

# ALEXANDER J. TURNER

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## EDUCATION

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

## PROFESSIONAL EXPERIENCE

<b>Research Affiliate</b> , NASA Jet Propulsion Lab	2018 –
<b>Miller Postdoctoral Fellow</b> , University of California at Berkeley	2017 –
<b>Graduate Research Assistant</b> , Harvard University	2012 – 2017
<b>Technical Consultant</b> , ExxonMobil Research and Engineering Company	2016 – 2017
<b>Visiting Scholar</b> , University of California at Berkeley	2014 & 2016
<b>Undergraduate Research Assistant</b> , University of Colorado at Boulder	2010 – 2012
<b>Undergraduate Research Assistant</b> , NOAA Geophysical Fluid Dynamics Lab	2011
<b>Undergraduate Research Assistant</b> , DOE Lawrence Berkeley National Lab	2010

## AWARDS AND FELLOWSHIPS

Miller Fellowship at UC Berkeley	2017 – 2020
Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS XIV)	2017
DOE Computational Science Graduate Fellowship (CSGF)	2013 – 2017
National Defense Science and Engineering Graduate (NDSEG) fellowship, <i>declined</i>	2013
CU Boulder College of Engineering's "Outstanding Graduate for Research"	2012
Vestas Mechanical Engineering Student of the Year	2010
NOAA Ernest F. Hollings Scholar	2010 – 2012

## PUBLICATIONS (\*SUBMITTED, \*CONTRIBUTED EQUALLY, ‡ESI HIGHLY CITED PAPER)

h-index = 14, total citations = 729 (*as of September 1, 2019 on Google scholar*)

- \*25. **Turner, A. J.**, P. Köhler, T. S. Magney, C. Frankenberg, I. Fung, and R. C. Cohen (submitted), A double peak in the seasonality of California's photosynthesis as observed from space, *submitted*.
- \*24. Nguyen, N., **A. J. Turner**, Y. Yin, M. Prather, and C. Frankenberg (submitted), Effects of chemical feedbacks on decadal methane emissions estimates, *submitted*.
- 23. **Turner, A. J.**<sup>\*</sup>, C. Frankenberg<sup>\*</sup>, and E. A. Kort<sup>\*</sup> (2019), Interpreting contemporary trends in atmospheric methane, *Proc. Natl. Acad. Sci.*, *116*, 2805–2813, doi:10.1073/pnas.1814297116.
- 22. Cusworth, D. H., D. J. Jacob, J. X. Sheng, J. Benmergui, **A. J. Turner**, J. Brandman, L. White, and C. A. Randles (2018), Detecting high-emitting methane sources in oil/gas fields using satellite observations, *Atmos. Chem. Phys.*, *18*, 16885–16896, doi:10.5194/acp-18-16885-2018.
- 21. **Turner, A. J.**, I. Fung, V. Naik, L. W. Horowitz, and R. C. Cohen (2018), Modulation of hydroxyl variability by ENSO in the absence of external forcing, *Proc. Natl. Acad. Sci.*, *115*, 8931–8936, doi:10.1073/pnas.1807532115.
- 20. Sheng, J. X., D. J. Jacob, **A. J. Turner**, J. D. Maasakkers, J. Benmergui, A. A. Bloom, C. Arndt, R. Gautam, D. Zavala-Araiza, H. Boesch, and R. J. Parker (2018), 2010–2016 methane trends over Canada, the United States, and Mexico observed by the GOSAT satellite: contributions from different source sectors, *Atmos. Chem. Phys.*, *18*, 12257–12267, doi:10.5194/acp-18-12257-2018.
- 19. **Turner, A. J.**, D. J. Jacob, J. Benmergui, J. Brandman, L. White, and C. A. Randles (2018), Assessing the capability of different satellite observing configurations to resolve the distribution of methane emissions at kilometer scales, *Atmos. Chem. Phys.*, *18*, 8265–8278, doi:10.5194/acp-18-8265-2018.
- 18. Sheng, J. X., D. J. Jacob, **A. J. Turner**, J. D. Maasakkers, M. P. Sulprizio, A. A. Bloom, A. E. Andrews, and D. Wunch (2018), High-resolution inversion of methane emissions in the Southeast US using SEAC<sup>4</sup>RS aircraft observations of atmospheric methane: anthropogenic and wetlands sources, *Atmos. Chem. Phys.*, *18*, 6483–6491, doi:10.5194/acp-18-6483-2018.
- 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. Heymenn, 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.
- <sup>‡</sup>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 CO<sub>2</sub> 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 CO<sub>2</sub> 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.
- <sup>‡</sup>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.
- <sup>‡</sup>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. Velasco, 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.

## INVITED SEMINARS

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2019 Bay Area Air Quality Management District (BAAQMD)  
2019 OneNOAA Science Seminar  
2018 Stanford University  
2018 University of California at Berkeley  
2018 Technical University of Munich (TUM), Germany  
2018 NASA Ames Research Center  
2018 NOAA Geophysical Fluid Dynamics Laboratory (GFDL)  
2018 University of Washington  
2017 Japanese Aerospace Exploration Agency (JAXA)  
2017 California Institute of Technology (Caltech)  
2016 Massachusetts Institute of Technology (MIT)  
2016 NASA Jet Propulsion Laboratory (JPL)  
2016 NOAA Earth System Research Laboratory (ESRL)  
2016 IBM Thomas J. Watson Research Center  
2014 DOE Lawrence Livermore National Laboratory (LLNL)  
2014 NOAA Earth System Research Laboratory (ESRL)

## SELECTED ORAL CONFERENCE PRESENTATIONS (<sup>†</sup>INVITED)

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2019<sup>†</sup> CO<sub>2</sub>-Urban Synthesis and Analysis (CO<sub>2</sub>-USA) Workshop, Boston University  
2019<sup>†</sup> Frontiers of Atmospheric Science and Chemistry (FASCINATE 2019), NCAR, Boulder, CO  
2019<sup>†</sup> Global Air Quality Sensing Forum, Berkeley, CA  
2017 AGU Fall Meeting, New Orleans, LA  
2017<sup>†</sup> UN Climate Change Conference (COP23), Bonn, Germany  
2017 Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS) XIV, Brookhaven National Lab  
2017<sup>†</sup> DOE Computational Science Graduate Fellowship Program Review, Washington, DC  
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

## TEACHING EXPERIENCE

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2019 **Global Air Quality & Health** (10 students; guest lecturer), University of California at Berkeley  
2019 **Atmospheric Science Seminar Course** (6 students; guest lecturer), Columbia University  
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

## RESEARCH ADVISING

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### Master Students:

- Philipp Lux (2019, UC Berkeley): “Spatio-temporal sampling frequency for direct observation of pollution sources”

### Undergraduates:

- Connor Dolan (2019, UC Berkeley): “Identifying the modes of photosynthesis variability with TROPOMI SIF”
- Erik Tamre (2014, Harvard University): “Observing abrupt changes in methane sources from space”

## SERVICE ACTIVITIES

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Proposal reviewer for *NASA* and *NOAA*.

Peer reviewer for *PNAS*, *Nature Geoscience*, *Nature Climate Change*, *Geophysical Research Letters*, *Atmospheric Chemistry and Physics*, *Journal of Geophysical Research*, *Atmospheric Measurement Techniques*, *Environmental Science & Technology*, *Geoscientific Model Development*, *IEEE Transactions on Geoscience and Remote Sensing*, and *Atmospheric Environment*.

Japanese National Institute for Environmental Studies, workshop participant (2017, 2018) and lead author on a chapter of the report: “*A guidebook on the use of satellite greenhouse gases observation data to evaluate and improve greenhouse gas emission inventories*”.

Session convener for AGU Fall Meeting (2019).

Miller Institute at UC Berkeley: symposium planning committee (2019, 2020).

Harvard University Earth & Planetary Science faculty search: student advisory committee (2017).