Curriculum Vitae: Eliza Harris

Personal Information

Name	Eliza Jean Harris
Affiliation	Swiss Data Science Center, ETH Zürich
Researcher ID	https://orcid.org/0000-0002-7102-8305
Date of birth	05.08.1987 (Melbourne, Australia)
Family status	Married; two children (Luisa: 16.04.15 and Antonia: 18.09.17)
Nationality	Australian and British
Languages	English (native), German (fluent), French (basic)

Research Interests

- Development, optimization and implementation of complex methodological, data analysis and modelling techniques for novel and challenging data streams
- Use of isotopic composition to identify sources, sinks and chemistry of trace gases and aerosols at the interface between biosphere and atmosphere
- Greenhouse gas emission and consumption processes in a changing global climate

Employment history

Associate Professor and Director of the HFSJG, Climate and Environmental Physics, University of Bern, Switzerland
September 2024 - N.N. (1.0 FTE)

Senior Scientist, Swiss Data Science Centre, ETH Zürich, Switzerland
March 2021 - August 2024 (0.80 FTE; 0.9 FTE since October 2022)

Postdoctoral Research Associate, Department of Ecology, University of Innsbruck, Austria
February 2017 - February 2023 (0.85 FTE to March 2022; 0.25 FTE subsequently)

Postdoctoral Fellow, Marie Curie COFUND program, Empa, Switzerland
October 2013 - February 2017 (0.9 FTE)

Postdoctoral Research Associate, Massachusetts Institute of Technology, USA
September 2012 - September 2013 (1.0 FTE)

Education

Habilitation in Biogeosciences
University of Innsbruck, Austria: 09.2020 - 11.2021
Venia Legendi granted by the Department of Environmental Systems Science at ETHZ, 01.08.2022
Thesis title: *Using isotopic measurements to understand sources, sinks and transformations of trace gases at the biosphere-atmosphere interface*

Doctoral degree, summa cum laude (Supervisor: Dr. Peter Hoppe)
Max Planck Institute for Chemistry / Johannes Gutenberg University, Germany: 02.2009 - 05.2012
Thesis title: *Using sulfur isotope fractionation to understand atmospheric oxidation of* SO_2

Bachelor degree with Honours in Antarctic Science, first class
University of Tasmania, Australia: 02.2005 - 11.2008
Thesis title: *Weathering processes and remediation options for polychlorinated biphenyl and polycyclic aromatic hydrocarbon contamination at Kinnvika Station, Svalbard*

Grants and funding

- **World Food System Centre (ETHZ)/Fenaco research program on Smart Sustainable Farming (PI)** for 'Chemiresistive sensors for effective Agricultural N management and N_2O mitigation' (199,876 CHF), 2024-2026
- **RUFORUM-GRA Graduate Research Grants (co-applicant)** for 'Building climate resilient mixed crop-livestock and agro-pastoral farming systems in Elgeyo Marakwet County through agroecology: Quantification, reduction and community sensitization on greenhouse gas emissions' (80,000 USD), 2024-2025
- **SNF Scientific Exchange Grant (PI)** for 'State-space modelling for a unified understanding of N_2O emissions across soil and aqueous systems' (IZSEZ0_211196, 11,367 CHF) to visit *Lincoln University*, New Zealand, 11-12.2022
- **SNF project grant (PI)** for 'Combining measurements, modelling and machine learning to improve N2O accounting for sustainable agricultural development in sub-Saharan Africa' (200021_207348, 660,564 CHF), 2022-2026
- **Austrian Science Foundation (FWF) stand-alone project (PI)** co-financed by the Land Tirol 'NitroTrace: Using isotopes to trace the effects of climate extremes on N_2O emissions and the nitrogen cycle in managed grasslands' (363,454 Euro), 2018-2022
- **University of Innsbruck funding for Digital Innovation in Research and Teaching (PI)**, 'Unified data and metadata management for ecological research and education at the University of Innsbruck: Moving towards the big data era' (24,697.50 Euro), 2019-2020
- **OECD Cooperative Research Program (PI)** for Sustainable Agriculture fellowship for 'Identifying drivers of N_2O emissions in a changing climate' (12,365 Euro) to visit the *University of Melbourne*, 12.2019-04.2020
- **Tiroler Wissenschaftsförderung (TWF) project** 'An isotopic method to analyse nitrous oxide sources in grasslands after drought' (15,000 Euro), 2017
- **SNF Project Proposal (co-PI)** for 'Assessment of the global N_2O budget based on seasonal and long-term isotope measurements at Jungfraujoch and the Cape Grim Air Archive' (255,725 CHF), 2015-2017[1]
- **SNF 120% Support Grant** for researchers with family commitments (14,000 CHF), 2015
- **Marie Curie COFUND fellowship** for postdoctoral research at Empa, October 2013-2015
- **TNA-2 funding** for access to Mace Head station from the European Community's Seventh Framework programme in the Integrated non-CO_2 Greenhouse gas Observing System (InGOS), June 2013

Awards and honours

- Liechtenstein prize for Outstanding Research at the University of Innsbruck, 2022
- Early Career Scientist Grant to attend the EGU General Assembly, April 2017 and 2019
- Award for the best contribution at the 49^{th} meeting of scientists from AGAGE and cooperating networks, Ascona, Switzerland, April 2014

[1]Submitted and managed by my postdoctoral mentor Dr. Joachim Mohn, as I did not fulfil SNF eligibility requirements for project submissions due to being <4 years from my PhD

- Dieter-Rampacher-Prize from the Max Planck Society for the youngest PhD candidate with outstanding doctoral research, 2013
- Travel grant from the International Max Planck Research School to undertake two weeks research at MIT, November 2011
- Travel grant for the Goldschmidt Conference, 2011
- Travel grant for the Tenth Informal Conference on Atmospheric and Molecular Sciences (TICAMS), Copenhagen, 2011
- University Medal from the University of Tasmania for Outstanding Honours Results, 2008
- Royal Australian Chemical Institute Prize for the Best Chemistry Graduate
- Tasmania Antarctic Scholarship for honours research work
- Tasmania National Undergraduate Scholarship

Laboratory and computer skills

- Advanced data science and data analysis approaches
- Strong programming and data management skills (eg. Matlab, R, Python, PostgreSQL)
- Use of virtual machines and supercomputing facilities for high-performance computing
- Atmospheric transport modelling with FLEXPART
- Extensive experience in isotope analysis with spectroscopy, IRMS and NanoSIMS
- Remote site and field work experience (Mace Head, Ireland; Jungfraujoch, Switzerland; Kaserstatt Alm and Gumpenstein, Austria)

Professional development courses

- UIBK courses: 'Exams and grading' and 'Managing Scientific Projects', 2019
- ICOS-NEON Carbon Workshop on 'Big data', Haute Provence, September 2014
- ETH, Department of Educational Development and Technology (LET), 'Learning to Teach' didactics module for lecturers and teaching assistants, Zürich, October 2014
- ACCESS XII: Atmospheric Chemistry Colloquium for Emerging Senior Scientists, July 2013
- Max Planck Graduate School course on 'Biogeochemistry and physics of the lower atmosphere', Cyprus, October 2010
- NanoBeams PhD School on 'Nanoanalysis using focused ion and electron beams', Luxembourg, March 2011 and November 2010
- European Research Course on Atmospheres (ERCA), Grenoble, January - February 2010

Other professional activities

- Member of the editorial board for Atmospheric Chemistry and Physics since 01.12.2014
- Proposal reviews (NSF, NOAA, Environment Canada, SNSF)
- Peer reviews (Geophysical Research Letters, Environmental Science and Technology Letters, Geochemica et Cosmochimica Acta, Journal of Surface Science, Atmospheric Environment, Journal of Geophysical Research, Water Research, Environmental Science and Pollution Research, Earth System Science Data and other)
- Member of American Geophysical Union, German Association for Stable Isotope Research, Ecological Society of America
- Maternity leave from April to August 2015 and from July 2017 to April 2018

Publications and presentations

Summary

- First author on 14 peer-reviewed scientific publications and 4 published datasets, co-author on numerous further peer-reviewed publications
- >1 850 citations, *h*-index of 21
- >30 presentations at international scientific conferences and meetings including numerous invited and keynote contributions

Publication list

Note: Contributions from students I have supervised or mentored are indicated with underline.

- **Harris, E.**, Fischer, P., Lewicki, M., Lewicka-Szczebak, D., Harris, S.J. and Perez-Cruz, F. (2023) *Technical Note: TimeFRAME - A Bayesian mixing model to unravel isotopic data and quantify trace gas production and consumption pathways for timeseries data*, Biogeoscience Discussions, doi: 10.5194/egusphere-2023-2836.

- Daly, E., Hernandez-Ramirez, G., Congreves, K.A., Clough, T., Voigt, C., **Harris, E.** and Ruser, R. (2023) *Soil organic nitrogen priming to nitrous oxide: a synthesis*, accepted, Soil Biology and Biochemistry.

- Renfrew, D., Vasilaki, V., Nika, E., **Harris, E.**, and Katsou, E. (2023) *Tracing wastewater resources: Unravelling the circularity of waste using source, destination, and quality analysis*, accepted, Water Research.

- Roskar, R., Ramakrishnan, C., Volpi, M., Perez-Cruz, F. ,..., **Harris, E.**, ..., Verscheure, O. and Wirtz, D. (full author list not shown; 2023) *Renku: a platform for sustainable data science*, Datasets and Benchmarks, NeurIPS.

- **Harris, E.**, Gasser, L., Volpi, M., Perez-Cruz, F., Bjelic, S., and Obozinski, G. (2023) *Harnessing data science to improve molecular structure elucidation from tandem mass spectrometry*, Structural Chemistry, doi: 10.1007/s11224-023-02192-2

- **Harris, E.**, Yu, L., Mohn, J., Henne, S., Bai, E., Barthel, M., Bauters, M., Boeckx, P., Dorich, C., Farrell, M., Krummel, P. B., Loh, Z. M., Reichstein, M., Six, J., Steinbacher, M., Wells, N. S., Bahn, M. and Rayner, P. (2022) *Warming and redistribution of nitrogen inputs drive an increase in terrestrial nitrous oxide emission factor*, Nature Communications, 13, doi: 10.1038/s41467-022-32001-z.

- Friedlos, P., Gasser, L. and **Harris, E.** (2022) *Retention time prediction to facilitate molecular structure identification with tandem mass spectrometry*, BioRXiV, https://doi.org/10.1101/2022.10.19.512911.

- **Harris, E.**, Diaz-Pines, E., Stoll, E., Schloter, M., Schulz, S., Duffner, C., Li, K., Moore, K.L., Ingrisch, J., Reinthaler, D., Zechmeister-Boltenstern, S., Glatzel, S., Brüggemann, N. and Bahn, M. (2021) *Denitrifying pathways dominate nitrous oxide emissions from a managed grassland during drought and rewetting*, Science Advances, 7, doi: 10.1126/sciadv.abb7118.

- Reinthaler, D., **Harris, E.**, Pötsch, E., Herndl, M., Richter, A., Wachter, H. and Bahn, M. (2021) *Responses of grassland soil CO_2 production and fluxes to drought are shifted in a warmer climate under elevated CO_2*, Soil Biology and Biogeochemistry, 163, doi: 10.1016/j.soilbio.2021.108436.

- Yu, L., **Harris, E.**, Lewicka-Szczebak, D., Barthel, M., Blomberg, M., Harris, S., Johnson, M., Lehmann, M., Liisberg, J., Müller, C., Ostrom, N., Six, J., Toyoda, S., Yoshida, N. and Mohn, J. (2020) *What can we learn from N_2O isotope data? Analytics, processes and modelling*, Rapid Communications in Mass Spectrometry, doi: 10.1002/rcm.8858.

- Yu, L., **Harris, E.**, Henne, S., Eggleston, S., Steinbacher, M., Emmenegger, L., Zellweger, C. and Mohn, J. (2020) *The isotopic composition of atmospheric nitrous oxide observed at the high-altitude research station Jungfraujoch, Switzerland*, Atmospheric Chemistry and Physics, 20, 6495-6519, doi: 10.5194/acp-2019-829.

- Ibraim, E., Wolf, B., **Harris, E.**, Gasche, R., Wei, J., Yu, L., Kiese, R., Eggleston, S., Butterbach-Bahl, K., Zeeman, M., Tuzson, B., Emmenegger, L., Six, J., Henne, S. and Mohn, J. (2019) *Attribution of N_2O sources in a grassland soil with laser spectroscopy based isotopocule analysis*, Biogeosciences, 16, 3247–3266.

- **Harris, E.**, Ladreiter-Knauss, T., Butterbach-Bahl, K., Wolf, B. and Bahn, M. (2018) *Land-use and management alters methane and nitrous oxide fluxes in mountain grasslands*, Science of the Total Environment, 628-629, 997-1008.

- Ibraim, E., **Harris, E.**, Eyer, S., Tuzson, B., Emmenegger, L., Six, J. and Mohn, J. (2018) *Development of a field-deployable method for simultaneous, real-time measurements of the four most abundant N_2O isotopocules*, Isotopes in Environment and Health Studies, 54, 1-15, doi:10.1080/10256016.2017.1345902.

- **Harris, E.**, Henne, S., Hüglin, C., Zellweger, C., Tuzson, B., Ibraim, E., Emmenegger, L. and Mohn, J. (2017) *Tracking nitrous oxide emission processes at a suburban site with semi-continuous, in-situ measurements of isotopic composition*, Journal of Geophysical Research - Atmospheres, 122, 1850-1870, doi:10.1002/2016JD025906.

- **Harris, E.**, Emmenegger, L. and Mohn, J. (2017) *Using Isotopic Fingerprints to Trace Nitrous Oxide in the Atmosphere*, Chimia, 71, 46, doi:10.2533/chimia.2017.46.

- Denk, T., Mohn, J., Decock, C., Lewicka-Szczebak, D., **Harris, E.**, Butterbach-Bahl, K., Kiese, R. and Wolf, B. (2017) *The nitrogen cycle: a review of isotope effects and isotope modeling approaches*, Soil Biology and Biochemistry, 105, 121-137.

- Röckmann, T., Eyer, S., van der Veen, S., Popa, M.E., Tuzson, B., Monteil, G., Houweling, S., **Harris, E.**, Brunner, D., Fischer, H., Zazzeri, G., Lowry, D., Nisbet, E., Brand, W.A., Necki, J.M., Emmenegger, L. and Mohn, J. (2016) *In-situ observations of the isotopic composition of methane at the Cabauw tall tower site*, Atmospheric Chemistry and Physics, 16, 10469-10487, doi:10.5194/acp-16-10469-2016.

- Mohn, J., Gutjahr, W., Toyoda, S., **Harris, E.**, Ibraim, E., Geilmann, H., Schleppi, P., Kuhn, T., Lehmann, M.F., Decock, C., Werner, R.A., Yoshida, N. and Brand, W. (2016) *Reassessment of the NH_4NO_3 thermal decomposition technique for calibration of the N_2O isotopic composition*, Rapid Communications in Mass Spectrometry, 30(23), 2487-2496, 10.1002/rcm.7736.

- Eyer, S., Tuzson, B., Popa, E., van der Veen, C., Röckmann, T., Brand, W.A., Fisher, R., Lowry, D., Nisbet, E.G., Brennwald, M.S., **Harris, E.**, Emmenegger, L., Fischer, H. and Mohn, J. (2016) *Real-time analysis of $\delta^{13}C$- and δD-CH_4 in ambient methane with laser spectroscopy: Method development and first inter-comparison results*, Atmospheric Measurement Techniques, 9, 263-280.

- **Harris, E.**, Joss, A., Emmenegger, L., Kipf, M., Wolf, B., Mohn, J. and Wunderlin, P. (2015) *Isotopic evidence for nitrous oxide production pathways in a partial nitritation-anammox reactor*, Water Research, 83, 258-270.

- **Harris, E.**, Zeyer, K. and Mohn, J. (2015) *Methane and nitrous oxide emissions and nitrous oxide isotopic composition from municipal solid waste incineration plants in Switzerland*, Waste Management, 35, 135-140.

- Wolf, B., Merbold, L., Decock, C., Tuzson, B., **Harris, E.**, Six, J., Emmenegger, L. and Mohn, J. (2015) *First online isotopic characterization of N_2O emitted from intensively managed grassland*, Biogeosciences, 12, 2517-2531.

- **Harris, E.**, Sinha, B., van Pinxteren, D., Schneider, J., Poulain, L., Collett, J., d'Anna, B., Fahlbusch, B., Foley, S., Fomba, K.W., George, C., Gnauk, T., Henning, S., Lee, T., Mertes, S., Roth, A., Stratmann, F., Borrmann, S., Hoppe, P. and Herrmann, H. (2014) *In-cloud sulfate addition to single particles resolved with sulfur isotope analysis during HCCT-2010*, Atmospheric Chemistry and Physics, 14, 4219-4235.

- **Harris, E.**, Ono, S., Nelson, D., Potter, K. and Prinn R. (2014) *Development of a spectroscopic technique for continuous online monitoring of oxygen and site-specific nitrogen isotopic composition of atmospheric nitrous oxide*, Analytical Chemistry, 86, 1726-1734.

- Henning, S., Dieckmann, K., Ignatius, K., Schäfer, M., Zedler, P., **Harris, E.**, van Pinxteren, D., Mertes, S., Birmili, W., Merkel, M., Wu, Z., Wiedensohler, A., Wex, H., Herrmann, H. and Stratmann, F. (2014) *Influence of cloud processing on CCN activation behaviour in the Thuringian Forest, Germany during HCCT-2010*, Atmospheric Chemistry and Physics, 14, 1617-1645.

- **Harris, E.**, Ono, S., Sinha, B. and Hoppe, P. (2013) *High-precision measurements of ^{33}S and ^{34}S fractionation during SO_2 oxidation reveal causes of seasonality in SO_2 and sulfate isotopic composition*, Environmental Science and Technology, 47, 12174-12183.

- **Harris, E.**, Sinha, B., van Pinxteren, D., Tilgner, A., Fomba, K.W., Schneider, J., Roth, A., Gnauk, T., Fahlbusch, B., Mertes, S., Lee, T., Collett, J., Foley, S., Borrmann, S., Hoppe, P. and Herrmann, H. (2013) *Enhanced role of transition metal ion catalysis during in-cloud oxidation of SO_2*, Science, 340, 727-730.

- J. A. Huffman, C. Pöhlker, A. J. Prenni, P. J. DeMott, R. H. Mason, N. H. Robinson, J. Fröhlich-Nowoisky, Y. Tobo, V. R. Desprès, E. Garcia, D. J. Gochis, **E. Harris**, I. Müller-Germann, C. Ruzene, B. Schmer, B. Sinha, D. A. Day, M. O. Andreae, J. L. Jimenez, M. Gallagher, S. M. Kreidenweis, A. K. Bertram, and U. Pöschl (2013) *High concentrations of biological aerosol particles and ice nuclei during and after rain*, Atmospheric Chemistry and Physics, 13, 6151-6164.

- **Harris, E.**, Sinha, B., Hoppe, P., Foley, S. and Borrmann, S. (2012) *Fractionation of sulfur isotopes during heterogeneous oxidation of SO_2 on sea salt aerosol: A new tool to investigate non-sea salt sulfate production in the marine boundary layer*, Atmospheric Chemistry and Physics, 12, 4619-4631

- **Harris, E.**, Sinha, B., Foley, S., Crowley, J. N., Borrmann, S., and Hoppe, P. (2012) *Sulfur isotope fractionation during heterogeneous oxidation of SO_2 on mineral dust*, Atmospheric Chemistry and Physics, 12, 4867-4884

- **Harris, E.**, Sinha, B., Hoppe, P., Crowley, J. N., Ono, S., and Foley, S. (2012) *Sulfur isotope fractionation during oxidation of sulfur dioxide: gas-phase oxidation by OH radicals and aqueous oxidation by H_2O_2, O_3 and iron catalysis*, Atmospheric Chemistry and Physics, 12, 407-423.

- van Pinxteren, D., Birmili, W., Fomba, W., Gnauk, T., Iinuma, Y., Mertes, S., Mildenberger, K., Merkel, M., Müller, C., Müller, K., Poulain, L., Spindler, G., Henning, S., Stratmann, F., Tilgner, A., Wex, H., Wolke, R., Wiedensohler, A., Zhijun, W., Böttger, T., Borrmann, S., **Harris, E.**, Roth, A., Schneider, J., Sinha, B., George, I., Heard, D., Whalley, L., D'Anna, B., George, C., Müller, M., Amedro, D., Fittschen, C., Schoemaker, C., Collett, J., Lee, T., and Herrmann, H. (2011) *Hill Cap Cloud Thuringia 2010 - Overview and first results*, Atmospheric Environment, 45, S1, A 338.

Published datasets

- **Harris, E.**, Yu, L., Mohn, J., Henne, S., Bai, E., Barthel, M., Bauters, M., Boeckx, P., Dorich, C., Farrell, M., Krummel, P. B., Loh, Z. M., Reichstein, M., Six, J., Steinbacher, M., Wells, N. S., Bahn, M. and Rayner, P. (2022) *Soil nitrogen isotope database*, PANGAEA, https://doi.pangaea.de/10.1594/PANGAEA.946948

- **Harris, E.**, Diaz-Pines, E., Stoll, E., Schloter, M., Schulz, S., Duffner, C., Li, K., Moore, K.L., Ingrisch, J., Reinthaler, D., Zechmeister-Boltenstern, S., Glatzel, S., Brüggemann, N. and Bahn, M. (2019) *N_2O isotopic composition and soil microclimate for grassland monoliths subjected to an experimental drought*, 3 datasets, PANGAEA, https://doi.org/10.1594/PANGAEA.907601

- **Harris, E.**, Ladreiter-Knauss, T., Butterbach-Bahl, K., Wolf, B. and Bahn, M. (2019) *N_2O, CH_4 and CO_2 fluxes from automated and manual chamber measurements at the Kaserstatt Alm subalpine site, Austria*, 3 datasets, PANGAEA, https://doi.org/10.1594/PANGAEA.907623

- **Harris, E.**, Mohn, J. (2016) *N_2O mole fraction and isotopic composition at Dübendorf, Switzerland, from 2014-2016*, PANGAEA, https://doi.org/10.1594/PANGAEA.864305

Selected presentations

- Talk (invited): **Harris, E.** (2023) Using nitrogen isotopic composition to model N_2O processes and estimate emissions, *Workshop: Reducing nitrogen losses and greenhouse gas emissions from arable agriculture: How can new modeling concepts help?*, 3 - 4 May, Garmisch-Partenkirchen, Germany.

- Keynote speaker: **Harris, E.** (2022) Understand N_2O emissions from soils using measurements, modelling, and data science, *New Zealand Soil Science Society Annual Meeting*, 28 November - December 1, Blenheim, New Zealand.

- Seminar (invited): **Harris, E.** (2022) Warming and redistribution of nitrogen inputs drive an increase in terrestrial nitrous oxide emission factor, *Colloquium in Climatology, Climate Impact and Remote Sensing, University of Bern*, October 5, Bern, Switzerland

- Seminar (invited): **Harris, E.** (2022) Using isotopic measurements to understand N_2O emission pathways and drive smart agricultural practices, *Institute of Climate-Smart Agriculture, Thünen Institute*, September 13, Braunschweig, Germany.
- Talk: **Harris, E.** et al. (2022) Denitrifying pathways dominate nitrous oxide emissions from managed grassland during drought and rewetting, *International Symposium on Isotopomers*, May 29 - June 3, Dübendorf, Switzerland.
- Talk: **Harris, E.** et al. (2022) Spatial changes in nitrogen inputs drive short- and long-term variability in global N_2O emissions, *European Geosciences Union General Assembly*, May 23-27, Vienna, Austria (hybrid conference format).
- Keynote speaker: **Harris, E.** (2021) Using isotopic measurements to understand N_2O emission pathways: Combining measurements, modelling, and data science approaches, *Annual meeting of the Stable Isotope Network Austria*, 11-12 November, Tulln, Austria.
- Talk: **Harris, E.** et al. (2021) Climate warming and the spatial distribution of N inputs drive a long-term increase in mean terrestrial N_2O emission factor, *JULES Model Scientific Meeting*, June 17, online meeting.
- Talk: **Harris, E.** et al. (2021) Spatiotemporal distribution of N inputs drives variability in global N_2O emissions, *European Geosciences Union General Assembly*, April 19-30, Vienna, Austria (online conference format).
- Talk (invited): **Harris, E.** et al. (2020) Nitrous oxide emissions during drought and rewetting are dominated by denitrifying pathways, *Ecological Society of America annual conference*, August 3-8, Salt Lake City, USA (online conference format).
- Seminar (invited): **Harris, E.** et al. (2020) Using isotopic measurements to understand N_2O emission pathways, *Soil and the Environment Research Group, University of Melbourne*, 8 February, Melbourne, Australia.
- Discussion leader: 'N_2O reaction mechanisms' and Poster: Denitrification dominates grassland nitrous oxide emissions through fertilisation and drought, *Workshop: What can we learn from N_2O isotope data?*, 23-25 October 2019, Dübendorf, Switzerland.
- Seminar (invited): **Harris, E.** et al. (2019) Using isotopic measurements to understand N_2O emissions, *Helmholtz Institute for Coastal and Marine Research*, 10 July, Germany.
- Talk: **Harris, E.** et al. (2019) Using isotopes to trace the effects of changing precipitation regimes on N_2O emission pathways in grasslands, *European Geosciences Union General Assembly*, 8-12 April, Vienna, Austria.
- Seminar (invited): **Harris, E.** et al. (2019) N_2O and CH_4 emissions at Kaserstatt Alm: Effects of land use and drought, *KIT Seminar*, 25 February, Garmisch, Germany.
- Talk: **Harris, E.**, Ingrisch, J., Reinthaler, D. and Bahn M. (2018) Using isotopes to trace the effects of drought and rewetting on N_2O emission pathways, *TERENO Conference*, 8-12 October, Berlin, Germany.
- Talk: **Harris, E.**, Henne, S., Hüglin, C., Zellweger, C., Tuzson, B., Ibraim, E., Emmenegger, L. and Mohn, J. (2017) Tracking nitrous oxide emission processes at a suburban site with semicontinuous, in situ measurements of isotopic composition, *European Geosciences Union General Assembly*, 23-28 April, Vienna, Austria.

- Talk: **Harris, E.**, Henne, S., Hüglin, C., Zellweger, C., Tuzson, B., Ibraim, E., Emmenegger, L. and Mohn, J. (2016) Tracking N_2O emissions processes at a suburban site using isotope measurements, *Eighth International Symposium on Isotopomers*, 3-6 October, Nantes, France.

- Talk: **Harris, E.**, Joss, A., Emmenegger, L., Kipf, M., Wolf, B., Mohn, J. and Wunderlin, P. (2015) Isotopic monitoring of N_2O emissions from wastewater treatment: Evidence for N_2O production associated with anammox metabolism?, *AGU Fall Meeting*, 14-18 December, San Francisco, USA.

- Talk: **Harris, E.**, Wolf, B., Zeyer, K., Tuzson, B., Emmenegger, L. and Mohn, J. (2014) Development and application of spectroscopic N_2O isotope measurements at Empa, *49^{th} meeting of scientists from AGAGE and cooperating networks*, 29 April - 2 May, Ascona, Switzerland.

- Talk: **Harris, E.**, Ono, S., McManus, B., Nelson, D., Zahniser, M., Olsewski, W., Potter, K. and Prinn, R. (2013) Real-time online monitoring of N_2O isotopic composition at Mace Head, Ireland, *ACCESS XII*, 26-27 July, Long Island, New York.

Organised conference sessions

- European Geosciences Union General Assembly, 2022 and 2023, *Stable isotopes and novel tracers in biogeochemical and atmospheric research*, co-convenors: Lisa Wingate (INRAE), Getachew Adnew (Utrecht University), Jan Kaiser (University of East Anglia)

- European Geosciences Union General Assembly, 2021-2023, *Exchange of GHG and reactive gases in agricultural ecosystems*, co-convenors: Christof Ammann, Alex Valach (Agroscope), Christian Brümmer (Thünen Institute), Alexander Moravek (Umweltbundesamt)

- American Geophysical Union Fall Meeting, 2021, *Geoclimatic Drivers of Nitrous Oxide (N_2O) and Nitric Oxide (NO) Emissions: From Microscopic Variability to Global Influences*, co-convenors: Peter Homyak (UC Riverside), Wendy Yang (University of Illinois Urbana-Champaign), Longfei Yu (Jinan University)

- American Geophysical Union Fall Meeting, 2015, *Measurements and modelling of stable isotopes to advance understanding of non-CO_2 greenhouse gas cycling and budgets*, co-convenors: Kristie Boering (UC Berkeley), Nathaniel Ostrom (Michigan State University) and Peter Sperlich (NIWA)

List of teaching and mentoring activities

Table 1: Overview of all courses taught by the applicant. The year and semester are given; W = winter, S = summer, Sp = spring, A = autumn. Institutes: MIT = Massachusetts Institute of Technology, ETHZ = Eidgenössiche Technische Hochschule Zürich, UIBK = University of Innsbruck. SWS is the approximate course load held by the applicant in 'Semesterwochenstunden' (hours per week through a semester). Type: L = lecture, P = practical, S = seminar, discussion group or tutorial.

Date	**Institute**	**Title**	**Number**	**Level**	**SWS**	**Type**
2012W	MIT	*Fundamentals of stable isotope geochemistry*	12.S493	MSc/PhD	1	L/S
2014W	ETHZ	*Stable isotope ecology of terrestrial ecosystems*		MSc/PhD	0.1	L
2015W	ETHZ	*Stable isotope ecology of terrestrial ecosystems*		MSc/PhD	0.1	L
2016W	ETHZ	*Stable isotope ecology of terrestrial ecosystems*		MSc/PhD	0.1	L
2018S	UIBK	*Ecology, project study*	743213	MSc	0.5	P
2019S	UIBK	*Ecology, measurement methods*	743251	MSc	1	P
2019S	UIBK	*Ecology, project study*	743252	MSc	2	P
2019W	UIBK	*Data management and analysis for environmental sciences*	800987	PhD	1	L/S
2020S	UIBK	*Case studies in ecology*	743214	BSc	0.6	P
2020S	UIBK	*Ecology field project*	743423	BSc	0.3	P
2020S	UIBK	*Ecology, project study*	743424/213	BSc	0.7	P
2020S	UIBK	*Isotope Ecology*	743280/1/2	MSc/PhD	2.3	L/P/S
2020W	UIBK	*Data management and analysis for environmental sciences*	800960	PhD	1	L/S
2020W	UIBK	*Presentation techniques*	743302	MSc	1	L/S
2022W	ETHZ	*Stable isotope ecology of terrestrial ecosystems*	751-5125-00	MSc/PhD	0.1	L
2022A	ETHZ	*Environmental Systems Data Science I and II*	701-3001/3-00	MSc/PhD	1	L/P
2023W	ETHZ	*Stable isotope ecology of terrestrial ecosystems*	751-5125-00	MSc/PhD	0.15	L
2023A	ETHZ	*Environmental Systems Data Science I and II*	701-3001/3-00	MSc/PhD	1	L/P

Table 2: Student projects and theses mentored by the applicant. Role refers to the applicant's role as primary supervisor (P), co-supervisor (C) or mentor (M) for the project. Institutes: MIT = Massachusetts Institute of Technology, ETHZ = Eidgenössiche Technische Hochschule Zürich, Empa = Swiss Federal Institute for Materials Science and Technology, UM = University of Manchester, UIBK = University of Innsbruck. Levels: BSc = Bachelor thesis, MSc = Master thesis, PhD = PhD thesis, DAS = Diploma of Advanced Studies in Data Science. * indicates the project is ongoing and the end date is estimated.

Start	**End**	**Institute**	**Name**	**Thesis**	**Level**	**Role**
01.2013	07.2013	MIT	Siyi Zhang	*Sulfur isotopic signatures in the two column aerosol project*	BSc	P
06.2020	02.2022	UIBK	Jessica Kannler	*Impact of multiyear recurring drought periods on soil respiration*	BSc	P
04.2023	10.2023	UIBK	Marc Padrutt	*Mass spectrum to structure: Calculation of compound structural fingerprints based on high-resolution tandem mass spectrometry data*	BSc	C
03.2022	08.2022	ETHZ	Patrik Friedlos	*Retention time prediction to facilitate molecular structural identification with tandem mass spectrometry*	DAS	P
10.2022	04.2023	ETHZ	Benjamin Hohermuth	*Interpretable feature selection of spatio-temporal environmental and meteorological variables in the Arctic*	DAS	C
05.2023	10.2023	ETHZ	Mariana Coelho	*Clustering spectra to isolate dissolved organic matter*	DAS	C
05.2019	09.2019	UM/UIBK	Chris Bowden	*Legacy data collation and database construction for 15 years of fine-scale alpine micrometeorological data*	MSc	C
09.2019	04.2022	UIBK	Carmen Telser	*Legacy effects of multiyear summer drought on soil CO_2 production, transport and efflux in a sub-alpine grassland*	MSc	P
08.2022	01.2023	ETHZ	Orhan Saeedi	*Machine learning for paleoclimate predictions*	MSc	C
12.2022	06.2023	ETHZ	Philipp Fischer	*Using Bayesian mixing models to unravel isotopic data and quantify N_2O production and consumption pathways*	MSc	P
05.2023	10.2023	ETHZ	Robin Bosshard	*Enhancing toxicity prediction of MLinvitroTox: Prioritizing unidentified compounds in environmental samples based on hazard assessment*	MSc	P
2009	2015	MIT	Andrew Whitehill	*Is SO_2 photolysis the source for Archean mass-independent sulfur isotope signatures?*	PhD	M
2012	2016	Empa/ETHZ	Simon Eyer	*Real-time analysis of $\delta^{13}C$- and δD-CH_4 in ambient air with laser spectroscopy: Method development, validation and applications*	PhD	M

Table 2: (continued) Student projects and theses mentored by the applicant. Role refers to the applicant's role as primary supervisor (P), co-supervisor (C) or mentor (M) for the project. Institutes: MIT = Massachusetts Institute of Technology, ETHZ = Eidgenössiche Technische Hochschule Zürich, Empa = Swiss Federal Institute for Materials Science and Technology, UM = University of Manchester, UIBK = University of Innsbruck. Levels: BSc = Bachelor thesis, MSc = Master thesis, PhD = PhD thesis, DAS = Diploma of Advanced Studies in Data Science. * indicates the project is ongoing and the end date is estimated.

Start	**End**	**Institute**	**Name**	**Thesis**	**Level**	**Role**
2014	2018	Empa/ETHZ	Erkan Ibraim	*Development and Field Application of a Laser Spectroscopy Based Method for on-site Analysis of N_2O Isotopocules to Constrain Source Processes of Emissions*	PhD	M
10.2018	2022*	UIBK	Elena Stoll	*Impacts of climate change on N_2O production pathways in a managed grassland*	PhD	P
08.2022	2026*	ETHZ	Turry Ouma	*Combining measurements, modelling and machine learning to improve N_2O accounting for sustainable agricultural development in sub-Saharan Africa*	PhD	P