NORIBETH MARISCAL

noribethmariscal@gmail.com **|** 313-404-3390

Google Scholar | **LinkedIn**

https://noribeth-m.github.io/

EDUCATION

PhD Wayne State University, Detroit, MI
Civil Engineering & Urban Sustainability (Dual-Title) August 2025
Dissertation Title: "Ozone Atmospheric Chemistry in Southeast Michigan"
Advisor: Dr. Yaoxian Huang

MS Wayne State University, Detroit, MI
Environmental & Sustainability Engineering December 2022
Advisor: Dr. Yaoxian Huang

BS Wayne State University, Detroit, MI
Civil & Environmental Engineering August 2020
Minor: Latin American Studies

RESEARCH INTERESTS

My research focuses on understanding ozone (O_3) atmospheric chemistry in urban areas using high-resolution global modeling. I employ CESM/MUSICAv0 to investigate O_3 production and loss processes, particularly in Southeast Michigan, using custom grids with resolutions as fine as ~7 km. My work integrates field campaign observations (e.g., MOOSE and USOS) to evaluate and improve model performance, emphasizing the importance of O_3 precursors like NO_x, isoprene, and formaldehyde. Through awarded fellowships and collaborations with the National Center for Atmospheric Research (NCAR), I've developed novel modeling capabilities, such as implementing a diurnal cycle for anthropogenic nitric oxide emissions and explored the impacts of emission scenarios. My skill set spans advanced programming (e.g., Python), fieldwork, and data management, enabling innovative contributions to urban air quality research. I am motivated by the intersection of atmospheric chemistry, societal relevance, and collaborative science, aiming to enhance understanding and improve air quality in vulnerable regions.

PROFESSIONAL EXPERIENCE

Postdoctoral Researcher August 2025 – Present
Environmental Modelling Group
Max Planck Institute for Meteorology, Hamburg, Germany
Advisor: Dr. Guy Brasseur

Graduate Research / Teaching Assistant September 2020 – August 2025
Department of Civil and Environmental Engineering
Wayne State University, Detroit, MI
Advisor: Dr. Yaoxian Huang
  o *Employ chemistry-climate models to quantify the impacts of anthropogenic emissions on air quality, climate, and human health.*
  o *Support faculty advisor in teaching responsibilities, course material development, and grading, as well as held weekly office hours for graduate and undergraduate students.*
  o *Course as GTA: CE 4210, CE 5240/7240, CE 6160/7160*

ACOM Ralph Cicerone Fellow May 2023 – December 2024
Atmospheric Chemistry Modeling & Observations Laboratory
National Center for Atmospheric Research, Boulder, CO
Host: Dr. Louisa K. Emmons

- o *As the 2023-2024 ACOM Ralph Cicerone Fellow, I had the opportunity to collaborate with NCAR scientists and make advancements on my Ph.D. dissertation where I am running CESM/MUSICAv0 to study tropospheric ozone chemistry in the contiguous United States.*
- o *Application of diurnal cycle on NO anthropogenic emissions from the CAMSv5.1 inventory to CESM/MUSICAv0 simulations over Michigan at ~14 and ~7 km horizontal resolution.*

Educator   November 2023 – May 2024
Michigan Science Center, Detroit, MI
- o *Engage with individuals and groups with classes, demonstrations, activities around a variety of STEM topics.*
- o *Facilitate live STEM experiences onsite at the Michigan Science Center, offsite through the Traveling Science Program, and for online/virtual audiences.*

ASP GVP Graduate Student Fellow   16 May 2022 – 31 August 2022
Atmospheric Chemistry Modeling & Observations Laboratory
National Center for Atmospheric Research, Boulder, CO
Host: Dr. Louisa K. Emmons
- o *Funded through NCAR's Advanced Study Program's Graduate Student (GVP) Fellowship to visit in-person.*
- o *Developed a custom horizontal grid resolution (~7 km) for implementation in CESM/MUSICAv0 to study ozone atmospheric chemistry in Michigan, US.*

Intern   20 May 2021 – 17 August 2021
Atmospheric Chemistry Modeling & Observations Laboratory
National Center for Atmospheric Research, Boulder, CO
Host: Dr. Louisa K. Emmons
- o *Became proficient in running CESM/MUSICAv0 and analyzing model output using the Python programming language.*
- o *Investigated Colorado air quality in the summer of 2014 using MUSICAv0 model simulations and observations from the FRAPPÉ and DISCOVER-AQ-CO.*

Intern   February 2021 – September 2021
Belle Isle Canopy Working Group
Michigan Department of Natural Resources
- o *Worked on the development of a tree management program for Belle Isle, Michigan.*

Gallery Advisor   October 2018 – March 2020
Tesla, Inc., Troy, MI
- o *Support visitors and potential customers with all questions related to Tesla, Inc. and their products with the goal of educating and exciting them about Tesla's mission to "accelerate the world's transition to sustainable energy."*
- o *Offered demonstration drives of the vehicles and participated in various marketing events.*

Peer Mentor   August 2017 – May 2020
Center for Latino/as and Latin American Studies
Wayne State University, Detroit, MI
- o *Served as a mentor to ~10 undergraduate students per semester (total of 6 semesters) from the CLLAS program and assisted them in navigating campus resources, adapting to university norms, and offered tutoring for math courses.*

SKILLS

- o **Languages**: English (Native), Spanish (Native)
- o **Programming Languages**: Python, bash, Minor knowledge of FORTRAN and NCL
- o **Earth System Modeling**: CESM CAM-chem, CESM MUSICAv0
- o **Big Data Analysis**: Ground Stations, Aircraft Data, Mobile Laboratory Data, Ground-based Remote Sensing

    o **Misc**.: Teaching Materials Development, Course Administration, Literature Analysis and Research, Customer Experience

TEACHING EXPERIENCE

Wayne State University
    o CE 4210: Intro to Environmental Engineering (*W23, W24, W25*)
    o CE 5240: Air Pollution Engineering (*F22, F24*)
    o CE 6160: Principles of Atmospheric Chemistry and Applications (*W22*)
    o CE 7160: Advanced Principles of Atmospheric Chemistry and Applications (*W22*)
    o CE 7240: Advanced Air Pollution Engineering (*F22, F24*)

FIELD CAMPAIGN SUPPORT

1. Utah Summer Ozone Study (USOS), Summer 2024.
2. Michigan-Ontario Ozone Source Experiment (MOOSE), Summer 2021 & 2022.

TRAINING & CERTIFICATIONS

1. NASA ARSET Training: Atmospheric Composition Ground Networks Supporting Air Quality and Climate Applications, 8-22 August 2024.
2. NSF NCAR/UCAR ASP Colloquium: Integrating Atmospheric and Social Approaches to Improve Urban Air Quality, 15-26 July 2024.
3. NSF NCAR/UCAR CESM Tutorial, July 2023.

PUBLICATIONS

To Be Submitted, Submitted, In Review, and/or Accepted

Mariscal, N., Emmons, L. K., Jo, D. S., Xiong, Y., Judd, L. M., Janz, S. J., Chai, J., and Huang, Y.: Evaluation of Ozone and its Precursors using the Multi-Scale Infrastructure for Chemistry and Aerosols Version 0 (MUSICAv0) during the Michigan-Ontario Ozone Source Experiment (MOOSE), EGUsphere [preprint], https://doi.org/10.5194/egusphere-2025-228, *Submitted to Geoscientific Model Development [Accepted]*, 2025.

Salah, H., Xiong, Y., Partha, D., **Mariscal, N.**, Wang, L., Tilmes, S., Tang, W., and Huang, Y.: Comparing Global Emissions of CEDS, CAMS, and ECLIPSEv6b and their Effects on Air Quality and Human Health using CESM CAM6-Chem, *Submitted to GeoHealth [In Review]*, 2025.

Nayeem, N. R., Qian, X., **Mariscal, N.**, Huang, Y., and Zhou, S.: Uncovering the Interplay Between Socioeconomic Factors, Infrastructure, and Cycling Behavior on Children Physical and Mental Health, *Submitted to Journal of Transport & Health*, 2025.

Buchholz, R., Fillmore, D., Li, M., Bruckner, M., Lichtig, P., Shams, S., Gaubert, B., **Mariscal, N.**, Lu, C. H., Schwantes, R., Baker, B., Moon, Z., Pfister, G., and Emmons, L.: Satellite Comparisons in the MELODIES MONET Atmospheric Composition Model Evaluation Package, *To Be Submitted to Geoscientific Model Development*, 2025.

1. Xiong, Y., Chai, J., Mao, H., **Mariscal, N.**, Yacovitch, T., Lerner, B., Majluf, F., Canagaratna, M., Olaguer, E. P., and Huang, Y.: Examining the Summertime Ozone Formation Regime in Southeast Michigan Using MOOSE Ground-Based HCHO/NO2 Measurements and F0AM Box Model, Journal of Geophysical Research: Atmospheres, 128, e2023JD038943, DOI: 10.1029/2023JD038943, 2023.
2. Xiong, Y., Partha, D., Prime, N., Smith, S. J., **Mariscal, N.**, Salah, H., and Huang, Y.: Long-term trends of impacts of global gasoline and diesel emissions on ambient PM2.5 and O3 pollution and the related health burden for 2000–2015, Environ. Res. Lett., 17, 104042, DOI: 10.1088/1748-9326/ac9422, 2022.
3. O'Leary, B. F., Hill, A. B., Akers, K. G., Esparra-Escalera, H. J., Lucas, A., Raoufi, G., Huang, Y., **Mariscal, N.**, Mohanty, S. K., Tummala, C. M., and Dittrich, T. M.: Air quality monitoring and

measurement in an urban airshed: Contextualizing datasets from the Detroit Michigan area from 1952 to 2020, Science of The Total Environment, 809, 152120, DOI: 10.1016/j.scitotenv.2021.152120, 2022.
4. Masoud, S., **Mariscal, N.**, Huang, Y., and Zhu, M.: A Sensor-Based Data Driven Framework to Investigate PM2.5 in the Greater Detroit Area, IEEE Sensors Journal, 21, 16192–16200, DOI: 10.1109/JSEN.2021.3076041, 2021.

PRESENTATIONS

1. **Invited Seminar**, "Ozone Atmospheric Chemistry in Southeast Michigan", Comisión Nacional de Energía Atómica, Buenos Aires, Argentina, July 2025.
2. **Oral Presentation**, "Ozone Atmospheric Chemistry in Southeast Michigan", Multi-Scale Modeling Meeting, National Center for Atmospheric Research, Boulder, CO, May 2025.
3. **Poster Presentation**, "Quantifying the Contribution of Emissions and Transport to Ozone Production and Loss Processes: A Case Study of Southeast Michigan, United States", 2024 AGU Annual Meeting, Washington, D.C., December 2024.
4. **Oral Presentation,** "Impact of Horizontal Resolution on Ozone Atmospheric Chemistry in Southeast Michigan during MOOSE", 2024 CESM Workshop, Boulder, CO, June 2024.
5. **Oral Presentation**, "Ozone Atmospheric Chemistry in Southeast Michigan during the Michigan-Ontario Ozone Source Experiment (MOOSE)", 2023 AGU Annual Meeting, San Francisco, CA, December 2023.
6. **Poster Presentation,** "Ozone Atmospheric Chemistry in Southeast Michigan during the Michigan-Ontario Ozone Source Experiment (MOOSE)", IGAC Early Career Researchers Online Conference, November 2023.
7. **Poster Presentation,** "Ozone Atmospheric Chemistry in Southeast Michigan during the Michigan-Ontario Ozone Source Experiment", Environmental Engineering and Science Poster Session in Honor of the 23-24 AEESP (Association of Environmental Engineering and Science Professors Foundation) Distinguished Lecturer, Wayne State University, Detroit, MI, September 2023.
8. **Oral Presentation,** "Ozone Atmospheric Chemistry in Southeast Michigan during the Michigan-Ontario Ozone Source Experiment", Tropospheric Chemistry Meeting, National Center for Atmospheric Research, Boulder, CO, August 2023.
9. **Oral Presentation,** "Evaluation of Ozone and its Precursors Using the Multi-Scale Infrastructure for Chemistry and Aerosols (MUSICA) during the Michigan-Ontario Ozone Source Experiment (MOOSE)," 2023 CESM Summer Workshop, Boulder, CO, June 2023.
10. **Poster Presentation,** "Evaluation of Ozone Using High-Resolution Model Simulations during the Michigan-Ontario Ozone Source Experiment," 2023 International Association for Great Lakes Research (IAGLR), Toronto, Ontario, CA, May 2023.
11. **Poster Presentation,** "Evaluation of Ozone Using High-Resolution Model Simulations during the Michigan-Ontario Ozone Source Experiment," 2023 WSU Graduate Research Symposium, Detroit, MI, March 2023.
12. **Oral Presentation,** "Evaluation of Model Simulated Ozone and its Precursors Using High-Resolution Model Simulations during the Michigan-Ontario Ozone Source Experiment (MOOSE)," 2023 Atmosphere, Chemistry Climate, and Whole Atmosphere Winter Working Group Meeting, Boulder, CO, February 2023 *(Virtual)*.
13. **Poster Presentation,** "Evaluation of Model Simulated Ozone and its Precursors Using High-Resolution Model Simulations during the Michigan-Ontario Ozone Source Experiment (MOOSE)," 2022 AGU Fall Meeting, Chicago, IL, December 2022.
14. **Poster Presentation,** "Transformative Research in Urban Sustainability Training (T-RUST) Program," 2022 NRT Annual Meeting, Virginia Tech, Blacksburg, VA, October 2022.
15. **Poster Presentation,** "Evaluation of Model Simulated Ozone and its Precursors Using High-Resolution Model Simulations during the Michigan-Ontario Ozone Source Experiment (MOOSE)," MSGC Fall Conference, University of Michigan, Ann Arbor, MI, October 2022.
16. **Oral Presentation,** "Evaluations of Model Simulated Ozone and Precursors in MUSICAv0 Against In-Situ and Airborne Measurements in the Continental US: A Case Study in Colorado and Michigan," ACOM CAM-Chem/MUSICA Meeting, Boulder, CO, June 2022.

17. **Poster Presentation,** "Evaluations of Model Simulated Ozone and Precursors in MUSICAv0 Against In-Situ and Airborne Measurements in the Continental US: A Case Study in Colorado and Michigan," CESM Workshop, Boulder, CO, June 2022.
18. **Poster Presentation,** "Evaluations of Model Simulated Ozone and its Precursors in MUSICA-V0 Against In-Situ and Airborne Measurements over the Continental US," AGU Fall Meeting, New Orleans, LA, December 2021 *(Virtual).*
19. **Poster Presentation**, "Evaluations of Model Simulated Ozone and its Precursors in MUSICA-V0 Against In-Situ and Airborne Measurements over the Continental US," MSGC Fall Conference, Calvin University, Grand Rapids, MI, October 2021 *(Virtual).*
20. **Poster Presentation**, "Sensitivity of Model Simulated Ozone in CESM2 to Emission Inventories, Meteorological Datasets, and Chemical Mechanisms," CESM Workshop, National Center for Atmospheric Research, Boulder, CO, June 2021 (*Virtual).*

GRANTS, FELLOWSHIPS AND AWARDS

1. National Science Foundation Non-Academic Research Internships for Graduate Students (INTERN) Supplemental Funding Opportunity, July 2024 – December 2024, $55,000.
2. National Science Foundation Research Traineeship (NRT) T-RUST Graduate Fellowship, 17 May 2023 – 16 August 2023, $8,500.
3. IAGLR IDEA+ Presenter Scholarship, 10 May 2023, $2,000.
4. 2023-2024 ACOM Ralph Cicerone Fellowship in Earth System Science, May 2023 – June 2024, $9,250.
5. United Healthcare Health Equity Challenge, *Honorable Mention*, 15 November 2022, $2,500.
6. National Center for Atmospheric Research (NCAR) Advanced Study Program Graduate Student Fellowship, 16 May 2022 – 31 August 2022, $10,000.
7. National Science Foundation Research Traineeship (NRT) T-RUST Graduate Fellowship, 16 May 2022 – 31 August 2022, $8,500.
8. Wayne State University OptimizeWayne Competition, 26 October 2021, $12,500.
9. Michigan Space Grant Consortium Fellowship, 1 September 2021 – 30 April 2022, $5,000.
10. Wayne State University MobilityForAll Competition (Phase II), 14 May 2021, $5,000.
11. Wayne State University MobilityForAll Competition (Phase I), 10 March 2021, $1,000.
12. Wayne State University Office of Vice President for Research Award for Graduate Students Who Obtain External Support, October 2021, $2,000.
13. National Science Foundation Research Traineeship (NRT) T-RUST Graduate Fellowship, 18 August 2020 – 17 August 2021, $55,000.
14. Wayne State University College of Engineering Graduate School Merit Scholarship, September 2020 – May 2021, $3,000.

PROFESSIONAL SERVICE

1. *Reviewer,* Discover Environment
2. *Reviewer,* Atmospheric Chemistry and Physics (ACP)
3. *Volunteer Scientist,* Detroit AirNet, Wayne State University, Detroit, MI.
4. *Panelist,* Society for Women Engineers, Wayne State University, Detroit, MI.
5. *Reviewer*, Hispanic Serving Institutions (HIS) Scholars Program, American Heart Association.

SUPERVISION AND MENTORING

1. Marisa Lavins (Graduate Student, 2022-2024)
2. Mikaela Senkus (Undergraduate Student, 2022)

REFERENCES

1. Dr. Yaoxian Huang (Wayne State University, yaoxian.huang@wayne.edu)
2. Dr. Louisa K. Emmons (National Center for Atmospheric Research, emmons@ucar.edu)
3. Dr. Duseong Jo (Seoul National University, duseong@snu.ac.kr)