Biographical Sketch: John C. Lin

John C. Lin is currently a Professor in the Dept. of Atmospheric Sciences at the University of Utah. Lin's research is focused on air quality and greenhouse gases in the Western U.S., and around the world. He obtained his Ph.D. at Harvard University's Dept. of Earth and Planetary Sciences (Ph.D. advisor: S.C. Wofsy), in which he carried out research on trace gases, interpreting aircraft data with atmospheric and biospheric models (see below). He won a NOAA Postdoctoral Fellowship and held the award at Colorado State University, where he was trained in satellite data analyses and mesoscale modeling (postdoc advisor: R. Pielke, Sr.).

Lin has expertise in modeling of greenhouse gases, pollutants, and inverse analyses for over 20 years. He was among the first to integrate continental atmospheric CO_2 concentrations with land surface observations to estimate regional scale carbon sources/sinks [*Lin et al.*, 2004]. He has been invited to participate in multi-institutional, international efforts at studying the carbon cycle. He was a contributing author to the North American Carbon Program (NACP) and is a member of NACP's Science Leadership Group. Since 2018 he has also been a Science Team member of the WMO Integrated Global Greenhouse Gas Information System (IG^3IS).

Lin has extensive experience in Lagrangian modeling of the atmosphere and is the original author of the STILT atmospheric model [*Lin et al*., 2003]. STILT is being used by a growing community for interpreting trace gas measurements made at ground based stations, on aircraft, as well as for remote sensing. He served as the Convener for AGU's Chapman Conference on "Advances in Lagrangian Modeling of the Atmosphere" and was the Chief Editor of an AGU Geophysical Monograph on Lagrangian Modeling [*Lin et al.*, 2012].

Lin is proficient in the application of satellite data for a variety of scientific purposes in Earth System Science, having published papers that utilized satellite data for understanding the impact of biomass burning-derived aerosols on clouds and precipitation [*Lin et al*., 2006], urban carbon emissions [*Wu et al.*, 2018; 2020], and biospheric modeling [*Mahadevan et al*., 2008; *Lin et al*., 2011; *Zuromski et al.*, 2018]. He is serving on the Science Teams of NASA's Carbon Monitoring System and Orbiting Carbon Observatory-2/-3.

EMPLOYMENT

Professor, Dept. of Atmospheric Sciences, Univ. of Utah, 2018~.

Associate Professor, Dept. of Atmospheric Sciences, Univ. of Utah, 2012~2018.

Assistant/Associate Professor, Earth & Environmental Sciences, Univ. of Waterloo, 2006~12.

NOAA Postdoctoral Fellow in Climate and Global Change, Colorado State Univ., 2005~06.

EDUCATION

Harvard University	Ph.D. (Earth & Planetary Sciences)	2003	Cambridge, MA, USA
Harvard University	A.B./A.M. (Biology)	1997	Cambridge, MA, USA

AWARDS

- Fellow of Earth Leadership Program (formerly the Leopold Leadership Program), 2021.
- University of Utah Top Researcher Award, 2017.
- Ontario Early Researcher Award, 2008.
- NOAA Postdoctoral Fellowship in Climate and Global Change, 2004.
- Harvard University Distinction in Teaching Award, 2002.
- NASA Earth System Science Fellowship, 1998-2001.

SYNERGISTIC ACTIVITIES

- NASA Orbiting Carbon Observatory-2/-3 Science Team Member, 2012~.
- NASA Carbon Monitoring System (CMS) Science Team Member, 2016~.
- WMO Integrated Global Greenhouse Gas Information System (IG^3IS) Science Team, 2018~.

- North American Carbon Program Science Leader Group, 2016~.
- Chief Editor of AGU Geophysical Monograph (Vol. 200): *Advances in Lagrangian Modeling of the Atmosphere*, American Geophysical Union, 349 pages, 2012.
- Editorial Board Member for *Nature Scientific Reports*, 2011~2017.

SELECTED PUBLICATIONS

Wu, D., **J.C. Lin**, et al. A Model for Urban Biogenic CO_2 Fluxes: Solar-Induced Fluorescence for Modeling Urban biogenic Fluxes (SMUrF v1), *Geosci. Model Dev. Discuss*., https://doi.org/10.5194/gmd-2020-301, in review, 2020.

Wu, D., **J.C. Lin**, et al.: Space-based quantification of per capita CO_2 emissions from cities, *Environmental Research Letters*, https://iopscience.iop.org/article/10.1088/1748-9326/ab68eb, 2020.

Womack, C., et al.: Wintertime ammonium nitrate aerosol pollution in urban areas: NO_x and VOC control as mitigation strategies, *Geophysical Research Letters*, 46, 4971– 4979, 2019.

Lin, J.C., et al., CO_2 and carbon emissions from cities: linkages to air quality, socioeconomic activity and stakeholders in the Salt Lake City urban area, *Bulletin of the American Meteorological Society*, doi:10.1175/BAMS-D-17-0037.1, 2018.

Wu, D., **J.C. Lin**, et al.: A Lagrangian Approach Towards Extracting Signals of Urban CO_2 Emissions from Satellite Observations of Atmospheric Column CO_2 (XCO_2): X-Stochastic Time-Inverted Lagrangian Transport model ("X-STILT"), *Geoscientific Model Development*, 11, 4843-4871, 2018.

Zuromski, L., D.R. Bowling, P. Köhler, C. Frankenberg, M.L. Goulden, and **J.C. Lin**: Solar-induced fluorescence detects inter-annual variation in gross primary production of coniferous forests in the western United States, *Geophysical Research Letters*, https://doi.org/10.1029/2018GL077906, 2018.

Mitchell, L.E., et al., Monitoring of trace gases and pollutants across an urban area using a light-rail public transit platform, *Atmospheric Environment*, 187, 9-23, 2018.

Mitchell, L.E., **J.C. Lin**, et al., Long-term urban carbon dioxide observations reveal spatial and temporal dynamics related to urban form and growth, *Proceedings of the National Academy of Sciences*, www.pnas.org/cgi/doi/10.1073/pnas.1702393115, 2018.

Bares, R., **J. Lin**, et al., The wintertime co-variation of CO_2 & criteria pollutants in an urban valley of the Western U.S., *Journal of Geophysical Research-Atmospheres*, doi://10.1002/2017JD027917, 2018.

Fasoli, B., **J.C. Lin**, et al.: Simulating atmospheric tracer concentrations for spatially distributed receptors: updates to the Stochastic Time-Inverted Lagrangian Transport model's R interface (STILT-R version 2), *Geoscientific Model Development*, 11, 2813-2824, 2018.

Lin, J.C., et al., How can mountaintop CO_2 observations be used to constrain regional carbon fluxes?, *Atmospheric Chemistry and Physics*, 17, 5561-5581, doi:10.5194/acp-17-5561-2017, 2017.

Baasandorj, M., et al., Coupling between chemical and meteorological processes under persistent cold-air pool conditions: evolution of $PM_{2.5}$ pollution events and N_2O_5 observations in Salt Lake Valley, Utah, *Environmental Science and Technology*, 51 (11), 5941–5950, 2017.

Lin, J.C. and D. Wen, A method to quantitatively apportion pollutants at high spatial and temporal resolution: the Stochastic Lagrangian Apportionment Method (SLAM), *Environmental Science and Technology*, 49, 351-360, doi: 10.1021/es505603v, 2015.

Lagrangian Modeling of the Atmosphere, AGU Geophysical Monograph (Vol. 200), edited by **Lin, J.C.**, D. Brunner, C. Gerbig, A. Stohl, A. Luhar, and P. Webley, Washington D.C., American Geophysical Union, 349 pages, 2012.

Mahadevan, P., S.C. Wofsy, D.M. Matross, X. Xiao, A.L. Dunn, **J.C. Lin**, et al., A Satellite-Based Biosphere Parameterization for Net Ecosystem CO_2 Exchange: Vegetation Photosynthesis and Respiration Model (VPRM), *Global Biogeochemical Cycles*, 22, doi:10.1029/2006GB002735, 2008.

Lin, J.C., T. Matsui, R.A. Pielke, Sr., C. Kummerow, Effects of biomass burning-derived aerosols on precipitation and clouds in the Amazon Basin: A satellite-based empirical study, *J. Geophys. Res.*, 111 (D19204), doi:10.1029/2005JD006884, 2006.

Lin, J.C. and C. Gerbig, Accounting for the effect of transport errors on tracer inversions, *Geophysical Research Letters*, 32 (L01802), doi:10.1029/2004GL021127, 2005.

Lin, J.C., C. Gerbig, S.C. Wofsy, et al., A near-field tool for simulating the upstream influence of atmospheric observations: The Stochastic Time-Inverted Lagrangian Transport (STILT) model, *J. Geophy. Res.*, 108(D16), 4493, doi:10.1029/2002JD003161, 2003.