

# 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>Assistant Professor</b> , University of Washington	2021 –
<b>Research Affiliate</b> , NASA Jet Propulsion Lab	2018 – 2021
<b>Miller Postdoctoral Fellow</b> , University of California at Berkeley	2017 – 2020
<b>Graduate Research Assistant</b> , Harvard University	2012 – 2017

## AWARDS AND FELLOWSHIPS

AGU James R. Holton Junior Scientist Award	2020
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
NOAA Ernest F. Hollings Scholar	2010 – 2012

## PUBLICATIONS (GROUP MEMBER, \*SUBMITTED, †ESI HIGHLY CITED PAPER)

h-index = 21, total citations = 1502 (*as of June 22, 2021 on Google scholar*)

- \*32. K. D. Hajny, C. Floerchinger, J. Pitt, J. Tomlin, R. Kaeser, B. H. Stirm, T. Jayarathne, C. Gately, M. Sargent, K. Gurney, G. Roest, I. Lopez-Coto, **A. J. Turner**, L. Hutyla, P. B. Shepson, S. Wofsy (submitted), Measurements of anthropogenic CO<sub>2</sub> emissions from New York City compared to inventories, *submitted*.
- \*31. E. R. Delaria, B. K. Place, **A. J. Turner**, Q. Zhu, and R. C. Cohen (submitted), Development of a solar induced fluorescence-canopy conductance model and its application to stomatal reactive nitrogen deposition, *submitted*.
- \*30. X. Wang, J. A. Biederman, J. F. Knowles, R. L. Scott, **A. J. Turner**, P. Köhler, C. Frankenberg, M. E. Litvak, G. N. Flerchinger, B. E. Law, H. Kwon, S. C. Reed, W. J. Parton, G. A. Barron-Gafford, and W. K. Smith (submitted), Satellite solar-induced chlorophyll fluorescence and near-infrared reflectance observations capture complimentary aspects of dryland vegetation dynamics, *submitted*.
- \*29. Laughner, J. L., J. L. Neu, D. Schimel, P. O. Wennberg, K. Barsanti, K. Bowman, A. Chatterjee, B. Croes, H. Fitzmaurice, D. K. Henze, J. Kim, E. A. Kort, Z. Liu, K. Miyazaki, **A. J. Turner**, S. Anenberg, J. Avise, H. Cao, D. Crisp, J. de Gouw, A. Eldering, J. Fyfe, D. L. Goldberg, K. R. Gurney, S. Hasheminassab, F. Hopkins, C. E. Ivey, D. B. A. Jones, N. S. Lovenduski, R. V. Martin, G. A. McKinley, L. Ott, B. Poulter, M. Ru, S. P. Sander, N. Swart, Y. L. Yung, Z. Zeng, and KISS COVID-19 workshop team (submitted), What can COVID-19 teach us about 2030 and beyond? A perspective on air pollution and climate, *submitted*.
- \*28. **Turner, A. J.**, P. Köhler, T. S. Magney, C. Frankenberg, I. Fung, and R. C. Cohen (submitted), Extreme events driving year-to-year differences in gross primary productivity across the US, *submitted*.
- 27. J. Gensheimer, **A. J. Turner**, A. Shekhar, A. Wenzel, F. N. Keutsch, and J. Chen (2021), What are different measures of mobility changes telling us about emissions during the COVID-19 pandemic?, *J. Geophys. Res.*, *126*, doi:10.1029/2021JD034664.
- 26. **Turner, A. J.**, J. Kim, H. Fitzmaurice, C. Newman, K. Worthington, K. Chan, P. J. Wooldridge, P. Köhler, C. Frankenberg, and R. C. Cohen (2020), Observed impacts of COVID-19 on urban CO<sub>2</sub> emissions, *Geophys. Res. Lett.*, *47*, doi:10.1029/2020GL090037.
- 25. **Turner, A. J.**, P. Köhler, T. S. Magney, C. Frankenberg, I. Fung, and R. C. Cohen (2020), A double peak in the seasonality of California's photosynthesis as observed from space, *Biogeosci.*, *17*, 405–422, doi:10.5194/bg-17-405-2020.
- 24. Nguyen, N., **A. J. Turner**, Y. Yin, M. Prather, and C. Frankenberg (2020), Effects of chemical feedbacks on decadal methane emissions estimates, *Geophys. Res. Lett.*, *47*, doi:10.1029/2019GL085706.

- ‡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.
- ‡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. 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.

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## INVITED SEMINARS

2021 Environment and Climate Change Canada  
 2021 University of Toronto  
 2021 UC Berkeley Climate and Impacts Group  
 2021 Imperial College  
 2020 NASA Jet Propulsion Laboratory (JPL)  
 2020 University of California at Berkeley  
 2020 University of Washington  
 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)

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

2020<sup>†</sup> AGU Fall Meeting: James R. Holton Award talk in the Frontiers of Atmospheric Science session  
 2020<sup>†</sup> AGU Fall Meeting: Union Session on COVID-19 in the Earth system  
 2020 AGU Fall Meeting: Session on Solar-Induced chlorophyll Fluorescence  
 2020 Air Sensors International Conference (ASIC) virtual fall series  
 2020<sup>†</sup> COVID-19: Identifying Unique Opportunities for Earth Science, Keck Institute for Space Studies  
 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

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## TEACHING EXPERIENCE

2021 **ATM S 358: Atmospheric Chemistry** (36 students), University of Washington  
 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  
 2015 **Environmental Modeling** (17 students; guest lecturer), Harvard University  
 2014 **Atmospheric Chemistry** (21 students; TA), Harvard University  
 2011 **Numerical Methods** (100+ students; TA), University of Colorado – *Outstanding Teaching Assistant Award*  
 2010 **Numerical Methods** (100+ students; TA), University of Colorado  
 2010 **First-Year Engineering Projects** (25 students; TA), University of Colorado

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## RESEARCH ADVISING

### Master Students:

- Johannes Gensheimer (TUM): 2020 – *present*
- Philipp Lux (LMU Munich): 2019 – 2020

### Undergraduates:

- Ryan Boyd (UW): 2021 – *present*
- Connor Dolan (UC Berkeley): 2019
- Erik Tamre (Harvard): 2014

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## SERVICE ACTIVITIES

Proposal reviewer for *NASA*, *NOAA*, and *Deutsche Forschungsgemeinschaft*.  
 Peer reviewer for *PNAS*, *Nature Geoscience*, *Nature Climate Change*, *Science Advances*, *Geophysical Research Letters*, *Atmospheric Chemistry and Physics*, *Biogeosciences*, *Journal of Geophysical Research*, *Atmospheric Measurement Techniques*, *Environmental Science & Technology*, *GeoHealth*, *Geoscientific Model Development*, *IEEE Transactions on Geoscience and Remote Sensing*, and *Atmospheric Environment*.  
 Team Lead for NASA Keck Institute for Space Sciences workshop on “*COVID-19 and the Earth System*” (2020) and co-author on resulting publication under review at PNAS.  
 Microsoft Research workshop participant (2020) and co-author on a white paper: “*Why all cities should have ‘Clean Air as a City Service’*”.  
 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*” (2018) that was organized by the Japanese National Institute for Environmental Studies and a workshop participant (2017, 2018).  
 Session convener for AGU Fall Meeting (2019, 2020).  
 Miller Institute at UC Berkeley: symposium planning committee (2019, 2020).  
 Harvard University Earth & Planetary Science faculty search: student advisory committee (2017).