**TIA SCARPELLI**
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## EDUCATION

**Harvard University**, Cambridge, MA (USA)
**PhD**, Earth & Planetary Sciences, May 2021.
Dissertation: Integration of bottom-up and top-down methods to evaluate national methane emission inventories
Advisor: Prof. Daniel J. Jacob

**Michigan Technological University**, Houghton, MI (USA)
**MS**, Environmental Engineering, May 2016.
Thesis: The role of amino acids in the nitrogen cycle of peatlands
Advisor: Prof. Paul V. Doskey

**Michigan Technological University, USA**
**BS**, *summa cum laude*, Environmental Engineering, May 2015.

## RESEARCH AREAS

Methane emission sources
Greenhouse gas modeling
Remote sensing of atmospheric pollutants

## RESEARCH APPOINTMENTS

2023 - present Research scientist and Waste Sector Lead, Carbon Mapper
2021 - 2023 Postdoctoral Research Associate, EU CoCO2 project, University of Edinburgh
2016 - 2021 Graduate Research Assistant and Teaching Fellow, Harvard University
2017 - 2021 National Defense Science and Engineering Graduate (NDSEG) Fellow
2013 - 2014 U.S. Environmental Protection Agency (EPA) Graduate Research Opportunity (GRO) Fellow
2012 - 2014 Undergraduate Research Assistant, atmospheric science lab, Michigan Technological University

## FIRST-AUTHOR PUBLICATIONS

**Scarpelli, T. R.**, D. J., Jacob, S., Grossman, X., Lu, Z., Qu, M. P., Sulprizio, Y., Zhang, F., Reuland, D., Gordon, J. R., Worden, Updated Global Fuel Exploitation Inventory (GFEI) for methane emissions from the oil, gas, and coal sectors: evaluation with inversions of atmospheric methane observations, Atmos. Chem. Phys., 22, 3235–3249, https://doi.org/10.5194/acp-22-3235-2022, 2022.

**Scarpelli, T. R**., D. J., Jacob, M., Moran, F., Reuland, D., Gordon, A gridded inventory of Canada's anthropogenic methane emissions, Environ. Res. Lett., 17, 014007, https://doi.org/10.1088/1748-9326/ac40b1, 2022.

**Scarpelli, T.R.,** D.J. Jacob, C.A. Octaviano Villasana, I.F. Ramirez Hernandez, P.R. Cardenas Moreno, E.A. Cortes Alfaro, M.A. Garcia Garcia, D. Zavala-Araiza, A gridded inventory of anthropogenic methane emissions from Mexico based on Mexico's national inventory of greenhouse gases and compounds, Environ. Res. Lett. 15, 105015, https://doi.org/10.1088/1748-9326/abb42b, 2020.

**Scarpelli, T.R.,** D.J. Jacob, J.D. Maasakkers, M.P. Sulprizio, J.X. Sheng, K. Rose, L. Romeo, J.R. Worden, G. Janssens-Maenhout, A global gridded (0.1° x 0.1°) inventory of methane emissions from oil, gas, and coal exploitation based on national reports to the United Nations Framework Convention on Climate Change, Earth Syst. Sci. Data, 12, 563–575, https://doi.org/10.5194/essd-12-563-2020, 2020.

## PRESENTATIONS

**Scarpelli, T.R.,** et al., Estimating combustion and non-combustion fluxes of carbon dioxide using satellite observations over Europe, American Geophysical Union (AGU) Fall Meeting, December 2022.

**Scarpelli, T.R.,** Integration of bottom-up and top-down methods to evaluate national methane emission inventories, RSC Desktop Seminar by Environmental Science: Advances, June 2022. (Invited Virtual Presentation)

**Scarpelli, T.R.,** Integration of bottom-up and top-down methods to evaluate national methane emission inventories, META Seminar at Stanford University, June 2021. (Invited Virtual Presentation)

**Scarpelli, T.R.,** et al., Using Geospatial Data and Atmospheric Observations to Evaluate National Inventories of Methane Emissions from Oil, Gas, and Coal, AGU Fall Meeting, December 2020. (Invited Presentation)

**Scarpelli, T.R.,** et al., A Global Gridded Inventory of Methane Emissions from Fuel Exploitation including Oil, Gas, and Coal, AGU Fall Meeting, December 2018.

## TEACHING AND MENTORING

**Mentor** for undergraduate student research project, Harvard University, 2020-2021.

**Teaching Fellow** for Energy Resources and the Environment (undergraduate), Harvard University, 2019-2020.

**Teaching Fellow** for Atmospheric Chemistry (undergraduate), Harvard University, 2018.

## SERVICE

**Creator and lead for Atmospheric Chemistry Journal Club at University of Edinburgh**, 2021-2023.

**Diversity, Inclusion, and Belonging Graduate Student Recruitment Subgroup**, 2020 - 2021.
Planned events and engaged in dialog with Department administration with the goal of increasing recruitment and retention of a diverse group of individuals into the geoscience field.

**Creator and organizer of AECS seminar**, Harvard University, 2020-2021.
Created and organized the first bi-annual Atmospheric & Environmental Chemistry and Society (AECS) Seminar at Harvard University with the goal of introducing atmospheric chemists to the public health/policy aspects of their field and increasing community engagement.

**Field Trip Leader**, Department of Earth and Planetary Sciences, Harvard University, 2019.
Co-organized and co-led the graduate student field trip to Washington State. Responsibilities included organizing logistics including accessibility options, and setting educational goals.

**Graduate Student-Postdoc Seminar organizer**, Harvard University, 2019 - 2020.

**Co-lead for Group Climate Survey**, Atmospheric Chemistry and Modeling Group (Harvard), 2019 - 2020.

**Climate Change and Urban Planning podcast**, Harvard University, *Sit'N Listen*, 2016.

## PROFESSIONAL EXPERIENCE

- Lab Technician for the U.S. Forest Service Northern Research Station, Summer 2015.
- Internship with the U.S. EPA's Region 8 Office (air pollutant emissions from oil/gas), Summer 2014.
- Internship with the U.S. EPA's National Vehicle Fuel Emissions Laboratory, Summer 2012.

## AWARDS AND RECOGNITION

- First-author paper highlighted in North American Carbon Program's "What we are reading", October 2020.
- Certificate of Distinction in Teaching, Harvard Bok Center, Spring 2019.
- Nicole Bloom Award for Environmental Sustainability, Michigan Technological University, 2014.
- Environmental Engineering Departmental Scholar Award, Michigan Technological University, 2014.

## SKILLS

- Python
- R
- GIS tools
- MATLAB
- HTML
- Git

## ADDITIONAL PUBLICATIONS

Shen, L., D.J. Jacob, R.Gautam, M. Omara, **T.R. Scarpelli**, A. Lorente, D. Zavala-Araiza, X. Lu, Z. Chen, and J. Lin, Worldwide inference of national methane emissions from fossil fuel exploitation using high-resolution inversions of satellite data, submitted to Nature Comm., 2023.

Qu, Z., D. J. Jacob, Y. Zhang, L. Shen, D. J. Varon, X. Lu, **T. Scarpelli**, A. Bloom, J. Worden, and R. J. Parker , Attribution of the 2020 surge in atmospheric methane by inverse analysis of GOSAT observations, Environ. Res. Lett., 17, 094003, 2022.

Worden, J.R., D.H, Cusworth, Z. Qu, Y. Yin, Y. Zhang, A.A. Bloom, S. Ma, B. Byrne, **T.R. Scarpelli**, J.D. Maasakkers, D. Crisp, R. Duren, and D.J. Jacob, The 2019 methane budget and uncertainties at 1 degree resolution and each country through Bayesian integration Of GOSAT total column methane data and a priori inventory estimates, Atmos. Chem. Phys., 22, 6811-6841, 2022.

Shen, L., R. Gautam, M. Omara, D. Zavala-Araiza, J.D. Maasakkers, **T.R. Scarpelli**, A. Lorente, D. Lyon, J. Sheng, D. Varon, H. Nesser, Z. Qu, X. Lu, M.P. Sulprizio, S.P. Hamburg, and D.J. Jacob, Satellite quantification of national emissions from oil/gas production in the US and Canada including contributions from individual basins, Atmos. Phys. Chem., 22, 11203-112015, 2022.

Lu, X., D. J. Jacob, H. Wang, J.D. Maasakkers, Y. Zhang, **T.R. Scarpelli**, L. Shen, Z. Qu, M.P. Sulprizio, H. Nesser, A. A. Bloom, S. Ma, J.R. Worden, S. Fan, R. J. Parker, H. Boesch, R. Gautam, D. Gordon, M.D. Moran, F. Reuland, C.A.O. Villasana, and A. Andrews, Methane emissions in the United States, Canada, and Mexico: Evaluation of national methane emission inventories and 2010-2017 sectoral trends by inverse analysis of in situ (GLOBALVIEWplus CH4 ObsPack) and satellite (GOSAT) atmospheric observations, Atmos. Chem. Phys., 22, 395-418, 2022.

Cusworth, D.H., A.A. Bloom, S. Ma, C.E. Miller, K. Bowman, Y. Yin, J.D. Maasakkers, Y. Zhang, **T.R. Scarpelli**, Z. Qu, D.J. Jacob, and J.R. Worden, A Bayesian framework for deriving sector-based methane emissions from top-down fluxes, Commun. Earth Environ., 2, 242, 2021.

Qu, Z., D. Jacob, L. Shen, X. Lu, Y. Zhang, **T. Scarpelli**, H. Nesser, M. Sulprizio, J. Maasakkers, A. Bloom, J. Worden, J. Parker, A. Delgado. Global distribution of methane emissions: a comparative inverse analysis of observations from the TROPOMI and GOSAT satellite instruments, Atmos. Chem. Phys., 21, 14159–14175, 2021.

Lu, X., D. Jacob, Y. Zhang, J. Maasakkers, M. Sulprizio, L. Shen, Z. Qu, **T. Scarpelli**, H. Nesser, R. Yantosca, J. Sheng, A. Andrews, R. Parker, H. Boech, A. Bloom, S. Ma. Global methane budget and trend, 2010-2017: complementarity of inverse analyses using in situ (GLOBALVIEWplus CH4 ObsPack) and satellite (GOSAT) observations. *Atmos. Chem. Phys.*, 21, 4637-4657, 2021.

Maasakkers, J., D. Jacob, M. Sulprizio, **T**. **Scarpelli**, H. Nesser, J. Sheng, Y. Zhang, X. Lu, A. Bloom, K. Bowman, J. Worden, R. Parker. 2010–2015 North American methane emissions, sectoral contributions, and trends: a high-resolution inversion of GOSAT satellite observations of atmospheric methane. *Atmos. Chem. Phys.*, 21, 4339-4356, 2021.

Zhang, Y., D. Jacob, X. Lu, J. Maasakkers, **T**. **Scarpelli**, J. Sheng, L. Shen, Z. Qu, M. Sulprizio, J. Chang, A. Bloom, S. Ma, J. Worden, R. Parker, H. Boesch. Attribution of the accelerating increase in atmospheric methane during 2010–2018 by inverse analysis of GOSAT observations. *Atmos. Chem. Phys.*, 21, 3643–3666, 2021.

Zavala-Araiza, D., M. Omara, R. Gautam, M. Smith, S. Pandey, I. Aben, V. Almanza-Veloz, S. Conley, S. Houweling, E. Kort, J. Maasakkers, L. Molina, A. Pusuluri, **T. Scarpelli**, S. Schwietzke, L. Shen, M. Zavala, S. Hamburg. A tale of two regions: methane emissions from oil and gas production in offshore/onshore Mexico. *Environ. Res. Lett.*, 16(2), 024019, 2021.

Varon, D.J., J. McKeever, D. Jervis, J.D. Maasakkers, S. Pandey, S. Houweling, I. Aben, **T.R. Scarpelli**, D.J. Jacob, Satellite discovery of anomalously large methane point sources from oil/gas production, *Geophys. Res. Lett.*, 46, 2019.

Maasakkers, J.D., D.J. Jacob, M.P. Sulprizio, **T.R. Scarpelli**, H. Nesser, J. Sheng, Y. Zhang, M. Hersher, A.A. Bloom, K.W. Bowman, J.R. Worden, G. Janssens-Maenhout, R.J. Parker, Global distribution of methane emissions, emission trends, and OH concentrations and trends inferred from an inversion of GOSAT satellite data for 2010-2015, *Atmos. Chem. Phys.*, 19, 7859-7881, 2019.

Zhang, Y., R. Gautam, D. Zavala-Araiza, D.J. Jacob, R. Zhang, L. Zhu, J. Sheng, **T.R. Scarpelli**, Satellite-observed changes in Mexico's offshore gas flaring activity linked to oil/gas regulations, *Geophys. Res. Lett.*, 46, 1879-1888, 2018.