



Zachary L. Moon

Research interests

I am interested in the modeling of forest canopies, the atmospheric boundary layer, and forest-atmosphere interactions, with an emphasis on in-canopy processes that affect atmospheric chemistry. Thus far my PhD work has focused on modeling of radiation and photochemistry inside plant canopies. Future PhD work will target generation of secondary aerosol from oxidation of plant emissions.

Education

- 2016– (expected Su21) **PhD Meteorology & Atmospheric Science**, *Penn State University*, University Park, PA.
Thesis: Title TBD
Committee: Jose D. Fuentes (advisor), William H. Brune, Miriam A. Freedman, Jerry Y. Harrington
- 2014–2016 **MS Geological Sciences – Atmospheric Science**, *Indiana University*, Bloomington, IN.
Thesis: A modeling study of the impacts of the tropopause height on the structure of intense tropical cyclones
Committee: Chanh Kieu (advisor), Kaj Johnson, Scott Robeson
- 2010–2014 **BS Chemistry** *summa cum laude*, *Indiana University*, Bloomington, IN, *GPA 3.91*.

Publications

Peer-reviewed journal articles

- 2017 4 **Moon, Z.**, C. Kieu, July 2017: Impacts of the Lower Stratosphere on the Development of Intense Tropical Cyclones, *Atmosphere*, doi:10.3390/atmos8070128
- 3 Ferrara, M., F. Groff, **Z. Moon**, K. Keshavamurthy, S. M. Robeson, C. Kieu, May 2017: Large-scale control of the lower stratosphere on variability of tropical cyclone intensity, *Geophysical Research Letters*, doi:10.1002/2017GL073327
- 2016 2 Kieu, C., V. Tallapragada, D.-L. Zhang, **Z. Moon**, July 2016: On the Development of Double Warm-Core Structures in Intense Tropical Cyclones, *J. Atmos. Sci.*, doi:10.1175/JAS-D-16-0015.1
- 1 Kieu, C. Q., **Z. Moon**, April 2016: Hurricane Intensity Predictability, *Bull. Amer. Meteor. Soc.*, doi:10.1175/BAMS-D-15-00168.1

Forthcoming

- o Moon, Zachary, Jose D. Fuentes, and Ralf M. Staebler: Impacts of spectrally resolved irradiance on photolysis frequency calculations within a forest canopy, *Agricultural and Forest Meteorology*, doi:10.1016/j.agrformet.2020.108012 [final-form, 2020-07-29; to be published in Vol. 291; share link]

Presentations

Conference

- 2020 8 **Moon, Z.**, J. D. Fuentes: Sensitivity of Modeled Leaf Temperature to Canopy Radiative Transfer Formulations, *AMS 100th Annual Meeting – 20th Symposium on Meteorological Observation and Instrumentation*, Boston, MA, January 2020 [talk]

- 7 Salinger, M. J., J. D. Fuentes, M. E. Mann, **Z. Moon**: Afforestation versus Reforestation in New Zealand: Effects on Regional Climate, *AMS 100th Annual Meeting – 33rd Conference on Climate Variability and Change*, Boston, MA, January 2020 [talk]
- 6 **Moon, Z.**, D. Wei, J. D. Fuentes, M. Chamecki, G. G. Katul, W. H. Brune, J. J. Orlando: Oxidation of Isoprene and Monoterpenes as a Function of Nitrogen Oxides in the Amazon Rain Forest, *AMS 100th Annual Meeting – 22nd Conference on Atmospheric Chemistry*, Boston, MA, January 2020 [talk]
- 2018 5 **Moon, Z.**, J. D. Fuentes: Modeling the disposition of spectral actinic flux in a mixed deciduous forest canopy, *AMS Fourth Conference on Biogeosciences*, Boise, ID, May 2018 [talk]
- 4 **Moon, Z.**, J. D. Fuentes: Modeling the disposition of spectral actinic flux in a mixed deciduous forest canopy, *NOAA Ninth Biennial EPP Forum*, Washington, D.C., March 2018 [talk]
- 2016 3 **Moon, Z.**, C. Kieu: On the Role of the Tropopause Height in the Development of a Double Warm Core Structure in Intense Tropical Cyclones, *AMS 32nd Conference on Hurricanes and Tropical Meteorology*, San Juan, PR, April 2016 [talk]
- 2 Kieu, C., **Z. Moon**: Upper Bound on Hurricane Intensity Forecast Errors, *AMS 32nd Conference on Hurricanes and Tropical Meteorology*, San Juan, PR, April 2016 [talk]
- 1 Ferrara, M., F. Groff, **Z. Moon**, K. Keshavamurthy, S. M. Robeson, C. Kieu: Understanding the Climatological Connection of Tropical Cyclone Intensity and the Tropopause Variability, *AMS 32nd Conference on Hurricanes and Tropical Meteorology*, San Juan, PR, April 2016 [talk]

At Penn State

- 2019 7 **Moon, Z.**: Spectrally resolved canopy radiative transfer, *Frank Talk seminar series*, University Park, PA, December 2019 [talk]
- 6 **Moon, Z.**: Photochemistry in plant canopies, *ESSC Brown Bag seminar series*, University Park, PA, December 2019 [talk]
- 5 **Moon, Z.**: Understanding the role of in-canopy oxidation of biogenic emissions by advancing 1-D modeling capabilities, *PhD Comprehensive Exam seminar*, University Park, PA, November 2019 [talk]
- 4 **Moon, Z.**: Photochemical loss of gases within plant canopies, *Frank Talk seminar series*, University Park, PA, April 2019 [talk]
- 2018 3 **Moon, Z.**, J. D. Fuentes: Impact of spectral resolution and canopy radiative transfer scheme on photolysis calculations within a forest canopy, *PhD Candidacy Exam seminar*, University Park, PA, May 2018 [talk]
- 2017 2 **Moon, Z.**, J. D. Fuentes: Comparing four approaches to modeling vertical profiles of spectral actinic flux in a mixed deciduous forest canopy, *Graduate Technical English Exam talk*, University Park, PA, December 2017 [talk]
- 1 **Moon, Z.**, J. D. Fuentes: Modeling Profiles of Spectral Irradiance in the Borden Forest, *First-Year Graduate Student Symposium*, University Park, PA, August 2017 [talk]

Other

- 2019 2 **Moon, Z.**, J. D. Fuentes, R. Saylor: Modeling radiative transfer in a forest canopy and its importance in a 1-D air chemistry model, *NOAA NCAS-M ProjectFest*, College Park, MD, September 2019 [poster]
- 2018 1 **Moon, Z.**, R. Saylor: Modeling radiative transfer in a forest canopy and its importance in a 1-D air chemistry model, *NOAA ARL/ATDD seminar*, Oak Ridge, TN, August 2018 [talk]

Teaching Experience

Penn State

Teaching Assistant.

- Fall 2019 Application of Computers to Meteorology (METEO 473).
Assisted students with Python and the Scientific Python stack during class and office hours.
- Spring 2019 Mesoscale Meteorology (METEO 414).
Graded and corrected homework assignments.
- Spring 2017 Applications of Computers in Meteorology (METEO 473).
Prepared and gave several lectures.
- Fall 2016 Climate Dynamics (METEO 470).
Gave two lectures, one of which I prepared in full.

Indiana University

Teaching Assistant.

- Spring 2015 Fate of Environmental Pollutants (SPEA-E 564).
Fall 2014 Intro. to Environmental Science (SPEA-E 272).
Spring 2014 Intro. to Programming I (CSC-A 201).

Honors, Awards, & Fellowships

- Sp17–Fa18 NCAS-M Graduate Fellowship, *NOAA Center for Atmospheric Science and Meteorology*.
2016 FEGR 1st-year graduate fellowship, *Penn State Graduate School*.
2014 College of Arts & Sciences Graduate Fellowship, *Indiana University*.
2013 Phi Beta Kappa Honor Society inductee.
2009 National Merit Scholar.

Professional Activities

- 2015– Student Member, *American Meteorological Society (AMS)*.

Employment

- 2015– RA/TA.
2011–2015 Starbucks Shift Supervisor, *The Indiana Memorial Union*, Bloomington, IN.

Computer skills

OS	Mac OS X, Windows, Linux	office suites	Microsoft Office, LibreOffice
programming	Python, Fortran	numerical	MATLAB, R
shell	Bash	misc	GrADS, HTML/CSS, git
some exp.	JavaScript, NCL, (t)csch, C, Julia, Jekyll/SASS, SQL		

Languages

English	mother tongue	Spanish	basic
French	basic (studied in high school)	Latin	basic (studied in undergrad)

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