011
- *Associate*, Orbiting Carbon Observatory (OCO) satellite science team, 2005 – 2009

Editorial roles

- *Editor*, Water Resources Research, American Geophysical Union, 2013 – present; *Associate Editor* 2008 – 2013
- *Guest Editor*, Inter-journal special issue on “9th International Carbon Dioxide Conference (ICDC9)” in European Geophysical Union journals of Atmospheric Chemistry and Physics, Earth System Dynamics, as well as Biogeosciences, 2013 – present
- *Co-editor*, Special issue on Water in Dædalus, the journal of the American Academy of Arts and Sciences, 2013 – present
- *Editorial board member*, Advances in Water Resources, Elsevier, 2009 – present

Scientific conference planning and organization

- *Member of scientific steering committee*, 9th International Carbon Dioxide Conference, Beijing, China, June 2013.
- *Co-organizer*, Program on “Simulating our complex world: Modeling, Computation and Analysis,” Institute for Mathematics and Its Applications (IMA), Minneapolis, Minnesota, 2010-2011.
- *Co-chair and local host*, ASCENDS Satellite Mission instrument and modeling workshop, University of Michigan, Ann Arbor, Michigan, April 2009.
- *Invited member*, Planning Committee, 2nd North American Carbon Program (NACP) Investigators’ Meeting, February 2009.
- *Co-organizer*, Symposium entitled “The Carbon Budget: Can We Reconcile Flux Estimates with Those Reported to the UNFCCC?” American Association for the Advancement of Science (AAAS) Annual Meeting, Chicago, Illinois, February 2009
- *Co-chair and local host*, ASCENDS Satellite Mission community workshop, University of Michigan, Ann Arbor, Michigan, July 2008.
- *Invited member*, International Scientific Committee, 6th International Conference on Inverse Problems in Engineering: Theory and Practice (ICIPE), Paris, France, June 2008
- American Geophysical Union Fall Meetings, San Francisco, California, special session planning and organization:
 - *Co-organizer and convener*, with C. Miller (JPL), A.M. Eldering (JPL), and C. O’Dell (Colorado State University), Special session entitled “Remote Sensing of the Carbon Cycle: Exploiting New Measurements and Linkages to the Water Cycle,” December 2014
 - *Co-organizer and convener*, with C. Miller (JPL) and A.M. Eldering (JPL), Special session entitled “Remote sensing of CO₂, CO, and CH₄: From missions to science,” December 2013
 - *Co-organizer and convener*, with D. Huntzinger (NAU), R. Cook (ORNL), C. Schwalm (NAU), Y. Wei (ORNL), Special session entitled “Model Intercomparisons: Syntheses That Inform Scientific Understanding,” December 2013
 - *Co-organizer and convener*, with C. Miller (JPL) and A.M. Eldering (JPL), Special session entitled “Remote sensing of CO₂, CO, and CH₄,” December 2012
 - *Co-organizer and convener*, with C. Miller (JPL), Special session entitled “Remote sensing of CO₂: Observations, modeling, and synthesis,” December 2011
 - *Co-organizer and convener*, with M. Chahine (JPL) and C. Miller (JPL), Special session entitled “Remote sensing of CO₂ emissions and atmospheric transport,” December 2010

- *Co-organizer and convener*, with M. Chahine (JPL) and C. Miller (JPL), Special session entitled “*Atmospheric carbon dioxide: Observation, validation, modeling, and assimilation*,” December 2009
- *Co-organizer and convener*, with J. Butler (NOAA-ESRL) and R. Duren (JPL), Special session entitled “*Towards a policy-relevant, open and transparent global greenhouse gas monitoring and information system (GHGIS)*,” December 2009
- *Co-organizer and convener*, with M. Chahine (JPL) and C. Miller (JPL), Special session entitled “*Space Observations of Atmospheric Carbon Dioxide: Retrieval, Validation, Modeling, and Assimilation*,” December 2008
- *Co-organizer and convener*, with M. Chahine (JPL) and S.R. Kawa (NASA GSFC), Special session entitled “*Space Observations of Atmospheric Carbon Dioxide: Retrieval, Validation, Modeling and Assimilation*,” December 2007
- *Invited convener*, Special session entitled “*Observing, Modeling, and Predicting Regional-Scale Carbon Exchange*,” December 2007
- *Invited convener*, Special session entitled “*Data Assimilation*,” December 2006
- *Co-organizer and convener*, with Y. Yung (Caltech) and B. Connor (NIWA, New Zealand), Special session entitled “*Remote Sensing and Modeling of Greenhouse and Related Gases and Implications for Understanding Their Sources and Sinks*,” December 2005
- *Co-organizer and convener*, with O. Cirpka (EAWAG, Switzerland) and P. Kitanidis (Stanford U.), Special session entitled “*Inverse Modeling and Conditional Uncertainty Propagation in Heterogeneous Aquifers*,” December 2005
- *Co-organizer and convener*, with P.P. Tans (NOAA ESRL) and W. Peters (NOAA ESRL), Special session entitled “*Use of Inverse Modeling for Constraining Global and Regional Budgets of Atmospheric Trace Gases*,” December 2004
- *Co-organizer and convener*, with P.P. Tans (NOAA ESRL) and W. Peters (NOAA ESRL), Special session entitled “*Use of Inverse Modeling for Constraining Global Budgets of Atmospheric Trace Gases*,” December 2003

Reviewer roles

- *Scientific research proposal review panel member*, National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), National Oceanic and Atmospheric Administration (NOAA)
- *Scientific research proposal reviewer*, National Aeronautics and Space Administration (NASA), National Science Foundation (NSF), Department of Energy (DOE)
- *Journal reviewer*, Advances in Water Resources (AWR), American Geophysical Union Geophysical Monograph Series, Chemical Engineering Science (ChES), Earth System Science Data (ESSD), Ecological Modeling (ECOMOD), Geophysical Research Letters (GRL), Global Biogeochemical Cycles (GBC), Ground Water (GW), Hydrology and Earth System Sciences (HESS), Journal of the American Statistical Association (JASA), Journal of Applied Remote Sensing (JARS), Journal of Climate (JCLIM), Journal of Contaminant Hydrology (JCH), Journal of Environmental Engineering (JEE), Journal of Fluid Mechanics (JFM), Journal of Geophysical Research (JGR), Journal of Hydraulic Research (JHR), Nature, Stochastic Environmental Research and Risk Assessment (SERRA), Transactions in Mobile Computing (TMC), Water Resources Research (WRR)
- *Reviewer*, National Research Council (NRC) “*Uncertainty Management in Remote Sensing of Climate Data*” report.

University of Michigan service

- *Member*, Executive Steering Committee, Institute for Computational Science and Engineering, 2010 – 2011
- *Member*, College of Engineering Research Computing Executive Committee, 2007 – 2011
- *Member*, advisory group for the Junior Women Faculty Network (JWFN), 2005 – 2011
- *Member*, Spatial Certificate Committee, Interdisciplinary Certificate Program in Spatial Analysis, 2004 – 2011
- *Member*, Civil and Environmental Engineering Strategic Planning Committee, 2009 – 2011
- *Member*, Civil and Environmental Engineering Research Strategic Directions Committee, 2009
- *Chair*, Civil and Environmental Engineering Information Technology Committee, 2008 – 2010; *Member*, 2005 - 2010
- *Member*, Civil and Environmental Engineering Robust and resilient infrastructure systems faculty search committee, 2007 – 2008
- *Member*, Civil and Environmental Engineering Graduate Committee, 2005 – 2008
- *Member*, Civil and Environmental Engineering Hydrology faculty position search committee, 2004 – 2006
- *Member*, Civil and Environmental Engineering Curriculum Committee, 2004 – 2005

TEACHING EXPERIENCE

New Courses Introduced at Stanford University

EESS 214 Introduction to Geostatistics and Modeling of Spatial Uncertainty

Department: Environmental Earth System Science

Introduced: Spring 2012

Taught: Spring 2012 (14 students and several auditors);
Spring 2013 (12 students and several auditors)

CEE 333 / GES 333, Water Policy Colloquium

Department: Geological and Environmental Sciences

Introduced: Spring 2002

Directed: Spring 2002

New Courses Introduced at the University of Michigan

CEE 682 Section 039: Inverse Problems in Environmental Science and Engineering

Department: Civil and Environmental Engineering

Introduced: Winter 2008

Taught: Winter 2008 (10 students)

CEE 570 / NRE 569: Introduction to Geostatistics

Department: Civil and Environmental Engineering, and
School of Natural Resources and the Environment

Introduced: Winter 2005

Taught: Winter 2005 (17 students), 2006 (17 students), 2007 (17 students);
Fall 2009 (26 students)

CEE 270: Statistical Methods for Data Analysis and Uncertainty Modeling

Department: Civil and Environmental Engineering

Introduced: Fall 2005 (initially as CEE 490 Section 039)

Taught: Fall 2005 (14 students), 2006 (39 students), 2007 (61 students),
2008 (54 students), 2009 (88 students)

Short Courses Taught

Autumn School on Data Assimilation in Biogeochemical Cycles

Location: International Centre for Theoretical Physics, Trieste, Italy
Dates: September 20-27, 2014
Role: Co-organizer and lecturer
Enrollment: 40 graduate students and postdoctoral fellows

Workshop on Geostatistical Inverse Modeling

Location: University of Michigan, Ann Arbor, Michigan
Dates: August 3 – 6, 2009
Role: Organizer and lead lecturer
Enrollment: 12 researchers, postdoctoral fellows, and graduate students

Summer Colloquium on Regional Biogeochemistry, Needs and Methodologies

Location: National Center for Atmospheric Research, Boulder, Colorado
Dates: June 4-15, 2007
Role: Invited lecturer and day lead
Enrollment: 50 graduate students from throughout the United States

Summer Graduate Workshop on Data Assimilation for the Carbon Cycle

Location: Mathematical Sciences Research Institute, University of California at Berkeley, Berkeley, California
Dates: July 16-29, 2006
Role: Course instructor (with eight others)
Enrollment: 28 graduate students from throughout the United States

Ecosystem Modeling Workshop

Location: University of Michigan Biological Station (UMBS), Pellston, Michigan
Dates: July 31, 2006
Role: Organizer and instructor
Enrollment: 6 graduate student fellows from the NSF IGERT Biosphere Atmosphere Research and Training (BART) program

Mathematical Geophysics Summer School

Location: Stanford University, Stanford, California
Dates: One week course, July 2001
Role: Course instructor (with several others)
Enrollment: 20 postdoctoral researchers and junior faculty in applied mathematics interested in geophysical applications

K-12 Teaching Experience

Second Language Monitor, French as a Second Language, Grades 9 through 13 1996 – 1997
Centennial High School, Guelph, Ontario, Canada

Second Language Monitor, French as a Second Language, Grades 9 through 13 1994 – 1996
St. James High School, Guelph, Ontario, Canada

HONORS AND AWARDS

Frank and Brooke Transue Faculty Scholar	2010 – 2011
University of Michigan Henry Russel Award	2011
National Center for Atmospheric Research (NCAR) ASP Faculty Fellowship	2010 – 2011
Department of Civil and Environmental Engineering Merit Award	2010
University of Michigan College of Engineering 1938E Award	2009
AEESP Outstanding Educator Award for “ Outstanding Teaching in Environmental Engineering and Science	2008
Presidential Early Career Award for Scientists and Engineers (PECASE)	2007
Michigan Memorial Phoenix Energy Institute (MMPEI) Faculty Fellow	2007 – 2011
NSF CAREER Award, National Science Foundation	2007
Elizabeth Crosby Research Award, University of Michigan	2005
NOAA Postdoctoral Program in Climate and Global Change Fellowship, University Corporation for Atmospheric Research	2003 – 2005
Roe Legal Fellowship, Property and Environmental Research Center	2002
PERC Summer Fellowship, Property and Environmental Research Center	2001
Hydrology Section Outstanding Student Paper Award, American Geophysical Union	1999
Gabilan Fellowship, Stanford University	1999
Stanford Graduate Fellowship, Stanford University	1997 – 2000
Department of Civil & Environmental Engineering Fellowship, Stanford University	1997 – 2000
School of Engineering Scholarship, University of Guelph	1997
Second place in Student Poster Competition, Air and Waste Management Association Annual Conference and Exhibition	1997
Helen Grace Tucker Design Award, School of Engineering, University of Guelph	1997
College of Physical & Engineering Science Alumni Association Scholarship, University of Guelph	2007
A&WMA Scholarship for Post-Secondary Studies in Air and Waste Management, Air and Waste Management Association	1995 and 1996

STUDENTS AND RESEARCHERS SUPERVISED

Completed committee service as principal Ph.D. advisor or co-advisor:

- *Dan Obenour*, University of Michigan, *Co-advisor*, Ph.D. completed 08/2013
- *Yuntao Zhou*, University of Michigan / Carnegie Institution for Science, *Principal advisor*, Ph.D. completed 01/2013
- *Abhishek Chatterjee*, University of Michigan / Carnegie Institution for Science, *Principal advisor*, Ph.D. completed 11/2012
- *Dorit Hammerling*, University of Michigan, *Principal advisor*, Ph.D. completed 11/2012
- *Kimberly Mueller*, University of Michigan, *Principal advisor*, Ph.D. completed 02/2011
- *Sharon Gourджи*, University of Michigan, *Principal advisor*, Ph.D. completed 02/2011
- *Alanood Alkhaled*, University of Michigan, *Principal advisor*, Ph.D. completed 03/2009
- *Shahar Shlomi*, University of Michigan, *Principal advisor*, Ph.D. completed 02/2009
- *Meng-Ying Li*, University of Michigan, *Co-advisor*, Ph.D. completed 02/2008

Ph.D. advisor or co-advisor:

- *Yoichi Shiga*, Department of Civil and Environmental Engineering, Stanford University, *Co-advisor*
- *Jeff Ho*, Department of Civil and Environmental Engineering, Stanford University, *Co-advisor*
- *Eva Sinha*, Department of Environmental Earth System Science, Stanford University, *Co-advisor*

Postdoctoral research advisor:

- *Chao Li*, Carnegie Institution for Science, 07/2013 – present
- *Jovan Tadic*, Carnegie Institution for Science, 03/2013 – present
- *Yuntao Zhou*, Carnegie Institution for Science, 02/2013 – present
- *Yuanyuan Fang*, Carnegie Institution for Science, 08/2012 – present
- *Kimberly Mueller*, University of Michigan, 02/2011 – 08/2011
- *Sharon Gourджи*, University of Michigan, 02/2011 – 06/2011
- *Vineet Yadav*, University of Michigan and Carnegie Institution for Science, 02/2008 – 09/2014
- *Deborah Huntzinger*, University of Michigan, 10/2007 – 08/2011

Completed service as doctoral external examiner (international):

- *Martine Rivest*, Génie civil, géologique et des mines, Université de Montréal, Canada, 2012
- *Andrew Keats*, Department of Mechanical Engineering, University of Waterloo, Canada, 2009
- *Arun Kansal*, Department of Civil and Environmental Engineering, Indian Institute of Technology, 2007

FUNDING HISTORY

Current Funding

1. *Multi-scale Synthesis and Terrestrial Model Intercomparison Project (MsTMIP) Phase II*
Co-Investigator, with D.N. Huntzinger (PI, Northern Arizona University (NAU)), Y. Fang (Co-I, Carnegie Institution for Science (CIS)), Y. Wei (Co-I, Oak Ridge National Laboratory (ORNL)), K. Schaefer (National Snow and Ice Data Center (NSIDC)), C. Schwalm (Co-I, NAU), J. Fisher (Co-I, Jet Propulsion Laboratory (JPL)), A. Jacobson (Co-I, NOAA Earth System Research Laboratory (ESRL)), and R. Cook (Co-I, ORNL), NASA Carbon Cycle Science Program, \$1,599,833, June 1, 2014, - May 31, 2017.
2. *Regional Inverse Modeling in North and South America for the NASA Carbon Monitoring System*
Co-Investigator, with A. Andrews (PI, NOAA Earth System Research Laboratory) J. Miller (Co-I, NOAA ESRL), C. O'Dell (Co-I, Colorado State University (CSU)), T. Nehrkorn (Co-I, Atmospheric & Environmental Research, Inc. (AER)), and M. Mountain (Co-I, AER), NASA Carbon Monitoring System Program, \$828,164, October 1, 2014 – September 30, 2017.
3. *Multivariate Data Fusion and Uncertainty Quantification for Remote Sensing*
Co-Investigator, with A. Braverman (PI, JPL) and N. Cressie (Co-I, Ohio State University (OSU)), NASA Advanced Information Systems Technology program, \$1,496,280, June 1, 2012 - May 31, 2015.
4. *Extension of Data Assimilation and Mapping Projects to Ingest Data from OCO-2*
Principal Investigator, with V. Yadav (Co-I, CIS), NASA Science Team for the OCO-2 Mission program, \$265,949, January 1, 2013, - December 31, 2015.
5. *SI2-SSI: Real-Time Large-Scale Parallel Intelligent CO₂ Data Assimilation System*
Principal Investigator, with V. Yadav (Co-PI, University of Michigan (UM)), C. Scott (Co-PI, UM), M. Cafarella (Co-PI, UM), X. Nguyen (Co-PI, UM), K. Lefevre (Co-PI, UM), NSF Software Infrastructure of Sustained Innovation Program, \$1,914,243, September 15, 2010, to August 31, 2015.
6. *WSC: Category 2: Extreme Events Impacts on Water Quality in the Great Lakes: Prediction and Management of Nutrient Loading in a Changing Climate*
Principal Investigator, with 11 Co-PIs and 15 other investigators, NSF Water Sustainability and Climate Program, \$4,992,916, January 1, 2011, to December 31, 2015.
7. *CO₂.0: Assessing the Impact of a Combined in Situ and Satellite CO₂ Monitoring Network on Constraining Biospheric and Anthropogenic Fluxes for North America*
Principal Investigator, with V. Yadav (Co-I, UM), T. Erickson (Co-I, Michigan Tech Research Institute), NASA Atmospheric CO₂ Observations from Space program, \$751,718, September 1, 2010, to December 31, 2014.

Prior Funding

1. *Modeling Activities in Support of ASCENDS Satellite Design*, PI, NASA, \$154,396, 09/19/2011 – 09/18/2014.
2. *PECASE Extension to Mapping Global CO₂: Development and Application of Geostatistical Algorithms for Gap Filling and Uncertainty Assessment for the Orbiting Carbon Observatory*, PI, NASA, \$198,613, 04/01/2008 – 03/31/2014.

3. *The North American Carbon Program (NACP) Multi-Scale Synthesis and Terrestrial Model Intercomparison Project*, PI, with D. Huntzinger (Sci-PI, UM), R. Cook (co-I, ORNL), W. Post (Co-I, ORNL), K. Schaefer (Co-I, NSIDC), A. Jacobson (Co-I, NOAA ESRL), NASA Terrestrial Ecology program, \$1,439,840, 03/15/2010 – 05/31/2014.
4. *CAREER: Development of Geostatistical Data Assimilation Tools for Water Quality Monitoring* PI, NSF Division of Chemical, Bioengineering, Environmental and Transport Systems (CBET), Directorate for Engineering (ENG), \$445,000, 07/01/2007 – 06/30/2014.
5. *North American regional-scale flux estimation and observing system design for the NASA Carbon Monitoring System*, Co-I, with A. Andrews (PI, NOAA ESRL), L. Bruhwiler (Co-I, NOAA ESRL), G. Petron (Co-I, NOAA ESRL), P. Tans (Co-I, NOAA ESRL), J. Eluszkiewicz (Co-I, AER), E. Novakovskaia (Co-I, Earth Networks, Inc.), C. O'Dell (Co-I, CSU), NASA Carbon Monitoring System program, \$367,745, 07/01/2012 – 12/31/2013.
6. *Kalman-Filtered Compressive Sensing for High Resolution Estimation of Anthropogenic Greenhouse Gas Emissions from Sparse Measurements*, Co-I, with J. Ray (PI, Sandia National Laboratories (SNL)), B.G. Van Bloemen Waanders (Co-I, SNL), S.A. McKenna (Co-I, SNL), DOE Sandia National Laboratories, Laboratory Directed Research and Development Program, \$1,839,000, 10/01/2010 – 9/30/2013.
7. *Exploring the Potential of Remotely Sensed Chlorophyll Fluorescence to Evaluate Terrestrial Ecosystem Models*, Co-I with C. Frankenberg (PI, JPL), J. Berry (Co-I, CIS), C. Field (Co-I, CIS), J. Fisher (Co-I, JPL), and C. Miller (Co-I, JPL), NASA Jet Propulsion Laboratory Strategic University Research Partnership, \$100,000, 06/24/2012 – 06/23/2013.
8. *Carbon Monitoring System Science Definition Team Membership*, PI, NASA Carbon Monitoring System program, \$34,623, 04/17/2011 – 10/16/2012.
9. *Role of Diesel and Other Vehicular Exhaust in Exacerbation of Childhood Asthma*, Co-I with T.G. Robins (PI, UM), S. Batterman (Co-I, UM), B. Israel (Co-I, UM), T. Lewis (Co-I, UM), and E. Parker (Co-I, UM), NIH, \$3,986,456, 07/01/2007 – 06/30/2012.
10. *Diagnosing the Effects of Climatic Variability on Ecosystem-Atmosphere Exchange of CO₂*, PI with S. Wofsy (PI, Harvard), DOE National Institute for Climate Change Research, \$250,000, 04/01/2009 – 11/30/2011.
11. *Supplement to CAREER: Development of Geostatistical Data Assimilation Tools for Water Quality Monitoring*, PI, NSF Division of Chemical, Bioengineering, Environmental and Transport Systems (CBET), \$25,523, 10/1/2008 – 03/31/2012.
12. *Geostatistical Data Fusion for Remote Sensing Applications*, Co-I with A. Braverman (PI, JPL), and N. Cressie (Co-I, OSU), NASA Advanced Information Systems Technology, \$1,300,000, 03/1/2009 – 02/28/2012.
13. *Mapping Global CO₂: Development and Application of Geostatistical Algorithms for Gap Filling and Uncertainty Assessment for the Orbiting Carbon Observatory*, PI with N. Cressie (Co-I, OSU), A. Braverman (Co-I, JPL), NASA Carbon Cycle Science, \$807,562, 04/1/2008 – 03/31/2013.
14. *Feasibility of Geostatistical Carbon Dioxide Data Assimilation using Data from OCO*, PI, NASA Jet Propulsion Laboratory (JPL), \$62,500, 03/15/2009 – 03/14/2011
15. *Constraining North American Fluxes of CO₂ and Inferring Their Spatiotemporal Covariances through Assimilation of Remote Sensing and Atmospheric Data in a Geostatistical Framework*; PI, with A. Hirsch (Co-I, NOAA ESRL), J.C. Lin (Co-I, U. Waterloo), A. Andrews (Co-I, NOAA ESRL), NASA North American Carbon Program, \$815,649, 09/01/2006 – 08/31/2010.

16. *Equipment Supplement to Support Project: Constraining North American Fluxes of Carbon Dioxide and Inferring Their Spatiotemporal Covariances through Assimilation of Remote Sensing and Atmospheric Data in a Geostatistical Framework*, PI, NASA, \$25,948, 06/01/2008 – 08/31/2010.
17. *The Detroit Asthma Morbidity, Air Quality and Traffic (DAMAT) Study*, Co-PI, with R. Wahl (PI, Michigan Department of Community Health), S. Batterman (Co-PI, UM), E. Wasilevich (Co-PI, Michigan Department of Community Health), M.L. Hultin (Co-PI, Michigan Department of Environmental Quality), B. Mukherjee (Co-PI, UM), K. Dombkowski (Co-PI, UM), EPA G2007 STAR A1, \$500,000, 09/01/2007 – 08/31/2010.
18. *Conceptual Design of the WATer and Environmental Research Systems Network (WATERS Network)*, Senior Investigator, with J. Dozier (University of California, Santa Barbara, PI), J.B. Braden (Co-PI, University of Illinois at Urbana Champaign (UIUC)), R.P. Hooper (Co-PI, CUAHSI), B.S. Minsker (Co-PI, UIUC), J.L. Schnoor (Co-PI, University of Iowa), and 13 other senior investigators, NSF, \$750,000, 10/01/2008- 03/31/2010.
19. *Sampling and Inversion Methods for Quantifying Effect of Incomplete Subsurface Characterization on Uncertainty Associated with Recovery of Contamination History*, PI, NSF Division of Chemical, Bioengineering, Environmental and Transport Systems (CBET), \$179,996, 09/01/2006 – 08/31/2009.
20. *REU supplement for Grant 0607002 “Sampling and Inversion Methods for Quantifying Effect of Incomplete Subsurface Characterization on Uncertainty Associated with Recovery of Contamination History”*, PI, NSF Division of Chemical, Bioengineering, Environmental and Transport Systems (CBET), \$5,885, 01/01/2007 – 08/31/2009.
21. *Development of a Subsampling Strategy for the Orbiting Carbon Observatory Satellite*, PI, NASA Jet Propulsion Laboratory (JPL), \$108,456, 05/08/2006 – 09/30/2008.
22. *Characterization of Spatio-temporal Covariance of Remote Sensing Data from Earth-observing Satellites with Applications to Data Fusion, Sampling Design, and Measurement Gap-filling*, Co-I with C. Miller (PI, JPL) and A. Braverman (Co-I, JPL), NASA Jet Propulsion Laboratory Strategic University Research Partnership, \$50,000, 03/08/2007 – 09/05/2008.
23. *Geostatistical Analysis of NOAA Climate Monitoring and Diagnostics Laboratory Carbon Dioxide Data for 1997-2001*, PI, NOAA Climate Monitoring and Diagnostics Laboratory, \$96,500, 07/15/2005 – 09/30/2007.
24. *Use of Remote Sensing Data and Geostatistical Inverse Modeling for Validating Process-based Parameterizations in Biospheric Models*, PI, NASA Michigan Space Grant Consortium, \$10,000, 07/01/2006 – 06/30/2007.
25. *Geostatistical Analysis of the Spatial Covariance Structure of Modeled Column Average Dry Air Carbon Dioxide Mole Fraction Distributions*, PI, NASA Jet Propulsion Laboratory, \$10,984, 08/24/2005 – 07/31/2006.
26. *Auxiliary Environmental Data Assimilation in Geostatistical Inverse Modeling*, PI, Elizabeth Caroline Crosby Research Fund, NSF ADVANCE at the University of Michigan, \$20,000, 05/01/2005 – 04/30/2006.
27. *Quantification of Global Sources and Sinks of Methane Using Geostatistical Inverse Modeling*, PI, UCAR Visiting Scientist Programs, NOAA Postdoctoral Program in Climate & Global Change, \$96,000, 05/01/2003 – 04/30/2005, Declined remaining support starting 07/2004.

PUBLICATIONS

Journal Papers (denotes Michalak group students, denotes Michalak group postdoctoral researchers)

In review, revision, or press

1. Wei, Y., S. Liu, D.N. Huntzinger, A.M. Michalak, N. Viovy, W.M. Post, C.R. Schwalm, K. Schaefer, A.R. Jacobson, C. Lu, H. Tian, D.M. Ricciuto, R.B. Cook, J. Mao, X. Shi (*in press*) “The North American Carbon Program Multi-scale Synthesis and Terrestrial Model Intercomparison Project: Part 2 – Environmental driver data,” *Geoscientific Model Development*.
2. Obenour, D.R., A.M. Michalak, D. Scavia (*in press*) “Assessing biophysical controls on Gulf of Mexico hypoxia through probabilistic modeling,” *Ecological Modelling*, doi:10.1890/13-2257.1.
3. Fang, Y., A.M. Michalak, Y.P. Shiga, V. Yadav (*in revision*) “Using atmospheric observations to evaluate the spatiotemporal variability of CO₂ fluxes simulated by terrestrial biospheric models,” *Biogeosciences*.
4. Yadav, V., A.M. Michalak, J. Ray, Y.P. Shiga (*in revision*) “A statistical approach for isolating fossil fuel emissions in atmospheric inverse problems,” *Journal of Geophysical Research – Atmospheres*.
5. Li, C., E. Sinha, D.E. Horton, N.S. Diffenbaugh, A.M. Michalak (*in revision*) “Joint bias correction of temperature and precipitation in climate model simulations,” *Journal of Geophysical Research – Atmospheres*.
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1. Michalak, A., D. Huntzinger, G. Shrestha (2013) “Progress and Future Directions in North American Carbon Cycle Science,” *EOS Transactions, American Geophysical Union*, 94(20), 184, doi:10.1029/2013EO200004.
2. Michalak, A.M. R. Jackson, G. Marland, C. Sabine, and the Carbon Cycle Science Working Group (2011) “A U.S. Carbon Cycle Science Plan,” a report of the University Corporation for Atmospheric Research, Boulder, Colorado, <http://www.carboncyclescience.gov/USCarbonCycleSciencePlan-August2011.pdf>.
3. Michalak, A.M., R. Jackson, G. Marland, C. Sabine (2009) “The U.S. Carbon Cycle Science Plan First Meeting of the Carbon Cycle Science Working Group,” *EOS Transactions, American Geophysical Union*, 90(11), 102-103, doi:10.1029/2009ES002558.
4. Michalak, A.M., R. Jackson, G. Marland, C. Sabine, and Carbon Cycle Science Working Group (2009) “US Carbon Cycle Science Program Scoping Paper,” Report presented to the Climate Change Science Program, 6p., <http://www.carboncyclescience.gov/documents/Carbon-Cycle-Scoping-Paper-27Mar09.pdf>.
5. Body of Knowledge Committee of the Committee on Academic Prerequisites for Professional Practice (2008), “Civil Engineering Body of Knowledge for the 21st Century: Preparing the Civil Engineer for the Future,” Second Edition, American Society of Civil Engineers, 181p., Reston, Virginia, Contributor to Outcome 12: Risk and Uncertainty.
6. Birdsey, R.A., R. Cook, S. Denning, W. Emanuel, P. Griffith, B.E. Law, J. Masek, A.M. Michalak, S. Ogle, D. Ojima, Y. Pan, C.L. Sabine, E. Sheffner, E.T. Sundquist (2007), “NACP Investigators Share Improved Understanding of the North American Carbon Cycle,” *EOS Transactions, American Geophysical Union*, 88(24), 255.

7. Michalak, A.M. (2004), “Use of geostatistical inverse modeling for constraining trace gas budgets,” in *Climate Monitoring and Diagnostics Laboratory Summary Report #27 2002-2003*, pp. 53-54, edited by Russell C. Schnell, U.S. Department of Commerce, Boulder, Colorado.
8. Michalak, A.M. (2003), “Application of Bayesian Inference Methods to Inverse Modeling for Contaminant Source Identification,” *Ph.D. Dissertation submitted to the Department of Civil and Environmental Engineering*, Stanford University, Stanford, California, 292 p.

INVITED PRESENTATIONS (selected)

(Note: denotes Michalak group students, denotes Michalak group postdoctoral researchers)

2014

1. Michalak, A.M. “Statistical and computational challenges of constraining greenhouse gas budgets,” Plenary talk to be presented at the SIAM Conference on Computational Science and Engineering, Salt Lake City, Utah, March 2015.
2. Michalak, A.M., Y. Fang, V. Yadav, S. Gourджи, K.L. Mueller “Environmental controls on CO2 flux variability across spatial and temporal scales,” Invited talk to be presented at the American Geophysical Union Fall Meeting, San Francisco, California, December 2014.
3. Michalak, A.M., J. Ray, Y.P. Shiga, V. Yadav “Assessing regional anthropogenic emissions from observations of atmospheric CO2,” Invited talk to be presented at the American Geophysical Union Fall Meeting, San Francisco, California, December 2014.
4. Michalak, A.M., Seminar to be presented to the Environmental Engineering Seminar Series, University of California at Berkeley, November 2014.
5. Michalak, A.M., “The 2011/2012 one-two punch to Lake Erie: Impacts of agricultural management and meteorological trends on eutrophication,” seminar presented to the Environmental & Water Studies Summer Program seminar series, Stanford University, Stanford, California, July 2014.
6. Michalak, A.M., D.R. Obenour, Y. Zhou “Statistical approaches for assessing and predicting hypoxic extent,” Keynote address presented at the Computational Methods in Water Resources XX. International Conference, University of Stuttgart, Germany, June 2014.
7. Michalak, A.M., “A bird’s eye view of the carbon cycle: Using the atmosphere to inform processes at the land surface,” seminar presented to the Yale School of Forestry & Environmental Studies Seminar Lecture Series, Yale University, New Haven, Connecticut, February 2014.
8. Michalak, A.M., “The 2011/2012 one-two punch to Lake Erie: Impacts of agricultural management and meteorological trends on eutrophication,” seminar presented to the Yale School of Forestry & Environmental Studies, Yale University, New Haven, Connecticut, February 2014.
9. Michalak, A.M., “WSC Category 2: Extreme events impacts on water quality in the Great Lakes: Prediction and management of nutrient loading in a changing climate,” Invited talk presented at the Water Sustainability and Climate PI meeting, Washington, District of Columbia, January 2013.

2013

10. Michalak, A.M., Y. Fang, S.M. Miller, J. Ray, Y.P. Shiga, V. Yadav, J. Zscheischler, “Targeting patterns: A path forward for uncertainty quantification in carbon cycle science?” Abstract GC34C-04 presented at 2013 Fall Meeting, AGU, San Francisco, California, December 2013.

11. Michalak, A.M., “A Bird's-Eye View of the Carbon Cycle: Using the atmosphere to inform processes at the land surface,” Seminar presented to The Centre for Global Change Science, University of Toronto, Toronto, Canada, October 2013.
12. Michalak, A.M., “The 2011/2012 one-two punch to Lake Erie: Impacts of agricultural management and meteorological trends on eutrophication,” Seminar presented to Center for Applied Geoscience, University of Tübingen, Tübingen, Germany, October 2013.
13. Michalak, A.M., “Large scale inverse problems in quantifying emissions and uptake of atmospheric greenhouse gases,” Seminar presented to the Water Earth System Science competence cluster and the Integrated Hydrosystem Modelling International Research Training Group, University of Tübingen, Tübingen, Germany, October 2013.
14. Michalak, A.M., “A Bird's-Eye View of the Carbon Cycle: Spatiotemporal Tools for Constraining the CO₂ Budget from Atmospheric Observations,” Invited talk present at the Joint Statistical Meeting, Montréal, Canada, August 2013.
15. Michalak, A.M., “Big data meets big models in carbon cycle science: Spatiotemporal tools for constraining the CO₂ budget from atmospheric observations,” Invited talk presented at the Workshop on Large-Scale Inverse Problems and Quantification of Uncertainty: Big Data Meets Big Models, Santa Fe, New Mexico, May 2013.
16. Michalak, A.M., “A bird’s eye view of the carbon cycle: Using the atmosphere to inform processes at the land surface,” Seminar presented to the Atmosphere and Energy Program, Department of Civil and Environmental Engineering, Stanford University, Stanford, California, May 2013.
17. Michalak, A.M., “Big data meets big models in carbon cycle science,” Invited talk presented at the UC Davis Statistical sciences symposium 2013: Analysis of complex and Massive Data, April 2013.
18. Michalak, A.M., “State of the carbon cycle (NACP and GCP): Have components and their uncertainties changed over time?” Invited plenary talk presented at the NASA Terrestrial Ecology meeting, La Jolla, California, April 2013.
19. Michalak, A.M., “Big data meets big models in carbon cycle science,” Invited talk presented at the Society for Industrial and Applied Mathematics (SIAM) Computational Sciences conference, Boston, Massachusetts, February 2013.
20. Michalak, A.M., “Mapping NACP progress onto long-term carbon cycle science goals,” Invited plenary talk presented at the 4th North American Carbon Program All-Investigators Meeting, Albuquerque, New Mexico, February 2013.
21. Michalak, A.M., “WSC Category 2: Extreme events impacts on water quality in the Great Lakes: Prediction and management of nutrient loading in a changing climate,” Invited talk presented at the Water Sustainability and Climate PI meeting, Washington, District of Columbia, January 2013.

2012

22. Michalak, A.M., M. Goeckede, S.M. Gourdjii, D. Huntzinger, S.M. Miller, K. Mueller, V. Yadav “Informing improvements to terrestrial biogeochemical models through statistical integration of environmental datasets,” Abstract B34B-07 presented at 2012 Fall Meeting, AGU, San Francisco, California, December 2012.
23. Michalak, A.M., “A bird’s eye view of the carbon cycle,” Invited talk presented at opening workshop for the Program on Statistical and Computational Methodology for Massive Datasets, Statistical and Applied Mathematical Science Institute, Raleigh, North Carolina, September 2012.

24. Michalak, A.M., “A bird’s eye view of the carbon cycle: Geostatistical approaches for constraining the CO₂ budget from atmospheric observations,” Invited plenary talk presented at the 9th Conference on Geostatistics for Environmental Applications (GeoENV), Valencia, Spain, September 2012.
25. Michalak, A.M., “A bird’s eye view of the carbon cycle,” Invited talk presented at New Methods for Measurements of Photosynthesis from Space, Keck Institute for Space Studies, Caltech, Pasadena, California, August 2012.
26. Michalak, A.M., “A bird’s eye view of the carbon cycle,” Invited talk presented at Lawrence Livermore National Laboratory, Livermore, California, May 2012.
27. Michalak, A.M., R.B. Jackson, G. Marland, C.L. Sabine “A U.S. Carbon Cycle Science Plan, Invited talk presented at the National Aeronautics and Space Administration headquarters, Washington, D.C., March 2012.
28. Michalak, A.M., R.B. Jackson, G. Marland, C.L. Sabine “A U.S. Carbon Cycle Science Plan, Invited talk presented at the United States Department of Agriculture headquarters, Washington, D.C., March 2012.
29. Michalak, A.M., R.B. Jackson, G. Marland, C.L. Sabine “A U.S. Carbon Cycle Science Plan, Invited talk presented at the Department of Energy headquarters, Germantown, Maryland, March 2012.
30. Michalak, A.M., D. Hammerling, C. O’Dell, S.R. Kawa “ACOS GOSAT Level 3 data products,” Invited talk presented at The GOSAT Workshop 2012 – Towards GOSAT-2 Mission, Tokyo, Japan, February/March 2012.

2011

31. Michalak, A.M., K.L. Mueller, S. Gourdj, V. Yadav “Uncertainty quantification and parameter estimation for multi-scale systems: Lessons learned from inverse problems aimed at constraining the CO₂ budget from atmospheric observations,” Abstract H11J-03 presented at 2011 Fall Meeting, AGU, San Francisco, California, December 2011.
32. Michalak, A.M., “WSC Category 2: Extreme events impacts on water quality in the Great Lakes: Prediction and management of nutrient loading in a changing climate,” Invited talk presented at the Water Sustainability and Climate PI meeting, Washington, District of Columbia, December 2011.
33. Michalak, A.M., “Mining sparse water quality data using spatial statistics,” Invited talk presented at the Environmental Engineering and Science seminar series, Department of Civil and Environmental Engineering, Stanford University, Stanford, California, December 2011.
34. Michalak, A.M., “A bird’s eye view of the carbon cycle,” Invited talk presented at the Department of Plant Biology seminar series, Carnegie Institution for Science, Stanford, California, November 2011.
35. Michalak, A.M., “A bird’s eye view of the carbon cycle,” Invited talk presented at the Department of Environmental Earth System Science seminar series, Stanford University, Stanford, California, October 2011.
36. Michalak, A.M., “Why can’t we (yet) exploit the Earth Sciences data tsunami,” Invited talk presented at the *What can’t we (yet) do to exploit the Earth Sciences data tsunami* Computational Earth Sciences Forum, Stanford University, Stanford, California, September 2011.
37. Michalak, A.M., “Assimilations and inversions from simulated measurements of CO₂ mixing ratio: A pro-typical example,” Invited talk presented at the ASCENDS (Active Sensing of CO₂ Emissions over Nights, Days, and Seasons) workshop, Greenbelt, Maryland, April 2011.

38. Michalak, A.M., “Assimilations and inversions from simulated measurements: Issues, approaches, and value,” Invited talk presented at the ASCENDS (Active Sensing of CO₂ Emissions over Nights, Days, and Seasons) workshop, Greenbelt, Maryland, April 2011.
39. Michalak, A.M., “Towards a global carbon monitoring system: Assimilating environmental data in a geostatistical framework,” Invited talk presented at the Environmental Science and Engineering seminar series, Colorado School of Mines, Golden, Colorado, March 2011.
40. Michalak, A.M., “Bridging across spatial and temporal scales in carbon dioxide flux estimation,” Invited talk presented at the National Ecological Observing Network, Boulder, Colorado, February 2011.
41. Michalak, A.M., G. Marland, R. Jackson, and C. Sabine, “The New U.S. Carbon Cycle Science Plan,” Plenary talk presented at the North American Carbon Program All Investigators Meeting, New Orleans, Louisiana, February 2011.
42. Michalak, A.M., “Towards a global carbon monitoring system: Novel approaches for characterizing fluxes, and ongoing research needs,” Invited talk presented at the Jet Propulsion Laboratory, Pasadena, California, January 2011.

2010

43. Michalak, A.M., “Research needs and current approaches for a global carbon monitoring system: Monitoring requirements, synthesis of existing data streams, and emissions verification,” Abstract GC41G-05 presented at 2010 Fall Meeting, AGU, San Francisco, California, December 2010.
44. Michalak, A.M., “Evaluation of constraint provided by current atmospheric monitoring network for quantifying anthropogenic emissions and biospheric carbon fluxes” Abstract A24A-06 presented at 2010 Fall Meeting, AGU, San Francisco, California, December 2010.
45. Michalak, A.M., “The C-Train: Highlights of A-Train Contributions to Carbon Cycle Science,” Invited keynote address presented at the NASA International Symposium on the A-Train Satellite Constellation, New Orleans, Louisiana, October 2010.
46. Michalak, A.M., G. Marland, R. Jackson, and C. Sabine, “A New U.S. Carbon Cycle Science Plan,” Invited talk presented at the NASA Carbon Monitoring System Scoping Workshop, Boulder, Colorado, July 2010.
47. Michalak, A.M., G. Marland, R. Jackson, and C. Sabine, “A New U.S. Carbon Cycle Science Plan,” Invited talk presented at the Carbon Cycle Science Steering Group meeting, Washington, D.C., June 2010.
48. Michalak, A.M. “Geostatistical inverse modeling for characterizing the global carbon cycle,” Invited seminar presented to the Department of Statistics, University of Michigan, Ann Arbor, Michigan, May 2010.
49. Michalak, A.M. “Towards a global carbon monitoring system: Assimilating in situ and remote sensing observations in a geostatistical framework,” Invited talk presented to Sandia National Laboratories, Livermore, California, April 2010.
50. Michalak, A.M. “Towards a global carbon monitoring system: Assimilating in situ and remote sensing observations in a geostatistical framework,” Invited seminar presented to the Department of Global Ecology of the Carnegie Institution at Stanford University, California, April 2010.
51. Michalak, A.M. “Overview of Research in Carbon Cycle Science,” Invited plenary talk presented at the NASA Terrestrial Ecology meeting, LaJolla, California, March 2010.

52. Michalak, A.M. “Monitoring Future Climate Treaties,” Invited public panel presentation at the *Quantifying the Sources and Sinks of Atmospheric CO₂* workshop, Keck Institute for Space Studies, California Institute of Technology, Pasadena, California, March 2010.
53. Michalak, A.M., P. Rayner “Overview of top-down methods,” Invited presentation at the *Quantifying the Sources and Sinks of Atmospheric CO₂* workshop, Keck Institute for Space Studies, California Institute of Technology, Pasadena, California, March 2010.

2009

54. Michalak, A.M., A. Chatterjee, S.R. Paradise, A.J. Braverman, C.E. Miller “A geostatistical data fusion technique for merging remote sensing and ground-based observations of aerosol optical thickness,” Invited presentation at the *American Geophysical Union Fall Meeting, EOS Transactions, American Geophysical Union 90 (52)*, Fall Meeting Supplement, Abstract A21G-01, December 2009.
55. Michalak, A.M. “Merging Across Spatial and Temporal Scales in North American Carbon Dioxide Flux Estimation,” Invited seminar presented to the Department of Atmospheric and Oceanic Sciences, University of Wisconsin, Madison, Wisconsin, October 2009.
56. Michalak, A.M. “Mapping Global CO₂ using AIRS data,” Invited talk presented at the Atmospheric Sounding Science Team Meeting, Greenbelt, Maryland, October 2009.
57. Michalak, A.M. “Modeling studies in support of the development of the ASCENDS instrument,” Invited talk presented at the 3rd International Workshop on CO₂ Active Remote Sensing by DiAL, Hampton, Virginia, October 2009.
58. Michalak, A.M. “Prior Error Structures,” Invited talk presented at the TransCom 2009 meeting, Jena, Germany, September 2009.
59. Michalak, A.M. “Geostatistical inverse modeling for characterizing the global carbon cycle,” Invited talk presented at the opening workshop of the Program on Space-time Analysis for Environmental Mapping, Epidemiology, and Climate Change, at the Statistical and Applied Mathematical Science Institute, Research Triangle Park, North Carolina, September 2009.
60. Michalak, A.M., “Contribution of terrestrial land surface to the carbon cycle, evidence from atmospheric models.” Invited plenary talk presented at the Workshop on Land Use / Land Cover Change and the Carbon Cycle, Ann Arbor, Michigan, June 2009.
61. Michalak, A.M., G. Marland, R. Jackson, and C. Sabine, “Status and Review of New Carbon Cycle Science Plan,” Invited talk presented at the Carbon Cycle Science Steering Group meeting, Reston, Virginia, June 2009.
62. Michalak, A.M., “Atmospheric Inverse Modeling, Data Assimilation, and Top-down / Bottom-up Reconciliation,” Invited talk presented at the Greenhouse Gas Information System Workshop, Sandia National Laboratory, Albuquerque, New Mexico, May 2009.
63. Michalak, A.M., “Bridging across Spatial and Temporal Scales in North American Carbon Dioxide Flux Estimation,” Invited seminar presented to the Department of Physics, University of Toronto, Ontario, Canada, April 2009.
64. Michalak, A.M., “Inferring historical forcing using geostatistical methods: Examples from atmospheric and water quality monitoring,” Invited seminar presented to the Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, April 2009.
65. Michalak, A.M. “Improving understanding of carbon flux variability using atmospheric inverse modeling,” Invited talk presented at the symposium “The Carbon Budget: Can We Reconcile Flux Estimates,” at the Annual Meeting of the *American Association for the Advancement of Science (AAAS)*, Chicago, Illinois, February 2009.

66. Michalak, A.M., C. Sabine, R. Jackson, G. Marland, “The New U.S. Carbon Cycle Science Plan,” Invited plenary talk presented at the 2009 North American Carbon Program (NACP) Investigators’ Conference, San Diego, California, February 2009.
67. Michalak, A.M. “The global carbon cycle and the role of the Orbiting Carbon Observatory,” Invited talk presented at the *Launch Minus 30 Days* press briefing for the Orbiting Carbon Observatory, Washington, D.C., January 2009.
68. Michalak, A.M., G. Marland, R. Jackson, and C. Sabine, “Status and Review of New Carbon Cycle Science Plan,” Invited talk presented at the North American Carbon Program (NACP) Interim Synthesis Meeting, Oak Ridge National Laboratory, Tennessee, January 2009.

2008

69. Michalak, A.M., K. Mueller, V. Yadav, A. Alkhaled, Y. Zhou, S. Gourджи, D. Huntzinger, A. Hirsch, A. Andrews, S. Wofsy, “Applications of Geostatistics to Data Assimilation in Biogeochemical Models,” Invited presentation at the *American Geophysical Union Fall Meeting, EOS Transactions, American Geophysical Union 89 (53)*, Fall Meeting Supplement, Abstract B33A-0391, December 2008.
70. Michalak, A.M., G. Marland, R. Jackson, and C. Sabine, “Status and Review of New Carbon Cycle Science Plan,” Invited presentation at the Carbon Cycle Science Steering Group meeting, Washington, D.C., December 2008.
71. Michalak, A.M. “Differences in terminology, techniques, and approaches between statisticians and earth scientists,” Invited plenary talk presented at the *Workshop on Uncertainty Management in Remote Sensing of Climate Data*,” organized by the National Academies’ Climate Research Committee (CRC), Committee on Applied and Theoretical Statistics (CATS), and Committee on Earth Studies (CES), Washington, D.C., December 2008.
72. Michalak, A.M. “The role of atmospheric observations in improving understanding of the global carbon cycle,” Invited talk presented at a press conference at NASA Headquarters and to be broadcast on NASA TV (<http://www.nasa.gov/multimedia/nasatv/>), Washington, D.C., November 2008.
73. Michalak, A.M. “Determining regional emissions patterns of non-CO₂ greenhouse gases,” Invited talk presented at the *Spatial and Temporal Distributions of Sources of non-CO₂ Greenhouse Gases (CH₄, CO, N₂O) over North America* Workshop, Boulder, Colorado, October 2008.
74. Michalak, A.M., “Atmospheric CO₂ and ASCENDS Science Background,” Invited plenary talk presented at the NASA ASCENDS Community Workshop, University of Michigan, Ann Arbor, Michigan, July 2008.
75. Michalak, A.M., “Improving Understanding of Global and Regional Carbon Dioxide Flux Variability through Assimilation of in Situ and Remote Sensing Data in a Geostatistical Framework,” Invited talk presented at the 8th Summer Institute for the NOAA Climate and Global Change Postdoctoral Fellowship Program, Steamboat Springs, Colorado, July 2008.
76. Michalak, A.M., A.A. Alkhaled, N. Cressie, A. Braverman, S.R. Kawa, S.C. Olsen, J.-W. Wang, “Mapping global CO₂: Development and application of geostatistical algorithms for gap filling and uncertainty assessment for the Orbiting Carbon Observatory,” Invited talk presented at the 5th International Workshop of Greenhouse Gas Measurements from Space (IWGGMS), California Institute of Technology, Pasadena, California, June 2008.

2007

77. Michalak, A.M., K. Mueller, S.M. Gourdj, A. Hirsch, A.E. Andrews, J.C. Lin, and T. Nehrkorn, “Bridging across spatial and temporal scales in North American CO₂ flux estimation through geostatistical analysis of scale-dependent relationships between carbon flux and auxiliary environmental data,” Invited talk presented at the American Geophysical Union fall meeting, *EOS Transactions, AGU 88 (52)*, Fall Meeting Supplement, Abstract B42C-01, December 2007.
78. Michalak, A.M., “Atmospheric inverse modeling as a tool for constraining the global and regional budgets of carbon dioxide,” Invited talk presented to the interdisciplinary faculty-graduate student seminar series “Engineering Climate Change: Knowledge, Responsibilities, and Actions,” University of Michigan, November 2007.
79. Michalak, A.M., “Inferring historical forcing using geostatistical inverse modeling: Examples from hydrogeology and atmospheric monitoring,” Invited talk presented to the *Department of Civil and Environmental Engineering*, Clarkson University, Potsdam, New York, April 2007.
80. Michalak, A.M., “Improving understanding of global and regional carbon dioxide flux variability through assimilation of in situ and remote sensing data in a geostatistical framework,” Invited talk presented at the *Atmospheric Sciences Seminar Series*, Harvard University, Cambridge, Massachusetts, March 2007.
81. Michalak, A.M., “Improving understanding of global and regional carbon dioxide flux variability through assimilation of in situ and remote sensing data in a geostatistical framework,” Invited talk presented at the *Department of Atmospheric Oceanic and Space Sciences Seminar Series*, University of Michigan, Ann Arbor, Michigan, March 2007.
82. Michalak, A.M., Invited plenary presentation at wrap-up panel session, U.S. North American Carbon Program (NACP) Investigators Meeting, Colorado Springs, Colorado, January 2007.

2006

83. Michalak, A.M., “Application of Geostatistical Tools for Quantifying Complexity and Uncertainty in Environmental Systems,” Invited talk presented at the *International Symposium on Soil, Groundwater Environment & Waste Management*, The University of Seoul, Seoul, Korea, May 2006.
84. Michalak, A.M., “Application of Geostatistical Tools for Quantifying Complexity and Uncertainty in Environmental Systems,” Invited talk presented at the *IIHR Hydroscience & Engineering seminar series*, University of Iowa, Iowa City, Iowa, March 2006.
85. Michalak, A.M., “Applications of geostatistical tools to constraining the global carbon cycle,” Invited talk presented to the *Department of Chemical and Biochemical Engineering*, University of Iowa, Iowa City, Iowa, March 2006.
86. Michalak, A.M., “Quantifying the Spatial Covariance Structure of Modeled X_{CO2} Distributions: A Tool for Informing the Level 1b Subsampling Strategy,” Invited talk presented at the *Orbiting Carbon Observatory (OCO) Science Team Meeting*, Pasadena, California, March 2006.
87. Michalak, A.M., “Improved Carbon Flux Estimates through Assimilation of Auxiliary Environmental Data,” Invited talk presented at the *Data Assimilation Techniques for Regional Estimates of North American Carbon Fluxes* workshop, NOAA, Boulder, Colorado, February 2006.

2005

88. Michalak, A.M., “Estimating Sources and Sinks of Atmospheric Trace Gases Using Geostatistical Inverse Modeling,” Invited talk presented to the *Physical Sciences group, Women in Science and Engineering group, and Natural Resources group* of the University of Michigan Undergraduate Research Opportunity Program, Ann Arbor Michigan, November 2005.
89. Michalak, A.M., “Estimating Sources and Sinks of Atmospheric Trace Gases Using Geostatistical Inverse Modeling, *or Why Should Atmospheric Scientists Care about a South African Mining Engineer Named Dr. Krige?*,” Invited talk presented at the *Department of Atmospheric Oceanic and Space Sciences Seminar Series*, University of Michigan, Ann Arbor, Michigan, October 2005.
90. Michalak, A.M., “Inferring historical forcing using geostatistical inverse modeling: Examples from hydrogeology and atmospheric monitoring,” Invited talk presented at the *Smith Lecture Series*, Department of Geological Sciences, University of Michigan, Ann Arbor, Michigan, September 2005.
91. Michalak, A.M., “Atmospheric Inverse Modeling as a Tool for Constraining the Global and Regional Budgets of Carbon Dioxide,” Invited talk presented at the headquarters of the *Meteorological Service of Canada*, Toronto, Ontario, Canada, May 2005.
92. Michalak, A.M., “Data-driven Inverse Modeling Methods for Constraining Global and Regional Budgets of Carbon Dioxide,” Invited talk presented at the *Department of Geography*, University of Toronto, Toronto, Ontario, Canada, May 2005.
93. Michalak, A.M. and I.G. Enting “Residual analysis as a statistical diagnostics tool for carbon flux inversions,” Invited talk presented at the *Orbiting Carbon Observatory (OCO) Science Team Meeting*, California Institute of Technology, Pasadena, California, March 2005.

1999-2004

94. Michalak, A.M., “Application of Geostatistical Inverse Modeling to High Resolution Carbon Flux Estimation Involving Disparate Data Types,” Invited talk presented at the *Modeling and Data Analysis of Atmospheric CO₂ Observations in North America* workshop, Boulder, Colorado, October 2004.
95. Michalak, A.M., “Using Geostatistics to Constrain Groundwater Contaminant Source Identification... and more!” Invited talk presented to the *Hydrologic Science and Water Resources Seminar Series* at the Department of Civil, Environmental and Architectural Engineering at the University of Colorado, Boulder, Colorado, February 2004.
96. Michalak, A.M., “Environmental Contamination with Multiple Potential Sources: Scientific Methods for Source Identification and Their Legal Applicability,” Invited talk presented to the *Environmental and Energy Systems Institute* at Rice University, Houston, Texas, November 2002.
97. Michalak, A.M., “Environmental Contamination with Multiple Potential Sources and the Common Law: Problems, Opportunities and Statistics,” Invited talk presented at *The Association of Private Enterprise Education International Convention*, Cancun, Mexico, April 2002.
98. Michalak, A.M., “Approaches to Contaminant Source Identification for Environmental Law Enforcement,” Invited talk presented at the *Environmental Crime Prevention Program (ECPP) Plenary Inter-Ministerial Meeting*, EPA Region 2 Headquarters, New York City, New York, November, 2000.

99. Michalak, A.M., “Feasibility of Contaminant Source Identification for Property Rights Enforcement,” Invited talk presented at the *1999 Political Economy Forum*, Chico, Montana, December 1999.

CONTRIBUTED PUBLISHED ABSTRACTS AND CONFERENCE PRESENTATIONS

Over 200 contributed published abstracts and conference presentations in 1997 - 2013, not listed individually here for brevity.