

ALEXANDER J. TURNER

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EDUCATION

Ph.D., Harvard University Atmospheric Chemistry, Advisor: Daniel J. Jacob	2012 – 2017
B.S., University of Colorado at Boulder Mechanical Engineering, Advisor: Daven K. Henze	2008 – 2012

PROFESSIONAL EXPERIENCE

Miller Postdoctoral Fellow , University of California at Berkeley	2017 –
Graduate Research Assistant , Harvard University	2012 – 2017
Visiting Scholar , University of California at Berkeley	2014 & 2016
Undergraduate Research Assistant , University of Colorado at Boulder	2010 – 2012
Undergraduate Research Assistant , NOAA Geophysical Fluid Dynamics Lab	2011
Undergraduate Research Assistant , DOE Lawrence Berkeley National Lab	2010

AWARDS AND FELLOWSHIPS

Miller Fellowship at UC Berkeley	(Postdoctoral Fellowship, <i>11 Recipients</i>)	2017 – 2020
Department of Energy CSGF Fellowship	(National Fellowship, <i>10 Recipients</i>)	2013 – 2017
Department of Defense NDSEG Fellowship, <i>declined</i>	(National Fellowship, <i>200 Recipients</i>)	2013
CU Boulder “Outstanding Graduate for Research”	(College Award, <i>Sole Recipient</i>)	2012
Vestas Mechanical Engineering Student of the Year	(National Award, <i>Sole Recipient</i>)	2010
NOAA Ernest F. Hollings Scholar	(National Scholarship, <i>100 Recipients</i>)	2010 – 2012

PEER-REVIEWED PUBLICATIONS (*SUBMITTED)

- *19. Sheng, J. X., D. J. Jacob, **A. J. Turner**, J. D. Maasakkers, M. P. Sulprizio, A. A. Bloom, A. E. Andrews, and D. Wunch (submitted), High-resolution inversion of methane emissions in the Southeast US using SEAC⁴RS aircraft observations of atmospheric methane: anthropogenic and wetlands sources, *submitted*.
- *18. Sheng, J. X., D. J. Jacob, **A. J. Turner**, J. D. Maasakkers, J. Benmergui, A. A. Bloom, C. Arndt, R. Gautam, D. Zavala-Araiza, S. P. Hamburg, H. Boesch, and R. J. Parker (submitted), 2010–2015 methane trends over Canada, the United States, and Mexico observed by the GOSAT satellite: contributions from different source sectors, *submitted*.
- 17. Bloom, A. A., K. Bowman, M. Lee, **A. J. Turner**, R. Schroeder, J. R. Worden, R. J. Weidner, K. McDonald, and D. J. Jacob (2017), A global wetland methane emissions and uncertainty dataset for atmospheric chemical transport models (WetCHARTs version 1.0), *Geosci. Mod. Dev.*, *10*, 2141–2156, doi:10.5194/gmd-10-2141-2017.
- 16. Buchwitz, M., O. Schneising, M. Reuter, J. Heymann, S. Krautwurst, H. Bovensmann, J. P. Burrows, H. Boesch, R. J. Parker, P. Somkuti, R. G. Detmers, O. P. Hasekamp, I. Aben, A. Butz, C. Frankenberg, and **A. J. Turner** (2017), Satellite-derived methane hotspot emission estimates using a fast data-driven method, *Atmos. Chem. Phys.*, *17*, 5751–5744, doi:10.5194/acp-17-5751-2017.
- 15. **Turner, A. J.**, C. Frankenberg, P. O. Wennberg, and D. J. Jacob (2017), Ambiguity in the causes for decadal trends in atmospheric methane and hydroxyl, *Proc. Natl. Acad. Sci.*, *114*, 5367–5372, doi:10.1073/pnas.1616020114.
- 14. Tzompa-Sosa, Z. A., E. V. Fischer, E. Mahieu, B. Franco, C. A. Keller, **A. J. Turner**, D. Helmig, A. Fried, D. Richter, P. Weibring, J. Walega, T. I. Yacovitch, S. C. Herndon, D. R. Blake, F. Hase, J. Hannigan, S. Conway, K. Strong, and M. Schneider (2017), Revisiting global fossil fuel and biofuel emissions of ethane, *J. Geophys. Res.*, *122*, 2493–2512, doi:10.1002/2016JD025767.
- 13. Bader, W., B. Bovy, S. Conway, K. Strong, D. Smale, **A. J. Turner**, T. Blumenstock, C. Boone, M. C. Coen, A. Coulon, O. Garcia, D. W. T. Griffith, F. Hase, P. Hausmann, N. Jones, P. Krummel, I. Murata, I. Morino, H. Nakajima, S. O’Doherty, C. Paton-Walsh, J. Robinson, R. Sandrin, M. Schneider, C. Servais, R. Sussmann, and E. Mahieu (2017), The recent increase of atmospheric methane from 10 years of ground-based NDACC FTIR observations since 2005, *Atmos. Chem. Phys.*, *17*, 2255–2277, doi:10.5194/acp-17-2255-2017.
- 12. Maasakkers, J. D., D. J. Jacob, M. Sulprizio, **A. J. Turner**, M. Weitz, T. Wirth, C. Hight, M. DeFigueiredo, M. Desai, R. Schmeltz, L. Hockstad, A. A. Bloom, K. W. Bowman, S. Jeong, and M. L. Fischer (2016), A gridded national inventory of US methane emissions, *Env. Sci. Technol.*, *50*, 13123–13133, doi:10.1021/acs.est.6b02878.

11. Jacob, D. J., **A. J. Turner**, J. D. Maasakkers, J. Sheng, K. Sun, X. Liu, K. Chance, I. Aben, J. McKeever, and C. Frankenberg (2016), Satellite observations of atmospheric methane and their application to constrain emissions, *Atmos. Chem. Phys.*, *16*, 14371–14396, doi:10.5194/acp-16-14371-2016.
10. **Turner, A. J.**, A. A. Shusterman, B. C. McDonald, V. Teige, R. A. Harley, and R. C. Cohen (2016), Network design for quantifying urban CO₂ emissions: assessing trade-offs between precision and network density, *Atmos. Chem. Phys.*, *16*, 13465–13475, doi:10.5194/acp-16-13465-2016.
9. Shusterman, A. A., V. Teige, **A. J. Turner**, C. Newman, J. Kim, and R. C. Cohen (2016), The BErkeley Atmospheric CO₂ Observation Network: Initial Evaluation, *Atmos. Chem. Phys.*, *16*, 13449–13463, doi:10.5194/acp-16-13449-2016.
8. Tan, Z., Q. Zhuang, D. K. Henze, C. Frankenberg, E. Dlugokencky, C. Sweeney, **A. J. Turner**, M. Sasakawa, and T. Machida (2016), Inverse modeling of pan-Arctic methane emissions at high spatial resolution: What can we learn from assimilating satellite retrievals and using different process-based wetland and lake biogeochemical models?, *Atmos. Chem. Phys.*, *16*, 12649–12666, doi:10.5194/acp-16-12649-2016.
7. Bousserez, N., D. K. Henze, B. Rooney, A. Perkins, K. J. Wecht, **A. J. Turner**, V. Natraj, and J. R. Worden (2016), Constraints on methane emissions in North America from future geostationary remote sensing measurements, *Atmos. Chem. Phys.*, *16*, 6175–6190, doi:10.5194/acp-16-6175-2016.
6. **Turner, A. J.**, D. J. Jacob, J. Benmergui, S. C. Wofsy, J. D. Maasakkers, A. Butz, O. Hasekamp, and S. C. Biraud (2016), A large increase in U.S. methane emissions over the past decade inferred from satellite data and surface observations, *Geophys. Res. Lett.*, *43*, doi:10.1002/2016GL067987.
5. Worden, J. R., **A. J. Turner**, A. Bloom, S. S. Kulawik, J. Liu, M. Lee, R. Weidner, K. Bowman, C. Frankenberg, R. J. Parker, and V. H. Payne (2015), Quantifying Lower Tropospheric Methane Concentrations Using Near-IR and Thermal IR Satellite Measurements: Comparison to the GEOS-Chem model, *Atmos. Meas. Tech.*, *8*, 3433–3445, doi:10.5194/amt-8-3433-2015.
4. **Turner, A. J.**, D. J. Jacob, K. J. Wecht, J. D. Maasakkers, E. Lundgren, A. E. Andrews, S. C. Biraud, H. Boesch, K. W. Bowman, N. M. Deutscher, M. K. Dubey, D. W. T. Griffith, F. Hase, A. Kuze, J. Notholt, H. Ohyama, R. Parker, V. H. Payne, R. Sussmann, C. Sweeney, V. A. Velazco, T. Warneke, P. O. Wennberg, and D. Wunch (2015), Estimating global and North American methane emissions with high spatial resolution using GOSAT satellite data, *Atmos. Chem. Phys.*, *15*, 7049–7069, doi:10.5194/acp-15-7049-2015.
3. **Turner, A. J.** and D. J. Jacob (2015), Balancing aggregation and smoothing errors in inverse models, *Atmos. Chem. Phys.*, *15*, 7039–7048, doi:10.5194/acp-15-7039-2015.
2. **Turner, A. J.**, A. M. Fiore, L. W. Horowitz, and M. Bauer (2013), Summertime cyclone frequencies over the Great Lakes Storm Track from 1860–2100: variability, trends, and association with ozone pollution, *Atmos. Chem. Phys.*, *13*, 565–578, doi:10.5194/acp-13-565-2013.
1. **Turner, A. J.**, D. K. Henze, R. V. Martin, and A. Hakami (2012), The spatial extent of source influences on modeled column concentrations of short-lived species, *Geophys. Res. Lett.*, *39*, L12806, doi:10.1029/2012GL051832.

SELECTED ORAL CONFERENCE PRESENTATIONS ([†]INVITED)

- 2017 AGU Fall meeting, New Orleans, LA
- 2017[†] UN Climate Change Conference (COP23), Bonn, Germany
- 2017 ACCESS XIV Meeting, Brookhaven National Laboratory
- 2016 AGU Fall meeting, San Francisco, CA
- 2015 11th International workshop on greenhouse gas measurements from space, Caltech
- 2015 7th International GEOS-Chem meeting, Harvard University
- 2015 5th North American carbon program meeting, Washington, DC
- 2014 AGU Fall meeting, San Francisco, CA
- 2013 AGU Fall meeting, San Francisco, CA
- 2011 AGU Fall meeting, San Francisco, CA
- 2011 5th International GEOS-Chem meeting, Harvard University

INVITED SEMINARS

2017 Japanese Aerospace Exploration Agency (JAXA)
2017 California Institute of Technology (Caltech)
2016 Massachusetts Institute of Technology (MIT)
2016 NASA Jet Propulsion Laboratory
2016 NOAA Earth System Research Laboratory
2016 IBM Thomas J. Watson Research Center
2014 DOE Lawrence Livermore National Laboratory
2014 NOAA Earth System Research Laboratory

TEACHING EXPERIENCE

2014 **Atmospheric Chemistry** (21 students), Harvard University
2011 **Numerical Methods** (100+ students), University of Colorado – *Outstanding Teaching Assistant Award*
2010 **Numerical Methods** (100+ students), University of Colorado
2010 **First-Year Engineering Projects** (25 students), University of Colorado

TECHNICAL SKILLS

Peer-reviewer for: Nature Geosci., GRL, JGR, ACP, AMT, GMD, and Atmos. Environ.
Proposal reviewer for: NASA.
Graduate Coursework: Inverse Methods, Partial Differential Equations, Stochastic Optimization, Parallel Computing, Environmental Modeling, Atmospheric Chemistry, Aerosols, Spectroscopy, Physics of Climate, Computing Foundations, Classical Thermo., Stat. Thermo., and Fluid Dynamics.
Programming: Matlab, Python, Julia, R, IDL, Fortran 77/90, Shell Scripting, Keras, Mathematica, html.
Computing Tools: MPI, CUDA, OpenMP, MapReduce, Unix, Amazon EC2, L^AT_EX.

RESEARCH GRANTS AND COMPUTING ALLOCATIONS

On the utility of satellite observations for constraining fine-scale methane fluxes and super-emitters
400,000 CPU hours, Alexander J. Turner (PI)

- NCAR/CISL Allocation Number: UHAR0006
- 05/19/2017 – 05/18/2018

Estimating urban carbon dioxide fluxes at high resolution from in situ observations
650,000 CPU hours & 400,000 Storage Units, Alexander J. Turner (PI)

- NERSC ERCAP Grant 87628
- 01/12/2014 – 01/09/2017