

Curriculum Vitae for Dr. Nora Zannoni

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Scopus 56866304000
Loop 523094
Nationality Italian

Research interests Atmospheric chemistry, biosphere-atmosphere interactions, indoor air chemistry, volatile organic compounds, OH reactivity

Education

01/11/2012-30/11/2015 PhD in atmospheric chemistry at Laboratoire des sciences du climat et de l'environnement (LSCE- Centre national de la recherche scientifique (CNRS)) and University Paris Orsay, France.
Thesis: "OH reactivity measurements in the Mediterranean region".
Marie Curie Early Stage Researcher grant in "Proton Ionization Molecular Mass Spectrometry (PIMMS)".
01/09/2009- MSc. in Chemistry, University of Copenhagen, Denmark.
01/11/2011 Thesis: "A volatility study on organic compounds in atmospheric aerosols" (12/12).
01/10/2004- BSc. in Chemistry, University of Florence, Italy.
20/07/2009 Thesis: "Spectroscopic study of *sigillate ceramic*" (101/110).
01/09/2006- Exchange student under the European project Erasmus, Universidad Autonoma de Madrid, Spain.
01/06/2007

Working Experience

01/01/2022- currently Post-doctoral scientist at Institute of Atmospheric Sciences and Climate National Research Council, Italy (CNR-ISAC)
VOCs measurements (ACTRIS, EU)
01/3/2017-31/12/2021 Postdoctoral scientist at Max Planck Institute for Chemistry, Germany
GC-MS measurements of VOCs and chiral molecules (ULTRACHIRAL, EU; ATTO, BMBF), OH reactivity/PTR-MS measurements of human emissions (ICHEAR, A. Sloan foundation)
01/12/2015-31/12/2016 Post-doctoral scientist at LSCE, France
OH reactivity and PTR-MS measurements of crops
01/12/2011-15/09/2012 Research assistant, University of Copenhagen, Denmark.
HTDMA measurements, evaporation model optimization, master students tutoring.
01/10/2010-01/12/2011 Laboratory technician assistant, Centre for Ice and Climate, Niels Bohr Institute, University of Copenhagen, Denmark.
Ice core samples preparation (North Greenland Eemian Ice Drilling project).

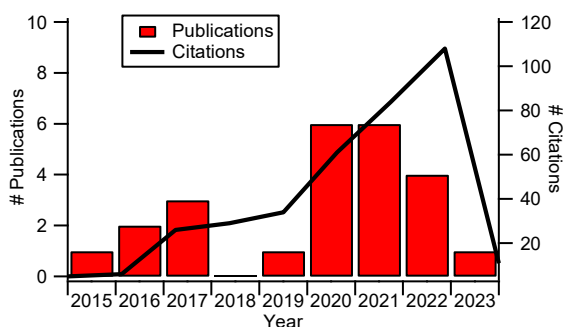
Research projects and field work

01/2023- currently **RIURBANS** (Research Infrastructures Services Reinforcing Air Quality Monitoring Capacities in European Urban & Industrial AreaS), Milan, Italy.

- Responsible for VOCs measurements with CI-TOF Vocus, support measurements of aerosol chemical composition with ACSM-ToF.
- 10/2022 **ACSM-ToF (Aerosol Chemical Speciation Monitor) intercomparison campaign for ACTRIS**, LSCE, France.
Co-responsible for aerosol chemical composition measurements with ACSM-ToF from CNR-ISAC.
- 01/2022-06/2022 **FAIRARI** (Fog and Aerosols Interactions Research), Po valley, Italy.
Support VOCs measurements with CI-TOF Vocus.
- 04/2021 **ICHEAR 2** (Indoor Chemical Human Emissions and Reactivity), at Technical University of Denmark (DTU), Denmark.
Responsible for OH reactivity (PTR-MS based) measurements of human emissions, terpene measurements indoors and skin VOCs measurements with GC-ToF-MS.
- 04/2019-05/2019 **ICHEAR 1** (Indoor Chemical Human Emissions and Reactivity) at DTU, Denmark.
Responsible for OH reactivity (PTR-MS based) measurements of human emissions.
- 2017-2021 **ATTO** (Amazonian Tall Tower Observatory) for two months every year (x6), Brazil
Responsible for terpenes and chiral molecules measurements in the atmosphere from the tower Instant (20m-80m), ATTO (40m-325m) and from the river Uatuma. Responsible for terpenes and chiral molecules measurements emitted by dominant tree species using dynamic flux chambers. Responsible for VOC measurements emitted by arthropods.
- 06/2017-06/2018 **HOMING** (Hunting Organic Molecules In Navigation), Pisa, Italy.
Responsible for the field work organization and execution, including an intensive field campaign with VOC measurements by PTR-MS and online GC-ToF-MS, VOC ground sampling from three different local ecosystems, VOC airborne sampling from three flights on board of a 2-seats plane.
- 06/2016-07/2016 **COV3ER**, INRA, France
Responsible for OH reactivity (PTR-MS based) measurements of wheat emissions.
- 10/2015 **OH reactivity intercomparison campaign**, atmospheric simulation chamber Saphir, FZJ, Juelich, Germany.
Responsible for OH reactivity (PTR-MS based) measurements with CRM-LSCE.
- 06/2015-07/2015 **PISA** (PImms-Saphir), Saphir atmospheric simulation chamber, FZJ, Germany
Responsible for SOA sampling. Support of VOC measurements with PTR-MS.
- 05/2014-06/2014 **CANOPEE 2014**, Observatoire Haute Provence, France.
Responsible for OH reactivity (PTR-MS based) measurements, support VOC measurements with PTR-MS and offline VOC sampling.
- 06/2013-08/2013 **ChArMEx**, Corsica, France
Responsible for OH reactivity (PTR-MS based) measurements.

Publications

(*h*-index=9, source: Scopus)



1) Peer-reviewed publications in open access journals

1. **Zannoni, N.**, Dusanter, S., Gros, V., Sarda Esteve, R., Michoud, V., Sinha, V., Locoge, N., and Bonsang, B.: *Intercomparison of two comparative reactivity method instruments in the Mediterranean basin during summer 2013*, *Atmos. Meas. Tech.*, 8, 3851-3865, doi:10.5194/amt-8-3851-2015, 2015.
2. **Zannoni, N.**, Gros, V., Lanza, M., Sarda, R., Bonsang, B., Kalogridis, C., Preunkert, S., Legrand, M., Jambert, C., Boissard, C., and Lathiere, J.: *OH reactivity and concentrations of biogenic volatile organic compounds in a Mediterranean forest of downy oak trees*, *Atmos. Chem. Phys.*, 16, 1619-1636, doi:10.5194/acp-16-1619-2016, 2016.
3. Yáñez-Serrano, A. M., Nölscher, A. C., Bourtsoukidis, E., Derstroff, B., **Zannoni, N.**, Gros, V., Lanza, M., Brito, J., Noe, S. M., House, E., Hewitt, C. N., Langford, B., Nemitz, E., Behrendt, T., Williams, J., Artaxo, P., Andreae, M. O., and Kesselmeier, J.: Atmospheric mixing ratios of methyl ethyl ketone (2-butanone) in tropical, boreal, temperate and marine environments, *Atmos. Chem. Phys.*, 16, 10965–10984, <https://doi.org/10.5194/acp-16-10965-2016>, 2016.
4. **Zannoni, N.**, Gros, V., Sarda Esteve, R., Kalogridis, C., Michoud, V., Dusanter, S., Sauvage, S., Locoge, N., Colomb, A., and Bonsang, B.: *Summertime OH reactivity from a receptor coastal site in the Mediterranean Basin*, *Atmos. Chem. Phys.*, 17, 12645-12658, <https://doi.org/10.5194/acp-17-12645-2017>, 2017.
5. Fuchs, H., Novelli, A., Rolletter, M., Hofzumahaus, A., Pfannerstill, E. Y., Kessel, S., Edtbauer, A., Williams, J., Michoud, V., Dusanter, S., Locoge, N., **Zannoni, N.**, Gros, V., Truong, F., Sarda-Esteve, R., Cryer, D. R., Brumby, C. A., Whalley, L. K., Stone, D., Seakins, P. W., Heard, D. E., Schoemaeker, C., Blocquet, M., Coudert, S., Batut, S., Fittschen, C., Thames, A. B., Brune, W. H., Ernest, C., Harder, H., Muller, J. B. A., Elste, T., Kubistin, D., Andres, S., Bohn, B., Hohaus, T., Holland, F., Li, X., Rohrer, F., Kiendler-Scharr, A., Tillmann, R., Wegener, R., Yu, Z., Zou, Q., and Wahner, A.: *Comparison of OH reactivity measurements in the atmospheric simulation chamber SAPHIR*, *Atmos. Meas. Tech.*, 10, 4023–4053, <https://doi.org/10.5194/amt-10-4023-2017>, 2017.
6. Vincent Michoud, Jean Sciare, Stéphane Sauvage, Sébastien Dusanter, Thierry Léonardis, Valérie Gros, Cerise Kalogridis, **Nora Zannoni**, Anaïs Féron, Jean-Eudes Petit, Vincent Crenn, Dominique Baisnée, Roland Sarda-Estève, Nicolas Bonnaire, Nicolas Marchand, H. Langley DeWitt, Jorge Pey, Aurélie Colomb, François Gheusi, Sonke Szidat, Iasonas Stavroulas, Agnès Borbon, and Nadine Locoge. *Organic carbon at a remote site of the western Mediterranean Basin: Sources and chemistry during the ChArMEx SOP2 field experiment* *Atmos. Chem. Phys.*, 17, 8837-8865, <https://doi.org/10.5194/acp-17-8837-2017>, 2017.
7. Schramm S, **Zannoni N**, Gros V, et al. *New application of direct analysis in real time high-resolution mass spectrometry for the untargeted analysis of fresh and aged secondary organic aerosols generated from monoterpenes*. *Rapid Commun Mass Spectrom.* 2019; 1–10. <https://doi.org/10.1002/rcm.8228>
8. Bsaibes, S.; Gros, V.; Truong, F.; Boissard, C.; Baisnée, D.; Sarda-Esteve, R.; **Zannoni, N.**; Lafouge, F.; Ciuraru, R.; Buysse, P.; Kammer, J.; Gonzaga Gomez, L.; Loubet, B. *Characterization of Total OH Reactivity in a Rapeseed Field: Results from the COV3ER Experiment in April 2017*. *Atmosphere* 2020, 11, 261 <https://doi.org/10.3390/atmos11030261>
9. Bekö, G.; Wargocki, P.; Wang, N.; Li, M.; Weschler, C. J.; Morrison, G.; Langer, S.; Ernle, L.; Licina, D.; Yang, S.; **Zannoni, N.**; Williams, J. *The Indoor Chemical Human Emissions and Reactivity (ICHEAR) Project: Overview of Experimental Methodology and Preliminary Results*. *Indoor Air* 2020, 30 (6), 1213–1228. <https://doi.org/10.1111/ina.12687>.
10. **Zannoni, N.**, Wikelski, M., Gagliardo, A. et al. *Identifying volatile organic compounds used for olfactory navigation by homing pigeons*. *Sci Rep* 10, 15879 (2020). <https://doi.org/10.1038/s41598-020-72525-2>

11. **Zannoni, N.**, Leppla, D., Lembo Silveira de Assis, P.I. et al. *Surprising chiral composition changes over the Amazon rainforest with height, time and season*. Commun Earth Environ 1, 4 (2020). <https://doi.org/10.1038/s43247-020-0007-9>
12. Wang, N.; **Zannoni, N.**; Ernle, L.; Bekö, G.; Wargocki, P.; Li, M.; Weschler, C. J.; Williams, J. *Total OH Reactivity of Emissions from Humans: In Situ Measurement and Budget Analysis*. Environ. Sci. Technol. 2021, 55 (1), 149–159. <https://doi.org/10.1021/acs.est.0c04206>.
13. Pfannerstill, E. Y., Reijrink, N. G., Edtbauer, A., Ringsdorf, A., **Zannoni, N.**, Araújo, A., Ditas, F., Holanda, B. A., Sá, M. O., Tsokankunku, A., Walter, D., Wolff, S., Lavrič, J. V., Pöhlker, C., Sörgel, M., and Williams, J.: *Total OH reactivity over the Amazon rainforest: variability with temperature, wind, rain, altitude, time of day, season, and an overall budget closure*, Atmos. Chem. Phys., 21, 6231–6256, <https://doi.org/10.5194/acp-21-6231-2021>, 2021.
14. **Zannoni, N.**, Li, M., Wang, N., Ernle, L., Bekö, G., Wargocki, P., Langer, S., Weschler, C. J., Morrison, G., Williams, J.: *The effect of ozone, clothing, temperature and humidity on the total OH reactivity emitted from humans*, Environ. Sci. Technol., <https://doi.org/10.1021/acs.est.1c01831>, 2021.
15. Wikelski, M., Quetting, M., Cheng, Y., Fiedler, W., Flack, A., Gagliardo, A., Salas, R., **Zannoni, N.**, Williams, J.: *Smell of green leaf volatiles attracts White storks to freshly cut meadows*, Sci Rep 11, 12912 (2021). <https://doi.org/10.1038/s41598-021-92073-7>.
16. **Zannoni N.**: *Homing pigeons find their way home by smelling the air*, The Science Breaker, 2021 <https://doi.org/10.25250/thescbr.brk553>.
17. Yang, S., Bekö, G., Weschler, C. J., Wang, N., **Zannoni, N.**, Li, M., Williams, J., Wargocki, P., Langer, S., Vanhanen, J., Licina, D.: *Ozone Initiates Human Emission of Nanocluster Aerosols*, Environmental Science & Technology 2021 55 (21), 14536-14545 DOI: 10.1021/acs.est.1c03379, (2021).
18. Edtbauer A., Pfannerstill, E. Y., Pires Florentino, A.P., Barbosa, C.G.G., Rodriguez-Caballero E., **Zannoni, N.**, Alves, R.P., Wolff, S., Tsokankunku, A., Aptroot, A., de Oliveira Sá, M., de Araújo, A.C., Sörgel, M., Mota de Oliveira, S., Weber, B., and Williams, J. *Cryptogamic organisms are a substantial source and sink for volatile organic compounds in the Amazon region*. Commun Earth Environ 2, 258 (2021). <https://doi.org/10.1038/s43247-021-00328-y>
19. Loubet, B., Buysse, P., Gonzaga-Gomez, L., Lafouge, F., Ciuraru, R., Decuq, C., Kammer, J., Bsaiibes, S., Boissard, C., Durand, B., Gueudet, J.-C., Fanucci, O., Zurfluh, O., Abis, L., **Zannoni, N.**, Truong, F., Baisnée, D., Sarda-Estève, R., Staudt, M., and Gros, V.: *Volatile organic compound fluxes over a winter wheat field by PTR-Qi-TOF-MS and eddy covariance*, Atmos. Chem. Phys., 22, 2817–2842, <https://doi.org/10.5194/acp-22-2817-2022> (2022).
20. E. Gomes Alves, T. Taylor, M. Robin, D. Pinheiro Oliveira, J. Schiatti, S. Duvoisin Júnior, **N. Zannoni**, J. Williams, C. Hartmann, J. F. C. Gonçalves, J. Schöngart, F. Wittmann, M. T. F. Piedade, Plant Biol J, doi:10.1111/plb.13419 (2022).
21. M. Li, G. Bekö, **N. Zannoni**, G. Pugliese, M. Carrito, N. Cera, C. Moura, P. Wargocki, P. Vasconcelos, P. Nobre, N. Wang, L. Ernle, J. Williams, *Human metabolic emissions of carbon dioxide and methane and their implications for carbon emissions*. Science of The Total Environment, 155241 (2022).
22. **N. Zannoni**, P. S. J. Lakey, Y. Won, M. Shiraiwa, D. Rim, C. J. Weschler, N. Wang, L. Ernle, M. Li, G. Bekö, P. Wargocki, J. Williams, *The human oxidation field*. Science. 377, 1071–1077 (2022).
23. Leppla, D., **Zannoni, N.**, Kremper, L., Williams, J., Pöhlker, C., Sá, M., Solci, M. C., and Hoffmann, T.: *Varying chiral ratio of pinic acid enantiomers above the Amazon rainforest*, Atmos. Chem. Phys., 23, 809–820, <https://doi.org/10.5194/acp-23-809-2023>, (2023).

2) Book chapters

Loubet B., Baisnee D., Cazaunau M., Cheiney A., Ciuraru R., Clerbaux C., Doussin J.F., Dufour G., Fléhard C., Focsa C., George C., Gros V., Hassouna M., Jaffrezo J.L., Kammer J., Laville P., Mellouki W., Millet, P., Petitprez D., Quivet E., Redon N., Sarda-Esteve R., Sauvage S., Uzu G., Villenave E., **Zannoni, N.** (2020) Measuring Air Pollutant Concentrations and Fluxes. In: Bedos C., Générumont S., Castell JF., Cellier P. (eds) Agriculture and Air Quality. Springer, Dordrecht. https://doi.org/10.1007/978-94-024-2058-6_6

Gros, V., & **Zannoni, N.** (2022). Total OH reactivity. In F. Dulac, S. Sauvage, & E. Hamonou (Eds.), Atmospheric chemistry in the Mediterranean (Vol. 2, From air pollutant sources to impacts). Springer, in press. https://doi.org/10.1007/978-3-030-82385-6_7

3) 29 Publications in conferences proceedings

4) Thesis

Nora Zannoni: “OH reactivity measurements in the Mediterranean region”, PhD thesis defended on 30/11/2015, Université Paris Orsay, France. PhD supervisor: Dr. Valerie Gros, PhD co-supervisor: Dr. Bernard Bonsang.

More about my publications from the media

- **The Human Oxidation Field**

<https://www.mpg.de/19157061/0902-chem-oxidation-field-152990-x?c=2249>

<https://www.science.org/doi/10.1126/science.add8461>

Science Podcast AAAS, 1/09/2022 <https://www.science.org/content/podcast/using-free-floating-dna-find-soldiers-remains-and-how-people-contribute-indoor-air>

<https://www.nationalgeographic.de/wissenschaft/2022/09/chemische-aura-wie-menschen-die-luft-in-innenraeumen-beeinflussen>

<https://www.the-scientist.com/news-opinion/a-new-culprit-in-air-pollution-reactions-triggered-by-human-skin-70455>

<https://www.bbc.com/portuguese/curiosidades-62976278>

<https://www.faz.net/aktuell/wissen/chemie-schleier-in-innenraeumen-braut-der-mensch-sich-seine-eigenen-giftwolken-18293761.html>

<https://pubs.acs.org/doi/10.1021/cen-10044-cover6>

<https://cen.acs.org/education/science-communication/CENs-Year-Chemistry-2022/100/i44>

(recognised as a fascinating chemistry findings of 2022 by C&EN mag)

- **ATTO project**

<https://www.attoproject.org/study-termites-as-bvoc-source/>

<https://ecoevocommunity.nature.com/posts/fingerprinting-sources-of-emissions-of-volatile-organic-compounds-in-the-amazonian-rain-forest>

<https://onlinelibrary.wiley.com/doi/10.1002/ciuz.202010006>

<https://www.attoproject.org/total-oh-reactivity/>

<https://www.attoproject.org/cryptogams-are-an-important-source-for-bvoc-emissions-in-tropical-forests/>

- **Animal behaviour**

<https://www.mpg.de/17069936/storks-smell?c=2249>

<https://www.welt.de/regionales/rheinland-pfalz-saarland/article231979721/Geruchssinn-Duft-von-gemaechtem-Gras-lockt-Stoerche-an.html>

<https://www.suedostschweiz.ch/wirtschaft/2021-06-21/unterschaetzter-geruchssinn-duft-von-gemaechtem-gras-lockt-stoerche-an>

<https://www.mpg.de/15506106/odours-navigation-pigeon?c=2249>

<https://www.derstandard.de/story/2000122684956/tauben-erstellen-exakte-geruchslandkarten-zur-orientierung?ref=rec>

Review and convening activities

Reviewer for *Atmospheric Environment*, *Atmospheric Chemistry and Physics*, *Atmospheric Measurement Technique*, *Environmental Science and Pollution Research (Springer)*, *Chemoecology (Springer)*, *Forests (MPDI)*. Review Editor for *Forests and the Atmosphere in Frontiers*.

Convener for the ATTO workshop 2021 (online, 10/2021, #150 participants).

Reviewer for the conferences Indoor Air 2022, Healthy Buildings Asia 2023, Healthy Buildings Europe 2023.

Networks

“Proton Ionization Molecular Mass Spectrometry” Marie Curie Early Stage Researchers (2012-2015).

Representative Board of the Early Career Students “Integrated Land Ecosystem-Atmosphere Processes Study (ILEAPS)” European and Mediterranean section network (from 2017).

Member of the Amazonian Tall Tower Observatory (ATTO, from 2017) project.

Member of the Nordic Society for Aerosol Research (NOSA, from 2011), member of International Society of Indoor Air Quality and Climate (ISIAQ, 2020&2022), member of the Italian Aerosol Society (IAS, 2022).

Language skills

	Native	Fluent	Medium	Basic
Italian	X			
English		X		
Spanish			X	
French			X	
German				X
Danish				X
Portuguese				X

Computer skills and competences

Microsoft Office tools, Origin, iGOR Wavemetrics, Aerosol Instrument Manager, PTR-MS viewer, Chem Station, Mass Hunter, TOF-DS, Chromspace, Tofware, basic skills in MatLab and Rstudio.

Other information

Driving license (B), swimming (>20 years), trained to conduct first aid in remote locations and from towers, experienced in working in extreme conditions (tropical environment) and on tall towers (up to 325 m).