

Zolal Ayazpour

CONTACT INFORMATION	Center for Astrophysics Harvard & Smithsonian 60 Garden Street Cambridge, MA 02138 USA	E-mail: zolal.ayazpour@cfa.harvard.edu https://zolal-ayazpour.github.io
EDUCATION	Doctor of Philosophy , Environmental Engineering (GPA: 4/4) Specialization: Atmospheric Remote Sensing University at Buffalo , Buffalo, NY, USA	May 2019 – May 2025
	Master of Science , Water Resources Engineering and Management University of Stuttgart , Stuttgart, Germany	October 2015 – June 2018
	Bachelor of Science , Civil Engineering University of Tehran , Tehran, Iran	September 2009 – July 2013
RESEARCH EXPERIENCE	Postdoctoral Research Fellow Smithsonian Astrophysical Observatory Center for Astrophysics Harvard & Smithsonian, Cambridge, MA, USA (Mentor: Gonzalo González Abad)	July 2025 – Present
	Research Scientist Department of Civil, Structural and Environmental Engineering University at Buffalo, Buffalo, NY, USA (Mentor: Kang Sun)	June 2025 – July 2025
	Predoctoral Research Fellow Smithsonian Astrophysical Observatory Center for Astrophysics Harvard & Smithsonian, Cambridge, MA, USA (Advisors: Gonzalo González Abad and Caroline R. Nowlan)	March 2023 – May 2025
	Visiting Ph.D. Student Smithsonian Astrophysical Observatory Center for Astrophysics Harvard & Smithsonian, Cambridge, MA, USA (Advisors: Gonzalo González Abad and Caroline R. Nowlan)	May 2020 – February 2023
	Graduate Research Assistant Department of Civil, Structural and Environmental Engineering University at Buffalo, Buffalo, NY, USA (Advisor: Kang Sun)	May 2019 – May 2025
	Graduate Research Assistant ISWA Institute for Sanitary Engineering, Water Quality and Solid Waste Management University of Stuttgart, Stuttgart, Germany (Advisor: Ulrich Dittmer)	November 2017 – September 2018
	Undergraduate Researcher Department of Civil Engineering University of Tehran, Tehran, Iran (Advisor: Mohammad Shekarchizadeh)	June 2011 – June 2012

HONORS AND AWARDS

Graduate Research Award

May 2025

University at Buffalo

SAO Predoctoral Fellowship

March 2023 – May 2025

Center for Astrophysics | Harvard & Smithsonian

AGU Student Travel Grant

December 2022

American Geophysical Union

Robert P. Apmann Memorial Award

May 2020

University at Buffalo

DAAD Scholarship

June 2015 – March 2018

German Academic Exchange Service

National Scholarship

September 2009 – July 2013

University of Tehran

TEACHING EXPERIENCE

Teaching Assistant, Air Pollution, University at Buffalo

Spring 2025

Guest lecturer, Introduction to Python, University at Buffalo

September 2024

Guest lecturer, Environmental Fluid Mechanics, University at Buffalo

Sep 2021 & Aug 2022

Co-Instructor, Air Pollution, University at Buffalo

Spring 2022

Guest lecturer, Introduction to MATLAB and Python, University at Buffalo

March 2021

Teaching Assistant, Calculus II, University of Tehran

Fall 2010 & Spring 2013

Instructor, Mathematics and Physics, Kherad High School

September 2010 – June 2011

PUBLICATIONS

Journal Articles

J. He, L. Zhang, R. H. Schwantes, B. D. Baker, L. W. Horowitz, V. Naik, C. Lyu, Z. Moon, G. A. A. Grell, R. Ahmadov, J. Schnell, K. Yang, Z. Wei, S. Wang, K. Chang, A. M. Gorchov Negron, A. Zhu, S. Kondragunta, E. C. Apel, I. Bourgeois, R. Commane, S. R. Hall, A. J. Hills, R. S. Hornbrook, J. Peischl, K. Ullmann, G. González Abad, **Z. Ayazpour**, C. R. Nowlan, B. McDonald (2026). Incorporating gas-phase chemistry into the Unified Forecast System (UFS) for global air quality applications. *Journal of Advances in Modeling Earth Systems*, 18, e2025MS005299. DOI: 10.1029/2025MS005299.

Z. Ayazpour, K. Sun, R. Zhang, H. Shen (2025). Evaluation of the Directional Derivative Approach for Timely and Accurate Satellite-based Emission Estimation Using Chemical Transport Model Simulation of Nitrogen Oxides. *Journal of Geophysical Research: Atmospheres*, 130, e2024JD042817. DOI: 10.1029/2024JD042817.

D. Gautam, S. Philip, S. Dey, M. Johnson, E. Chaudhary, **Z. Ayazpour**, G. González Abad (2025). Assessing Ambient Formaldehyde Exposure and Estimating Cancer Risks over India using the Ozone Monitoring Instrument Satellite Sensor. *ACS ES&T Air*. DOI: 10.1021/acsestair.4c00188.

Z. Ayazpour, G. González Abad, C. R. Nowlan, K. Sun, H. A. Kwon, C. C. Miller, H. Chong, H. Wang, X. Liu, K. Chance, E. O'Sullivan, L. Zhu, C. Vigouroux, I. De Smedt, et al. (2025). Aura Ozone Monitoring Instrument (OMI) Collection 4 Formaldehyde Products. *Earth and Space Science*, 12, e2024EA003792. DOI: 10.1029/2024EA003792.

J. Liao, G. M. Wolfe, A. E. Kotsakis, J. M. Nicely, J. M. St. Clair, T. F. Hanisco, G. González Abad, C. R. Nowlan, **Z. Ayazpour**, I. De Smedt, E. C. Apel, and R. S. Hornbrook (2025). Validation of formaldehyde products from three satellite retrievals (OMI SAO, OMPS-NPP SAO, and OMI BIRA) in the marine atmosphere with four seasons of Atmospheric Tomography Mission (ATom) aircraft observations. *Atmospheric Measurement Techniques*, 18, 1–16. DOI: 10.5194/amt-18-1-2025.

H. A. Kwon, G. González Abad, C. C. Miller, K. Hall, C. R. Nowlan, E. O'Sullivan, H. Wang,

- H. Chong, **Z. Ayazpour**, X. Liu, K. Chance (2024). Updated OMI Glyoxal Column Measurements Using Collection 4 Level 1B Radiances. *Earth and Space Science*, 11, e2024EA003705. DOI: 10.1029/2024EA003705.
- T. Zhao, J. Mao, **Z. Ayazpour**, G. González Abad, C. R. Nowlan, and Y. Zheng (2024). Interannual variability of summertime formaldehyde (HCHO) vertical column density and its main drivers at northern high latitudes. *Atmospheric Chemistry and Physics*, 24, 6105–6121. DOI: 10.5194/acp-24-6105-2024.
- H. Chong, G. González Abad, C. R. Nowlan, C. C. Miller, A. Saiz-Lopez, R. P. Fernandez, H. A. Kwon, **Z. Ayazpour**, H. Wang, A. H. Souri, X. Liu, K. Chance, E. O’Sullivan, J. Kim, J. H. Koo, W. R. Simpson, F. Hendrick, R. Querel, G. Jaross, C. Seftor, and R. M. Suleiman (2024). Global retrieval of stratospheric and tropospheric BrO columns from the Ozone Mapping and Profiler Suite Nadir Mapper (OMPS-NM) on board the Suomi-NPP satellite. *Atmospheric Measurement Techniques*, 17, 2873–2916. DOI: 10.5194/amt-17-2873-2024.
- D. C. Anderson, B. N. Duncan, J. Liu, J. M. Nicely, S. A. Strode, M. B. Follette-Cook, A. H. Souri, J. R. Ziemke, G. González Abad, and **Z. Ayazpour** (2024). Trends and Interannual Variability of the Hydroxyl Radical in the Remote Tropics During Boreal Autumn Inferred From Satellite Proxy Data, *Geophysical Research Letters*, 51, e2024GL108531. DOI: 10.1029/2024GL108531.
- H. Wang, G. González Abad, C. C. Miller, H. A. Kwon, C. R. Nowlan, **Z. Ayazpour**, H. Chong, X. Liu, K. Chance, E. O’Sullivan, K. Sun, R. Spurr, and R. J. Hargreaves (2023). Development of the MEaSUREs blue band water vapor algorithm – Towards a long-term data record. *Atmospheric Measurement Techniques Discussion* [preprint]. DOI: 10.5194/amt-2023-66.
- C. R. Nowlan, G. González Abad, H. A. Kwon, **Z. Ayazpour**, C. C. Miller, K. Chance, H. Chong, X. Liu, E. O’Sullivan, H. Wang, L. Zhu, I. De Smedt, G. Jaross, C. Seftor, and K. Sun (2023). Global Formaldehyde Products from the Ozone Mapping and Profiler Suite (OMPS) Nadir Mappers on Suomi NPP and NOAA-20. *Earth and Space Science*, 10, e2022EA002643. DOI: 10.1029/2022EA002643.
- C. Howlett, G. González Abad, C. C. Miller, C. R. Nowlan, **Z. Ayazpour**, and L. Zhu (2023). The influence of snow cover on Ozone Monitor Instrument formaldehyde observations. *Atmósfera*, 37, 159–174. DOI: 10.20937/ATM.53134.
- Z. Ayazpour**, S. Tao, D. Li, A. J. Scarino, R. E. Kuehn, and K. Sun (2023). Estimates of spatially complete, observational data-driven planetary boundary layer height over the contiguous United States. *Atmospheric Measurement Techniques*, 16, 563–580. DOI: 10.5194/amt-16-563-2023.
- Conference Paper**
- M.I. Pérez-Carrasco, C.F. Park, Q. Zhu, R.D. Tella, **Z. Ayazpour**, G. González Abad, Cecilia Garraffo (2026). Evaluating Self-Supervised Objectives for Spectroscopic Satellite Embeddings. 4th ICLR Workshop on Machine Learning for Remote Sensing (Main Track). <https://openreview.net/forum?id=vD0fmVF3r6>
- Z. Ayazpour**, A. E. Bakhshipour, U. Dittmer (2019). Combined Sewer Flow Prediction Using Hybrid Wavelet Artificial Neural Network Model. *International Conference on Urban Drainage Modelling 2018*, Springer, p. 693–8. DOI: 10.1007/978-3-319-99867-1_120.
- Z. Ayazpour**, K. Sun, C. R. Nowlan, and G. González Abad, Investigating Agricultural NO_x Emissions Using Observations from New Generation Satellite Instruments, AGU Fall Meeting, New Orleans, LA, December 2025.
- Z. Ayazpour**, G. González Abad, C. R. Nowlan, K. Sun, H. A. Kwon, C. C. Miller, H. Chong, H. Wang, X. Liu, K. Chance, E. O’Sullivan, L. Zhu, C. Vigouroux, I. De Smedt, et al., Aura Ozone Monitoring Instrument (OMI) Collection 4 Formaldehyde Product, OMI-TROPOMI Meeting, Boulder, CO, June 2024.
- Z. Ayazpour**, K. Sun, C. R. Nowlan, and G. González Abad, Quantification of NO_x Emissions from Power-Generating Facilities over the US using Satellite Observations and intercomparison with Ground Measurements, AGU Fall Meeting, San Francisco, CA, December 2023.

SELECTED
CONFERENCE
PRESENTATIONS

Z. Ayazpour, G. González Abad, C. R. Nowlan, H. A. Kwon, C. C. Miller, H. Chong, K. Sun, E. O'Sullivan, H. Wang, X. Liu, K. Chance, A Consistent Long-Term Global Data Record of Formaldehyde from UV-Visible Satellite Instruments, AGU Fall Meeting, San Francisco, CA, December 2023.

Z. Ayazpour, K. Sun, C. R. Nowlan, and G. González Abad, Estimating Short-lived Air Pollutant Emissions in the United States Using New Generation Satellite Observations, AGU Fall Meeting, Chicago, IL, December 2022.

Z. Ayazpour, K. Sun, S. Tao, and D. Li, Estimates of spatially complete, observational data-driven planetary boundary layer height over the contiguous United States, TEMPO Science Team Meeting (virtual), June 2022.

Z. Ayazpour, K. Sun, C. C. Miller, C. R. Nowlan, E. O'Sullivan, and G. González Abad, Aura Ozone Monitoring Instrument (OMI) Version-4 Formaldehyde Product, AGU Fall Meeting, New Orleans, LA, December 2021.

Z. Ayazpour, K. Sun, C. C. Miller, C. R. Nowlan, E. O'Sullivan, and G. González Abad, Improving the Spectral Fit of NASA's OMI Formaldehyde Operational Product, AGU Fall Meeting (virtual), December 2020.

Z. Ayazpour and K. Sun, TROPOMI Observations of the Atmospheric Composition over the Middle East, AMS Annual Meeting, Boston, MA, January 2020.

Z. Ayazpour and K. Sun, High-Resolution Satellite Remote Sensing of the Atmospheric Composition over the Middle East, AGU Fall Meeting, San Francisco, CA, December 2019.

Z. Ayazpour, A. E. Bakhshipour, and U. Dittmer, Combined sewer flow prediction using hybrid wavelet artificial neural network model, Urban Drainage Modeling Conference, Palermo, Italy, September 2018.

WORK EXPERIENCE

Civil and Environmental Engineer January 2014 – April 2015
Pazhoohesh Omran Rahvar (P.O.R) Consulting Engineers, Tehran, Iran

Civil Engineer Intern September 2013 – October 2013
HYETOS Consulting Engineers, Thessaloniki, Greece

- This internship was offered by International Association for the Exchange of Students for Technical Experience (IAESTE)

Civil Engineer Intern June 2012 – September 2012
KAYSON INC., Tehran, Iran

PROFESSIONAL ACTIVITIES AND SOCIETIES

Reviewer for Peer-Reviewed Journals
Journal of Geophysical Research-Atmospheres; Remote Sensing of Environment; Atmospheric Pollution Research; Atmospheric Environment: X; Journal of Hazardous Materials; ACS Omega; Journal of Atmospheric and Solar-Terrestrial Physics; Measurement; Remote Sensing; Sustainability

Board member

Member of the Postdoc Council at Center for Astrophysics | Harvard & Smithsonian, February 2026 – Present

Member of the Equity, Diversity, Inclusion, & Belonging Committee at Center for Astrophysics | Harvard & Smithsonian, December 2023 – January 2025

Vice president of the American Society of Civil Engineers - Environmental & Water Resources Institute Student Chapter at University at Buffalo, September 2021 – December 2022

Executive officer of the American Society of Civil Engineers - Environmental & Water Resources Institute Student Chapter at University at Buffalo, September 2019 – August 2020

Executive officer of the Civil, Structural & Environmental Engineering Graduate Student Association at University at Buffalo, September 2019 – August 2020

Executive officer of the Scientific Association of Civil Engineering at University of Tehran, September 2011 – August 2015

Outreach

Volunteer in the selection committee for Astro REU (Research Experience for Undergraduates) interns, Center for Astrophysics | Harvard & Smithsonian, February 2026

Volunteer at Cambridge Explores the Universe event, Center for Astrophysics | Harvard & Smithsonian, Fall 2025 and Fall 2023

Mentor for CREATE (Research Experiences in Astronomy, Technology, & Engineering) interns, Center for Astrophysics | Harvard & Smithsonian, June 2024 – August 2024

Member

American Geophysical Union, European Geosciences Union, American Meteorological Society

TECHNICAL SKILLS

Languages

Persian (native), English (advanced), German and Arabic (basic)

Programming

Python, MATLAB, R, FORTRAN, Linux Shell

Software

RStudio, L^AT_EX, ArcGIS, Autodesk AutoCAD

High performance computing

High performance computing using computing clusters at University at Buffalo and Smithsonian Institution.

REFERENCES

Dr. Gonzalo González Abad

Physicist

Atomic and Molecular Physics Division, Center for Astrophysics | Harvard & Smithsonian
ggonzalezabad@cfa.harvard.edu

Dr. Caroline R. Nowlan

Physicist

Atomic and Molecular Physics Division, Center for Astrophysics | Harvard & Smithsonian
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Dr. Kang Sun

Associate Professor

Department of Civil, Structural and Environmental Engineering, University at Buffalo
kangsun@buffalo.edu