

DANIEL J. VARON

Curriculum Vitae | September 2025

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EDUCATION

Ph.D., Atmospheric Chemistry , Harvard University M.Sc., Applied Mathematics Secondary field in Computational Science & Engineering	2015 – 2020
B.A., English Literature , McGill University	2010 – 2014
B.Sc., Physics , McGill University	2009 – 2014

EXPERIENCE

Assistant Professor , Massachusetts Institute of Technology Department of Aeronautics and Astronautics Institute for Data, Systems, and Society	2025 –
Research Associate , Harvard University School of Engineering and Applied Sciences	2023 – 2025
Visiting Postdoctoral Research Associate , Princeton University School of Public and International Affairs <i>Faculty host: Denise Mauzerall</i>	2021 – 2023
Postdoctoral Research Fellow , Harvard University School of Engineering and Applied Sciences <i>Faculty mentor: Daniel Jacob</i>	2020 – 2023

RELEVANT PUBLICATIONS (*SUBMITTED, †ADVISEE)

h-index = 26, total citations = 3472 (as of September 2025 on [Google Scholar](https://scholar.google.com/))

- *55. Sharma, S. Maasackers, J. D., Dogniaux, M., Girard, M., McKeever, J. Jervis, D., Schuit, B., de Jong, T., Irakulis-Loitxate, I., Balasus, N., **Varon, D. J.**, and Aben, I.: Estimating methane emissions from surface coal mines using complementary satellite observations, submitted to *Environ. Sci. Tech.*, 2025.
- *54. **Varon, D. J.**, Jacob, D. J., Estrada, L. A., Balasus, N., East, J. D., Pendergrass, D. C., Chen, Z., Sulprizio, M., Omara, M., Gautam, R., Barkley, Z. R., Cardoso-Saldaña, F. J., Reidy, E. K., Kamdar, H., Sherwin, E. D., Biraud, S. C., Jervis, D., Pandey, S., Worden, J. R., Bowman, K. W., Maasackers, J. D., and Kleinberg, R. L.: Seasonality and declining intensity of methane emissions from the Permian and nearby US oil and gas basins, [preprint] <https://doi.org/10.31223/X56B2G>, *Environ. Sci. Tech.*, in review, 2025.
- *53. Nesser, H., Bowman, K. W., Thill, M. D., **Varon, D. J.**, Randles, C. A., Tewari, A., Cardoso-Saldaña, F. J., Reidy, E., Maasackers, J. D., and Jacob, D. J.: Predicting and correcting the influence of boundary conditions in regional inverse analyses, EGU sphere [preprint], <https://doi.org/10.5194/egusphere-2025-2850>, 2025.
- *52. He, M., Jacob, D. J., Estrada, L. A., **Varon, D. J.**, Sulprizio, M., Balasus, N., East, J. D., Penn, E., Pendergrass, D., Chen, Z., Mooring, T., Maasackers, J. D., Brodrick, P., Frankenberg, C.,

- Bowman, K. W., and Bruhwiler, L.: Attributing 2019–2024 methane growth using TROPOMI satellite observations, submitted, 2025.
- *51. Wang, X., Jacob, D. J., Nesser, H., Balasus, N., Estrada, L. A., Sulprizio, M., Cusworth, D. H., Scarpelli, T. R., Chen, Z., East, J. D., and **Varon, D. J.**: Quantifying urban and landfill methane emissions in the United States using TROPOMI satellite data, [preprint] <https://doi.org/10.48550/arXiv.2505.10835>, submitted, 2025.
 - *50. Cusworth, D. H., Bon, D. M., Varon, D. J., Ayasse, A. K., Asner, G. P., Heckler, J., Sherwin, E. D., Biraud, S. C., and Duren, R. M.: Duration of Super-Emitting Oil and Gas Methane Sources, [preprint] <https://doi.org/10.31223/X5ZQ70>, in review, *Nat. Comms.*, 2025.
 - *49. Radman, A., Mahdianpari, M., Mohammadimanesh, F., and **Varon, D. J.**: SAM4CH4: Zero-Shot Methane Plume Mapping with Segment Anything and Vision-Language Models, submitted to *IEEE Trans. Geo. Rem. Sens.*, 2025.
 - *48. Pendergrass, D. C., Jacob, D. J., Balasus, N., Estrada, L., **Varon, D. J.**, East, J. D., He, M., Mooring, T. A., Penn, E., Nesser, H., and Worden, J. R.: Trends and seasonality of 2019–2023 global methane emissions inferred from a localized ensemble transform Kalman filter (CHEEREIO v1.3.1) applied to TROPOMI satellite observations, EGUsphere [preprint], <https://doi.org/10.5194/egusphere-2025-1554>, 2025.
 - *47. Dogniaux, M. Maasakkers, J. D., Girard, M., Jervis, D., McKeever, J., Schuit, B. J., Sharma, S., Lopez-Noreña, A., **Varon, D. J.**, and Aben, I.: Satellite survey sheds new light on global solid waste methane emissions, *Nature*, [preprint] <https://doi.org/10.31223/X5TB09>, in review, 2025.
 - 46. Marjani, M., Mahdianpari, M., **Varon, D. J.**, and Mohammadimanesh, F.: The Integration of Vision Transformers and SAM for Automated Methane Super-Emitter Detection using TROPOMI Data, *J. Environ. Manag.*, <https://doi.org/10.1016/j.jenvman.2025.127034>, 2025.
 - 45. Zhang, X., Maasakkers, J. D., Roger, J., Guanter, L., Sharma, S., Lama, S., Tol, P., **Varon, D. J.**, Cusworth, D. H., Howell, K., Thorpe, A. K., Brodrick, P. G., and Aben, I.: Global identification of solid waste methane superemitters using hyperspectral satellites, *Environ. Sci. Tech.*, <https://doi.org/10.1021/acs.est.4c14196>, 2025.
 - 44. Estrada, L. A., **Varon, D. J.**, Sulprizio, M., Nesser, H., Chen, Z., Balasus, N., Hancock, S. E., He, M., East, J. D., Mooring, T. A., Oort Alonso, A., Maasakkers, J. D., Aben, I., Baray, S., Bowman, K. W., Worden, J. R., Cardoso-Saldaña, F. J., Reidy, E., and Jacob, D. J.: Integrated Methane Inversion (IMI) 2.0: an improved research and stakeholder tool for monitoring total methane emissions with high resolution worldwide using TROPOMI satellite observations, *Geosci. Model Dev.*, 18, 3311–3330, <https://doi.org/10.5194/gmd-18-3311-2025>, 2025.
 - 43. Pandey, S., Worden, J., Cusworth, D., **Varon, D. J.**, Thill, M., Jacob, D. J., and Bowman, K. W.: Relating Multi-Scale Plume Detection and Area Estimates of Methane Emissions: A Theoretical and Empirical Analysis, *Environ. Sci. Tech.*, <https://doi.org/10.1021/acs.est.4c07415>, 2025.
 - 42. Mohammadimanesh, F., Mahdianpari, M., Radman, A., **Varon, D. J.**, Hemati, M., and Marjani, M.: Advancements in satellite-based methane point source monitoring: A systematic review, *IS-PRS J. Photogramm. Remote Sens.*, 224, 94–112, <https://doi.org/10.1016/j.isprsjprs.2025.03.020>, 2025.
 - 41. Zhao, S., Zhang, Y., Zhao, S., Wang, X., and **Varon, D. J.**: A data-efficient deep transfer learning framework for methane super-emitter detection in oil and gas fields using the Sentinel-2 satellite, *Atmos. Chem. Phys.*, 25, 4035–4052, <https://doi.org/10.5194/acp-25-4035-2025>, 2025.
 - 40. Hancock, S. E., Jacob, D. J., Chen, Z., Nesser, H., Davitt, A., **Varon, D. J.**, Sulprizio, M. P., Balasus, N., Estrada, L. A., Cazorla, M., Dawidowski, L., Diez, S., East, J. D., Penn, E., Randles, C. A., Worden, J., Aben, I., Parker, R. J., and Maasakkers, J. D.: Satellite quantification of methane emissions from South American countries: a high-resolution inversion of TROPOMI and

- GOSAT observations, *Atmos. Chem. Phys.*, 25, 797–817, <https://doi.org/10.5194/acp-25-797-2025>, 2025.
39. Hakkarainen, J., Ialongo, I. **Varon, D. J.**, Kuhlmann, G. and Krol, M. C.: Linear Integrated Mass Enhancement: A method for estimating hotspot emission rates from space-based plume observations, *Rem. Sens. Env.*, <https://doi.org/10.1016/j.rse.2025.114623>, 2025.
 38. Balasus, N., Jacob, D. J., Maxemin, G., Jenks, C., Nesser, H., Maasakkers, J. D., Cusworth, D. H., Scarpelli, T. R., **Varon, D. J.**, and Wang, X.: Satellite monitoring of annual US landfill methane emissions and trends, *Environ. Res. Lett.*, <https://doi.org/10.1088/1748-9326/ada2b1>, 2025.
 37. Harris, S. and 67 co-authors including **D. J. Varon**: Methane emissions from the Nord Stream subsea pipeline leaks, *Nature*, <https://doi.org/10.1038/s41586-024-08396-8>, 2024.
 36. Marjani, M., Mahdianpari, M., Radman, A., **Varon, D. J.**, and Mohammadimanesh, F.: PRIS-MethaNet: A Novel Deep Learning Model for Landfill Methane Detection using PRISMA Satellite Data, *ISPRS J. Photogramm. Remote Sens.*, <https://doi.org/10.1016/j.isprsjprs.2024.10.003>, 2024.
 35. **Varon, D. J.**, Jervis, D., Pandey, S., Gallardo, S. L., Balasus, N., Yang, L. H., and Jacob, D. J.: Quantifying NO_x point sources with Landsat and Sentinel-2 satellite observations of NO_2 plumes, *Proc. Natl. Acad. Sci.*, <https://www.pnas.org/doi/10.1073/pnas.2317077121>, 2024.
 34. Nathan, B., Maasakkers, J. D., Naus, S., Gautam, R., Omara, M., **Varon, D. J.**, Sulprizio, M. P., Estrada, L. A., Lorente, A., Borsdorff, T., Parker, R. J., and Aben, I.: Assessing methane emissions from collapsing Venezuelan oil production using TROPOMI, *Atmos. Chem. Phys.*, 24, 6845–6863, <https://doi.org/10.5194/acp-24-6845-2024>, 2024
 33. Dogniaux, M., Maasakkers, J. D., **Varon, D. J.**, and Aben, I.: Report on Landsat 8 and Sentinel-2B observations of the Nord Stream 2 pipeline methane leak, *Atmos. Meas. Tech.*, 17, 2777–2787, <https://doi.org/10.5194/amt-17-2777-2024>, 2024
 32. Bruno, J. H., Jervis, D., **Varon, D. J.**, and Jacob, D. J.: U-Plume: automated algorithm for plume detection and source quantification by satellite point-source imagers, *Atmos. Meas. Tech.*, 17, 2625–2636, <https://doi.org/10.5194/amt-17-2625-2024>, 2024.
 31. He, T.-L., Boyd, R. J., **Varon, D. J.**, and Turner, A. J.: Increased methane emissions from oil and gas following the Soviet Union’s collapse, <https://doi.org/10.1073/pnas.2314600121>, *Proc. Natl. Acad. Sci.*, 2024.
 30. [†]Watine-Guiu, M., **Varon, D. J.**, Irakulis-Loitxate, I., Balasus, N., and Jacob, D. J.: Geostationary satellite observations of extreme and transient methane emissions from oil and gas infrastructure, <https://www.pnas.org/doi/10.1073/pnas.2310797120>, *Proc. Natl. Acad. Sci.*, 2023.
Extensive media coverage: <https://pnas.altmetric.com/details/157610226>.
 29. Schuit, B. J., Maasakkers, J. D., Bijl, P., Mahapatra, G., van den Berg, A.-W., Pandey, S., Lorente, A., Borsdorff, T., Houweling, S., **Varon, D. J.**, McKeever, J., Jervis, D., Girard, M., Irakulis-Loitxate, I., Gorroño, J., Guanter, L., Cusworth, D. H., and Aben, I.: Automated detection and monitoring of methane super-emitters using satellite data, *Atmos. Chem. Phys.*, 23, 9071–9098, <https://doi.org/10.5194/acp-23-9071-2023>, 2023.
 28. Pendergrass, D. C., Jacob, D. J., Nesser, H., **Varon, D. J.**, Sulprizio, M., Miyazaki, K., and Bowman, K. W.: CHEEREIO 1.0: a versatile and user-friendly ensemble-based chemical data assimilation and emissions inversion platform for the GEOS-Chem chemical transport model, *Geosci. Model Dev.*, 16, 4793–4810, <https://doi.org/10.5194/gmd-16-4793-2023>, 2023.
 27. Balasus, N., Jacob, D. J., Lorente, A., Maasakkers, J. D., Parker, R. J., Boesch, H., Chen, Z., Kelp, M. M., Nesser, H., and **Varon, D. J.**: A blended TROPOMI+GOSAT satellite data product for

- atmospheric methane using machine learning to correct retrieval biases, *Atmos. Meas. Tech.*, 16, 3787–3807, <https://doi.org/10.5194/amt-16-3787-2023>, 2023.
26. Pandey, S., van Nistelrooij, M., Maasakkers, J. D., Sutar, P., Houweling, S., **Varon, D. J.**, Tol, P., Gains, D., Worden, J., and Aben, I.: Daily detection and quantification of methane leaks using Sentinel-3: a tiered satellite observation approach with Sentinel-2 and Sentinel-5p, *Rem. Sens. Env.*, <https://doi.org/10.1016/j.rse.2023.113716>, 2023.
 25. Radman, A., Mahdianpari, M., **Varon, D. J.**, and Mohammadimanesh, F.: S2MetNet: A novel dataset and deep learning benchmark for methane point source quantification using Sentinel-2 satellite imagery, *Rem. Sens. Env.*, <https://doi.org/10.1016/j.rse.2023.113708>, 2023. [PDF]
 24. **Varon, D. J.**, Jacob, D. J., Hmiel, B., Gautam, R., Lyon, D. R., Omara, M., Sulprizio, M., Shen, L., Pendergrass, D., Nesser, H., Qu, Z., Barkley, Z. R., Miles, N. L., Richardson, S. J., Davis, K. J., Pandey, S., Lu, X., Lorente, A., Borsdorff, T., Maasakkers, J. D., and Aben, I.: Continuous weekly monitoring of methane emissions from the Permian Basin by inversion of TROPOMI satellite observations, *Atmos. Chem. Phys.*, <https://doi.org/10.5194/acp-23-7503-2023>, 2023.
Selected as Highlight Paper
 23. Chen, Z., Jacob, D. J., Gautam, R., Omara, M., Stavins, R. N., Stowe, R. C., Nesser, H., Sulprizio, M. P., Lorente, A., **Varon, D. J.**, Lu, X., Shen, L., Qu, Z., Pendergrass, D. C., and Hancock, S.: Satellite quantification of methane emissions and oil–gas methane intensities from individual countries in the Middle East and North Africa: implications for climate action, *Atmos. Chem. Phys.*, 23, 5945–5967, <https://doi.org/10.5194/acp-23-5945-2023>, 2023.
 22. Lu, X., Jacob, D. J., Zhang, Y., Shen, L., Sulprizio, M. P., Maasakkers, J. D., **Varon, D. J.**, Qu, Z., Chen, Z., Hmiel, B., Parker, R. J., Boesch, H., Wang, H., He, C., and Fan, S.: Observation-derived 2010–2019 trends in methane emissions and intensities from US oil and gas fields tied to activity metrics, *Proc. Natl. Acad. Sci.*, <https://doi.org/10.1073/pnas.2217900120> 2023.
 21. Gorroño, J., **Varon, D. J.**, Irakulis-Loitxate, I., and Guanter, L.: Understanding the potential of Sentinel-2 for monitoring methane point emissions, *Atmos. Meas. Tech.*, 16, 89–107, <https://doi.org/10.5194/amt-16-89-2023>, 2023.
 20. Zhang, Z., Sherwin, E. D., **Varon, D. J.**, and Brandt, A. R.: Detecting and quantifying methane emissions from oil and gas production: algorithm development with ground-truth calibration based on Sentinel-2 satellite imagery, *Atmos. Meas. Tech.*, 15, 7155–7169, <https://doi.org/10.5194/amt-15-7155-2022>, 2022.
 19. Shen, L., Gautam, R., Omara, M., Zavala-Araiza, D., Maasakkers, J. D., Scarpelli, T. R., Lorente, A., Lyon, D., Sheng, J., **Varon, D. J.**, Nesser, H., Qu, Z., Lu, X., Sulprizio, M. P., Hamburg, S. P., and Jacob, D. J.: Satellite quantification of oil and natural gas methane emissions in the US and Canada including contributions from individual basins, *Atmos. Chem. Phys.*, 22, 11203–11215, <https://doi.org/10.5194/acp-22-11203-2022>, 2022.
 18. Chen, Z., Jacob, D. J., Nesser, H., Sulprizio, M. P., Lorente, A., **Varon, D. J.**, Lu, X., Shen, L., Qu, Z., Penn, E., and Yu, X.: Methane emissions from China: a high-resolution inversion of TROPOMI satellite observations, *Atmos. Chem. Phys.*, 22, 10809–10826, <https://doi.org/10.5194/acp-22-10809-2022>, 2022.
 17. Qu, Z., Jacob, D. J., Zhang, Y., Shen, L., **Varon, D. J.**, Lu, X., Scarpelli, T., Bloom, A., Worden, J., and Parker, R. J.: Attribution of the 2020 surge in atmospheric methane by inverse analysis of GOSAT observations, *Environ. Res. Lett.*, 17, 9, <https://doi.org/10.1088/1748-9326/ac8754>, 2022.
 16. Maasakkers, J. D., **Varon, D. J.**, Elfarsdóttir, A., McKeever, J., Jervis, D., Mahapatra, G., Pandey, S., Lorente, A., Borsdorff, T., Foorthuis, L. R., Schuit, B. J., Tol, P., van Kempen, T.

- A., van Hees, R., and Aben, I.: Using satellites to uncover large methane emissions from landfills, *Sci. Adv.*, 8, 32, <https://doi.org/10.1126/sciadv.abn9683>, 2022.
15. Jacob, D. J., **Varon, D. J.**, Cusworth, D. H., Dennison, P. E., Frankenberg, C., Gautam, R., Guanter, L., Kelley, J., McKeever, J., Ott, L. E., Poulter, B., Qu, Z., Thorpe, A. K., Worden, J. R., and Duren, R. M.: Quantifying methane emissions from the global scale down to point sources using satellite observations of atmospheric methane, *Atmos. Chem. Phys.*, 22, 9617–9646, <https://doi.org/10.5194/acp-22-9617-2022>, 2022.
 14. **Varon, D.J.**, Jacob, D. J., Sulprizio, M., Estrada, L. A., Downs, W. B., Shen, L., Hancock, S. E., Nesser, H., Qu, Z., Penn, E., Chen, Z., Lu, X., Lorente, A., Tewari, A., and Randles, C. A.: Integrated Methane Inversion (IMI 1.0): A user-friendly, cloud-based facility for inferring high-resolution methane emissions from TROPOMI satellite observations, *Geosci. Mod. Dev.*, 15, 5787–5805, <https://doi.org/10.5194/gmd-15-5787-2022>, 2022.
 13. Sánchez-García, E., Gorroño, J., Irakulis-Loitxate, I., **Varon, D. J.**, and Guanter, L.: Mapping methane plumes at very high spatial resolution with the WorldView-3 satellite, *Atmos. Meas. Tech.*, 15, 1657–1674, <https://doi.org/10.5194/amt-15-1657-2022>, 2022.
 12. Guanter, L., Irakulis-Loitxate, I., Gorroño, J., Sánchez-García, E., Cusworth, D. H., **Varon, D. J.**, Cogliati, S., and Colombo, R.: Mapping methane point emissions with the PRISMA spaceborne imaging spectrometer, *Rem. Sens. Env.*, <https://doi.org/10.1016/j.rse.2021.112671>, 2021.
 11. Irakulis, I., Guanter, L., Liu, Y., **Varon, D. J.**, Maasakkers, J. D., Zhang, Y., Thorpe, A. K., Duren, R. M., Frankenberg, C., Lyon, D., Cusworth, D. H., Zhang, Y., Seg, K., Gorroño, J., Sánchez-García, E., Sulprizio, M. P., Cao, K., Zhu, H., Liang, J., Li, X., Aben, I., and Jacob, D. J.: Satellite-based Survey of Extreme Methane Emissions in the Permian Basin, *Sci. Adv.*, 7, 27, <https://advances.sciencemag.org/content/7/27/eabf4507>, 2021.
 10. Lyon, D. R., Hmiel, B., Gautam, R., Omara, M., Roberts, K. A., Barkley, Z. R., Davis, K. J., Miles, N. L., Monteiro, V. C., Richardson, S. J., Conley, S., Smith, M. L., Jacob, D. J., Shen, L., **Varon, D. J.**, Deng, A., Rudelis, X., Sharma, N., Story, K. T., Brandt, A. R., Kang, M., Kort, E. A., Marchese, A. J., and Hamburg, S. P.: Concurrent variation in oil and gas methane emissions and oil price during the COVID-19 pandemic. *Atmos. Chem. Phys.*, 21, 6605–6626, <https://doi.org/10.5194/acp-21-6605-2021>, 2021.
 9. **Varon, D. J.**, Jervis, D., McKeever, J., Spence, I., Gains, D., and Jacob, D. J.: High-frequency monitoring of anomalous methane point sources with multispectral Sentinel-2 satellite observations. *Atmos. Meas. Tech.*, 14, 2771–2785, <https://doi.org/10.5194/amt-14-2771-2021>, 2021.
Among AMT’s most downloaded: https://amt.copernicus.org/most_downloaded.html.
Selected as Highlight Paper
 8. Jervis, D., McKeever, J., Durak, B. O. A., Sloan, J. J., Gains, D., **Varon, D. J.**, Ramier, A., Strupler, M., and Tarrant, E.: The GHGSat-D Imaging Spectrometer. *Atmos. Meas. Tech. Discuss.*, 14, 2127–2140, <https://doi.org/10.5194/amt-14-2127-2021>, 2021.
 7. Cusworth, D. H., Duren, R. M., Thorpe, A. K., Pandey, S., Maasakkers, J. D., Aben, I., Jervis, D., **Varon, D. J.**, Jacob, D. J., Randles, C. A., Smith, M., Gautam, R., Omara, M., Schade, G., Dennison, P. E., Frankenberg, C., Gordon, D., Lopinto, E., and Miller, C. E.: Multi-satellite imaging of a gas well blowout enables quantification of total methane emissions. *Geophys. Res. Lett.*, 48, 2, <https://doi.org/10.1029/2020GL090864>, 2020.
 6. **Varon, D. J.**, Jacob, D. J., McKeever, J., and Jervis, D.: Quantifying time-averaged methane emissions from individual coal mine vents with GHGSat-D satellite observations. *Environ. Sci. Tech.*, 54, 16, 10246–10253, <https://doi.org/10.1021/acs.est.0c01213>, 2020.
 5. Zhang, Y., Gautam, R., Pandey, S., Omara, M., Maasakkers, J. D., Sadavarte, P., Lyon, D., Nesser, H., Sulprizio, M. P., **Varon, D. J.**, Zhang, R., Houweling, S., Zavala-Araiza, D., Al-

- varez, R. A., Lorente, A., Hamburg, S. P., Aben, I., and Jacob, D. J.: Quantifying methane emissions from the largest oil producing basin in the U.S. from space. *Science Advances*, 6, 17, <https://www.science.org/doi/10.1126/sciadv.aaz5120>, 2020.
4. Cusworth, D. H., Jacob, **D. J.**, Varon, D. J., Chan Miller, C., Liu, X., Chance, K., Thorpe, A. K., Duren, R. M., Miller, C. E., Thompson, D. R., Frankenberg, C., Guanter, L., and Randles, C. A.: Potential of next-generation imaging spectrometers to detect and quantify methane point sources from space, *Atmos. Meas. Tech.*, 12, 5655–5668, <https://doi.org/10.5194/amt-12-5655-2019>, 2019.
 3. **Varon, D. J.**, McKeever, J., Jervis, D., Maasackers, J. D., Pandey, S., Houweling, S., Aben, I., Scarpelli, T., and Jacob, D. J.: Satellite discovery of anomalously large methane point sources from oil/gas production. *Geophys. Res. Lett.*, 46, 22, <https://doi.org/10.1029/2019GL083798>, 2019.
Extensive media coverage: <https://wiley.altmetric.com/details/69396084>.
 2. **Varon, D. J.**, Jacob, D. J., McKeever, J., Jervis, D., Durak, B. O. A., Xia, Y., and Huang, Y.: Quantifying methane point sources from fine-scale satellite observations of atmospheric methane plumes. *Atmos. Meas. Tech.*, 11, 5673–5686, <https://doi.org/10.5194/amt-11-5673-2018>, 2018.
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 1. Lovejoy, S., Schertzer, S., and **Varon, D. J.**: Do GCMs predict the climate... or macro-weather? *Earth System Dynamics* 4, 439–454. <http://www.earth-syst-dynam.net/4/439/2013/esd-4-439-2013.html>, 2013.

PRESENTATIONS

Invited talks

- 2025 GHGSat Science and Toolchain Team Meeting
- 2025 SRON Netherlands Institute for Space Research seminar, Leiden
- 2025 Sentinel-2 Quality Working Group, European Space Agency
- 2024 American Geophysical Union Fall Meeting ([A11F-01](#))
- 2024 AI Pathways to Energy Sustainability, New York Energy Forum
- 2024 AI4Carbon workshop on atmospheric transport
- 2024 ESA, Optical Mission Performance Cluster (OPT-MPC) Working Group meeting
- 2024 MIT, Department of Aeronautics and Astronautics seminar
- 2024 MIT, Department of Civil and Environmental Engineering seminar
- 2024 Stanford University, Methane Emissions Technology Alliance (META) seminar
- 2024 Harvard University, Atmospheric & Environmental Chemistry (AEC) seminar
- 2023 NASA GES DISC seminar
- 2023 SRON Netherlands Institute for Space Research seminar, Leiden
- 2023 NOAA National Environmental Satellite, Data, and Information Service (NESDIS)
- 2023 NASA Goddard Space Flight Center, Atmospheric Chemistry and Dynamics Lab seminar
- 2022 University of Wisconsin-Madison, Satellite Data for Energy Analysis and Policy conference
- 2022 MIT, Department of Earth, Atmospheric and Planetary Sciences (EAPS) seminar
- 2021 NASA Jet Propulsion Laboratory, Carbon Club seminar
- 2021 University of Washington, Department of Atmospheric Sciences seminar
- 2021 Stanford University, Energy Resources Engineering seminar
- 2019 American Geophysical Union Fall Meeting ([U14C-10](#))
- 2019 SRON Netherlands Institute for Space Research seminar, Utrecht

Conference presentations

- 2025 3rd GEOS-Chem Europe Meeting (GCE3), London, UK
- 2024 Committee on Earth Observation Satellites (CEOS) Joint AC/VC-20 Meeting, Maryland
- 2024 Harvard Climate Action Week, Brattle Square Studio [recording](#)

- 2024 20th International Workshop on Greenhouse Gas Measurements from Space (IWGGMS-20)
- 2024 NOAA GeoXO ACX Science Team Meeting, College Park, MD
- 2024 American Meteorological Society 104th Annual Meeting (AMS)
- 2023 American Geophysical Union Fall Meeting ([A11A-03](#))
- 2023 Committee on Earth Observation Satellites (CEOS) Joint AC/VC-19 Meeting, Brussels
- 2023 19th International Workshop on Greenhouse Gas Measurements from Space (IWGGMS-19)
- 2023 International Coordination Workshop on Detection of Anthropogenic Methane Emissions from High-Resolution Satellites, Harvard University
- 2022 American Geophysical Union Fall Meeting ([A13E-06](#))
- 2022 American Meteorological Society 102nd Annual Meeting (AMS)
- 2021 17th International Workshop on Greenhouse Gas Measurements from Space (IWGGMS-17)
- 2020 MIT A+B Applied Energy Symposium (MITAB)
- 2019 American Geophysical Union Fall Meeting ([A53F-03](#))
- 2019 15th International Workshop on Greenhouse Gas Measurements from Space (IWGGMS-15)
- 2019 Industrial Methane Measurements Conference, Rotterdam NL (IMM)
- 2018 14th International Workshop on Greenhouse Gas Measurements from Space (IWGGMS-14)
- 2017 American Geophysical Union Fall Meeting ([A32D-07](#))

Selected poster presentations

- 2023 American Geophysical Union Fall Meeting ([INV33A-0886](#))
- 2023 Carbon Monitoring System Meeting, Pasadena, CA
- 2021 American Geophysical Union Fall Meeting ([B25G-1538](#))
- 2018 American Geophysical Union Fall Meeting ([A43R-3443](#))

TEACHING

Teaching assistant

Atmospheric Chemistry, Harvard University

2017

- Overall teaching score of 4.7/5.0 based on student reviews
- Awarded Harvard Certificate of Distinction in Teaching

MENTORING

Postdocs

- Tailong He (Harvard), 2024– . GOES-ABI methane retrieval.
- Yeseul Cho (University of Maryland), 2024– . VIIRS methane retrieval.

Graduate students

- Kevin Gauld (PhD, MIT), 2025–
- François Martin-Monier (MSc, ETH Zürich), 2023. ML-based Sentinel-2 methane detection.
- Marc Watine (MSc, ETH Zürich), 2023. Geostationary satellite methane retrievals.

Undergraduate students

- Chevaughn Campbell (Kenyon College), 2022. Landsat methane retrievals.
- Daniel Shen (Harvard University), 2021. Sentinel-2 methane retrievals.

SERVICE

Scientist Integrated Methane Inversion (IMI) Model Scientist (2022–present)
 GEOS-Chem Co-Nested Model Scientist (2025–present)

Editor *Atmospheric Measurement Techniques*, Associate Editor (2023–present)

Advisor	Methane Emissions Detection Using Satellites Assessment (MEDUSA) Advisory Board
Chair	Co-chair, <i>Statistical Learning for Atmospheric Chemistry</i> seminar series (2022–2025)
Reviewer	<p><i>Atmospheric Chemistry & Physics, Atmospheric Measurement Techniques, Environmental Research Letters, Environmental Science & Technology, Geophysical Research Letters, Geoscientific Model Development, Journal of Geophysical Research: Atmospheres, Nature, Nature Climate Change, Nature Communications, Nature Scientific Reports, One Earth, Remote Sensing of Environment, Science Advances, Science of the Total Environment</i></p> <p>NASA review panel (2021; 2023; 2025), NOAA proposal reviewer (2023)</p>
Convener	<p>Data-Driven Methods for Quantifying Atmospheric Composition: Advances in Computation and Statistical Learning, AGU Fall Meeting 2025</p> <p>Data-Driven Methods for Quantifying Atmospheric Composition: Advances in Computation and Statistical Learning, AGU Fall Meeting 2024</p> <p>Local to Regional Sources, 20th International Workshop on Greenhouse Gas Measurements from Space (IWGGMS-20), 2024</p> <p>Data-Driven Methods for Quantifying Atmospheric Composition: Advances in Computation and Statistical Learning, (A11C and A12D) AGU Fall Meeting 2023</p> <p>International Measurements of Methane Emissions from the Fossil Fuel Industries, (A015) AGU Fall Meeting 2020.</p>