Joseph L. Wilkins, Ph.D.

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Current Appointment

2021-current Assistant Professor, Howard University, Interdisciplinary Studies Department, Howard University Program in Atmospheric Science (HUPAS).

Education

2016 Ph.D., Meteorology, Saint Louis University, St. Louis, MO

2016 PGC, Graduate Certificate in Advanced Remote Sensing and Geographic Information Systems (GIS), Saint Louis University, St. Louis, MO

2013 M.S., Meteorology, Saint Louis University, St. Louis, MO

2011 B.S., Atmospheric Science, Minor: Physics, University of Louisville, Louisville, KY

Honors/Awards

- Special Act Award, Scientific-Professional performance award: July 2019 / July 2020
- U.S. EPA ORD/NERL “November STEMbassador” for participation in 22 events during fiscal year 2017, reaching over 600 people: Oct. 2017
- US2020 STEM mentoring Awards for “Excellence in Volunteer Experience and Volunteer Mobilization”, EPA-RTP STEM outreach program: Oct. 2017
- Special Act Award, Scientific-Professional performance award: May 2017
- Chosen by upper ORD/NERL management as one of two representatives of the US EPA for the Research Triangle Cleantech Cluster (RTCC) partnership. Title “Cleantech Career Opportunities Project for K-12/Higher Education Students” working with the Research Triangle Cleantech Cluster's Talent Action Committee. https://www.youtube.com/watch?v=zlsq39MKv5g&t=2s
- “Extraordinary activity or project of a short term nature” Award (Amount $3,200): Dec. 2016
- Sigma Xi, The Scientific Research Society: May 2014
- NASA AMES Division Award “Group Achievement Award” to the SEAC^{4}RS team: Oct. 2014
- Member of the Month, Urban League Young Professionals, St. Louis, MO: May 2013

- Sigma Pi Sigma National Physics Honor Society: May 2011
- Scholarship Award, Cultural Center, University of Louisville: 2010 - 2011
- Louis Stokes Alliances for Minority Participation grant recipient: 2009 - 2010
- Award for Best Poster Presentation, KY – WV Louis Stokes Alliances for Minority Participation: May 2010
- Scholarship Award, Society of Porter Scholars: 2009 - 2010
- Porter Scholar Recipient: 2007 - 2010
- University of Louisville President's Commission on Diversity and Racial Equality Undergraduate Student Research Grant recipient: 2010
- Summer Research Opportunity for Undergrads grant recipient: 2009 - 2010
- Outstanding Sophomore, Society of Porter Scholars: 2008 - 2009

U.S. EPA Quality Assurance Project Plans

- 4-Jan-2018 D-CED-0031336: Methods Development, Evaluation, and Applications for Ambient Air Criteria Pollutants on Sensitive Cultivars via an Ozone Bio-Monitoring Garden
- 10-Dec-2017 D-CED-0030311: The Development of Air Quality Simulation Models: Model development activities for Tropospheric Ozone, Particulate Matter, and Hazardous Air Pollutants
- 10-Feb-2017 QT17015A/A-0030862: Grassland Smoke Emission Measurement Supporting Multi-Modeling Framework Simulation of Rangeland Burning Practices for the Kansas Flint Hills
- 10-May-2016 D-CED-0030312-QP-1-0: Improving and Quantifying Emission Estimates for Emission Sources Dependent on Meteorology and that Dynamically Vary Due to Atmospheric Concentrations (Task Em2.3)

Publications

1. **Wilkins, J. L.**, Gilliam, R., Landis, M. Inter-comparison of lidar, satellite retrievals, and model for aerosol and Planetary Boundary Layer profiling over the flint hills, Kansas (in prep)

2. **Wilkins, J. L.**, Pouliot, G., Pierce, T., Gilliam, R., Vukovich, J., Baker, K., Landis, M.S. Novel approaches to prescribed fire plume rise using grassland burn smoke-plume heights with a ground-based scanning lidar in the Flint Hills Region, Kansas, USA (under review). International Journal of Wildland Fires.
3. Pasken, R., **Wilkins, J. L.** Testing dispersion models in complex terrain validated with field observations. (under review). Atmospheric Environment.

4. Baker, K., Avey, L., Hawkins, A., Beidler, J., Szykman, J., Koplitz, S., **Wilkins, J. L.** Model Representation of Local to Regional Scale Prescribed Grassland Fire Smoke in the Flint Hills Region. Atmospheric Environment. (under review)

5. **Wilkins, J. L.**, Pouliot, G., Pierce, T., Landis, M.S. Determination of prescribed grassland burn smoke-plume heights with a ground-based scanning lidar in the Flint Hills Region, Kansas, USA (under review). International Journal of Wildland Fires.

6. D'Evelyn, S.M., Jung, J., Alvarado, E., Baumgartner, J., Caligiuri, P., Hagmann, R.K., **Wilkins, J.L.**, et al. Wildfire, smoke exposure, human health, and environmental justice need to be integrated into forest restoration and management. (under review, Science Advances).

7. Loria-Salazar, S.M., Sayer, A., Huang, J., Flynn, C., Lareau, N., Lee, J., **Wilkins, J.L.**, et al. Evaluation of Novel NASA MODIS and VIIRS Aerosol Products and Development of Air Quality Fire Ratio during Extreme Fire Events in the Western U.S. Journal of Geophysical Research. https://doi.org/10.1029/2020JD034180

8. **Wilkins, J. L.,** Pouliot, G., Pierce, T., Soja, A., Choi, H., Gargulinski, E., et al. 2021: An evaluation of empirical and statistically based smoke plume injection height parametrisations used within an air quality models. International Journal of Wildland Fire. https://doi.org/10.1071/WF20140.

9. O'Neill, S., Diao, M., Raffuse, S., Al-Hamdan, M., Barik, M., Jia, Y., **Wilkins, J.**, et al. 2021: A Multi-Analysis Approach for Estimating Regional Health Impacts from the 2017 Northern California Wildfires, Journal of the Air & Waste Management Association, DOI: 10.1080/10962247.2021.1891994.

10. **Wilkins, J. L.,** B. de Foy, A. M. Thompson, D. A. Peterson, E. J. Hyer, C. Graves, et al. 2020: Evaluation of stratospheric intrusions and biomass burning plumes on the vertical distribution of tropospheric ozone over the Midwestern U.S. J. Geophys. Res.-Atmos. 125:e2020JD032454. doi.org/10.1029/2020JD032454.

11. **Wilkins, J. L.,** Pouliot, G., Foley, K., Appel, W., Pierce, T. 2018: The impact of U.S. wildland fires on ozone and particulate matter: a comparison of measurements and CMAQ model predictions from 2008-2012. International Journal of Wildland Fires, https://doi.org/10.1071/WF18053.

12. Maimaitiyiming, M., Ghulam, A., Bozzolo, A., **Wilkins, J. L.**, Kwasniewski, M. 2017: Combining field spectroscopy and WorldView-3 visible/near infrared images for early detection of plant stress. Remote Sensing, 9(7), 745, https://doi.org/10.3390/rs9070745.

13. Ghulam, A., Fishman, J., Maimaitiyiming, M., **Wilkins, J. L.**, Maimaitijiang, M., Welsh, J., Bira, B., Grzovic, M. 2015: Characterizing crop responses to background ozone (O3) in open air agricultural field by using reflectance spectroscopy. IEEE, Geoscience and Remote Sensing Letters, 99, 1307-1311, doi:10.1109/LGRS.2015.2397001.

14. de Foy, B., **Wilkins, J. L.**, Lu, Z., Streets, D. G., Duncan, B. N. 2014: Model Evaluation of Methods for Estimating Surface Emissions and Chemical Lifetimes from Satellite Data. Atmospheric Environment, 98, 66-77.

Conference/Professional Presentations

Conferences organized:

1. 3rd International Smoke Symposium, Raleigh, NC. & Online, Apr. 23, 2020.

2. The Fire Continuum Conference, Missoula, MT. May 24, 2018.

Chaired sessions:

1. **Wilkins, J.L.**, et al., Selected, Session: The need for the next generation of smoke research and forecast systems. 2021 American Geophysical Union (AGU) Fall Meeting, New Orleans, LA. & Online, Dec. 13-17, 2021.

2. **Wilkins, J.L.**, et al., Selected, Special Session: Emerging Plume Rise Characterization Approaches. 3rd International Smoke Symposium, Raleigh, NC. & Online, Apr. 23, 2020. 8 presentations.

3. Landis, M., Brown, A., **Wilkins, J.L.**, et al., Selected, Special Session: EPA Wildland Fire Research: The intersection of Emissions, Ambient Characterization and Public Health. Outcomes Smoke Measurement and Modeling. The Fire Continuum Conference, Missoula, MT. May 24, 2018.

Presentations:

1. Loría-Salazar, S. M., Arnott, W. P., Clements, C.B, Barndard, J. C., Sayer, A. M., Flynn, C., Redemann, J, and **Wilkins, J.L.** 2021. Toward Understanding the Effect of Smoke Aerosols on Boundary Layer Properties and Regional Weather due to Local-Generated and Transported Smoke. American Meteorological Association.

2. **Wilkins, J. L.,** et al., Improving Daily Surface Particulate Matter Estimates during Extreme Fire Events using a Novel NASA Satellite Plume Injection Height Algorithm", DEC 2020, AGU ID# 713259.

3. **Wilkins, J. L.,** et al., Investigation of fire smoke plume injection height sensitivities during the 2017 Northern California wildfires outbreak using a combination of satellite data and air

quality modeling: Implications for health risk assessment 15 DEC 2020, AGU. ID# 770306

4. O'Neill S., **Wilkins, J.L.**, et al. HAQAST Final Showcase Panels-Meeting Virtual. 21-22 July 2020, HAQAST-showcase https://haqast.org/showcase/.

5. Soja, A. J., Choi, H.-D., Gargulinski E., Fairlie D., Pouliot G., Baker K., **Wilkins J. L.**, O'Neill S. (2020) Caliop-based Biomass Burning Smoke Plume Injection Height and Detrainment. United States Environmental Protection Agency AESMD Seminar Series. 15 July 2020, U.S. EPA ORD.

6. **Wilkins, J.L.**, O'Neill, S.M., Diao, M., Raffuse, S.M., Tanrikulu, S., Reid, S., Tong, D., et al. "Investigation of fire smoke plume injection height sensitivities during the 2017 Northern California wildfires". 3rd International Smoke Symposium, Raleigh, NC. Apr. 23, 2020.

7. Loría-Salaza, S.M., Huang J., Lee, J., Sayer, A.M., Flynn, C., **Wilkins, J.L.**, Ivey, C.E., et al., "Improving Daily Surface Particulate Matter Estimates during Extreme Fire Events using a Novel NASA Satellite Plume Injection Height Algorithm". 3rd International Smoke Symposium, Raleigh, NC. Apr. 21, 2020.

8. Soja, A.J., Choi, H-D, Gargulinski, E., Fairlie, T.D., O'Neill, S., **Wilkins, J.L.**, Pouliot, G., Tackett, J., and Baker, K. "CALIOP-based Biomass Burning Smoke Plume Height". 3rd International Smoke Symposium, Raleigh, NC. Apr. 21, 2020.

9. **Wilkins, J. L.**, "Improving the Vertical Distribution of Wildland Fire Smoke in the Community Multiscale Air Quality Model (CMAQ)". University of North Carolina Gilling's School of Public Health Air Quality Seminar, Chapel Hill, NC. Jan. 27, 2020.

10. **Wilkins, J.L.**, "Measuring and Modeling Smoke From Fires—an Overview". Lightning talk Schedule, 2019 American Geophysical Union (AGU) Fall Meeting, San Francisco, CA. Dec. 11, 2019.

11. **Wilkins, J. L.**, Pouliot, G., Pierce, T., Beidler, J. "Exploring the Vertical Distribution of Wildland Fire Smoke in CMAQ". 2019 American Geophysical Union (AGU) Fall Meeting, San Francisco, CA. Dec. 9, 2019.

12. O'Neill, S.M., Diao, M., Raffuse, S.M., Tanrikulu, S., Reid, S., Tong, D., **Wilkins, J.L.**, et al. "2017 Northern California Wildfires – A NASA Health and Air Quality Applied Sciences Team (HAQAST) Tiger Team". 2019 American Geophysical Union (AGU) Fall Meeting, San Francisco, CA. Dec. 9, 2019.

13. **Wilkins, J. L.**, Pouliot, G., Pierce, T., Beidler, J. “Exploring the Vertical Distribution of Wildland Fire Smoke in CMAQ”.
    - 17th Annual Community Modeling and Analysis System (CMAS) Conference, Chapel Hill, NC. Oct. 23, 2018.
    - The 6th International Fire Behavior and Fuels Conference, Albuquerque, NM. April 30, 2019.
    - The EPA International Emissions Inventory Conference 2019, Dallas, TX. Aug. 2, 2019.
    - 2019 American Geophysical Union (AGU) Fall Meeting, San Francisco, CA. Dec. 9, 2019.

14. **Wilkins, J. L.** “Exploring the Vertical Distribution of Wildland Fire Smoke in CMAQ”. NASA Health and Air Quality Applied Science Team (HAQAST6), Pasadena, CA. Jul. 10, 2019 (Invited).

15. Soja, A.J., Choi, H-D, Gargulinski, E., Fite, C., Bela, M., Fairlie, T.D., Pouliot, P., Baker, K., **Wilkins, J. L.** “CALIOP-based Biomass Burning Smoke Plume Injection Height”. The American Meteorological Society 99th Annual Meeting, Phoenix, AZ. Jan. 8, 2019.

16. Soja, A.J., Choi,H-D, Fairlie,T.D., **Wilkins, J. L.**, Pouliot, P., Baker, K., Dibb, J., Polashenski, C., Winker, D., Trepte, C., Szykman, J. “CALIOP-based Biomass Burning Smoke Plume Injection Height”. The Fire Continuum Conference, Missoula, MT. May 24, 2018.

17. Baker, K., **Wilkins, J. L.** “Modeled Smoke Impacts on Ozone and Particulate Matter Evaluated with Field Study and Routine Air Quality Measurements”. The Fire Continuum conference, Missoula, MT. May 24, 2018.

18. **Wilkins, J. L.**, Pouliot, G., Vukovich, J., Pierce, T. “Modeling Fire and Ecosystems: Improving the Vertical Distribution of Wildland Fire Emissions in CMAQ”.
    - EPA’s Computational Exposure Division Seminar series, Research Triangle Park, NC, Feb. 14, 2018.
    - The Fire Continuum conference, Missoula, MT. May 24, 2018.
    - 2018 American Geophysical Union (AGU) Fall Meeting, Washington, D.C., Dec. 12, 2018.

19. Pouliot, G., **Wilkins, J. L.** “Improving the Fire Emissions Inventory: A Dive in to the MODIS Fire Detections”.
    - EPA’s Computational Exposure Division Seminar series, Research Triangle Park, NC, Mar. 14, 2018.

- The Fire Continuum conference, Missoula, MT. May 24, 2018.

20. **Wilkins, J. L.** "Modeling Fire and ecosystems: Improving the Vertical Distribution of Wildland Fire Emissions in CMAQ". The University of Louisville Department of Physics and Astronomy Seminar series, Mar. 23, 2018. (Invited talk).

21. **Wilkins, J. L**., Baker, K., Landis, M., Aurell, J., Gullett, B. "Prescribed Grassland Smoke Plume Observations Using Lidar in the Northern Flint Hills Region". 2017 American Geophysical Union (AGU) Fall Meeting, New Orleans, LA. Dec. 12, 2017.

22. **Wilkins, J. L.**, McDowell, I, Brown, A., Gullet, B. "A video of the interworking behind conducting research on prescribed fires at the U.S EPA".
    - 2017 AGU Fall Meeting, New Orleans, LA. Dec. 11, 2017.
    - The Fire Continuum conference, Missoula, MT. May 24, 2018.

23. McDowell, I., Pierce, T., Eder, B., Foley, K., Gilliam, R., Pouliot, G., **Wilkins, J. L.** "$PM_{2.5}$ concentrations observed and modeled for the 2016 southern Appalachian wildfire event". Community Modeling and Analysis System (CMAS), Chapel Hill, NC. Oct. 23, 2017.

24. **Wilkins, J. L.** "Wildfires and modeling approaches". The monthly "eco-team" research coordination meeting, Research Triangle Park, NC, and webcast to Athens, GA. May 11, 2017.

25. **Wilkins, J. L.** "EPA Wildfires and modeling approaches". NASA Health and Air Quality Applied Science Team (HAQAST2), University of Washington, in Seattle, WA, Feb. 27-28, 2017

26. Maimatiyiming, M., Ghulam, A., Bozzolo, A., **Wilkins, J. L.** "Integrating Field Spectra and Worldview-2 Data for Grapevine Productivity in Different Irrigation Treatments, Abstract NH51E- 1950". 2015 AGU Fall Meeting, San Francisco, CA, Dec. 14-18, 2015.

27. Maimatiyiming, M., Ghulam, A., Bozzolo, A., Maimaitijiang, M., **Wilkins, J. L.** "Early Detection of Plant Responses to Water Stress Using Field Spectroscopy", ASPRS 2015 Annual Conference, Tampa, FL, May 4-8, 2015.

28. **Wilkins, J. L.**, de Foy, B., Morris, G.A., Fishman, J., Graves, C., Newchurch, M. J., Kuang, S., Hyer, E., Yan, M., Thompson, A. "An Analysis of SEACIONS Ozonesonde Measurements from St. Louis MO: Providing Insight into How Cross Country Wildfires and Descending Stratospheric Air over the Great Plains Impact Regional Air Quality".

- 10th Air Quality Applications Science Team Meeting (AQAST10), Research Triangle Park, NC, Jan. 5, 2015.
- Abstract A21A-0066, 2015 AGU Fall Meeting, San Francisco, CA, Dec. 14-18, 2015.
- SEAC4RS Science Team Meeting 2, Pasadena, CA, April 28 - May 1, 2015.
- 9th Air Quality Applications Science Team Meeting (AQAST9), St. Louis, MO, Jun. 3, 2015.
- Abstract A11H-3089, 2014 AGU Fall Meeting, San Francisco, CA, Dec. 15-19, 2014.

29. de Foy, B., **Wilkins, J. L.** "Estimates of Emissions and Chemical Lifetimes of NOx from Point Sources using OMI Retrievals", Abstract A53N-05. 2014 AGU Fall Meeting, San Francisco, CA, Dec. 15-19, 2014.

30. Thompson, A. M., Ott, L. E., Duncan, B. N., Witte, J. C., Selkirk, H. B., Miller, S. K., Stauffer, R.M., Morris, G. A., Fuelberg, H. E., Fishman, J., **Wilkins, J. L.**, Minschwaner, K. R., Johnson, B. J., Newchurch, M. J. "Overview of Ozone Variability During SEAC4RS from the SEACIONS Ozonesonde Network", A23J-3384. 2014 AGU Fall Meeting, San Francisco, CA, Dec. 15-19, 2014.

31. **Wilkins, J. L.**, Hartling, S., Ghulam, A. "Characterizing the Impacts of Land-cover/Land-use change on AOD Distribution and Pollution Concentrations in Missouri". 20th Annual Graduate Student Symposium, Saint Louis, MO, Apr. 11, 2014.

32. **Wilkins, J. L.**, Morris, G.A., Fishman, J., de Foy, B. "A Preliminary Analysis of SEACIONS Ozonesondes from St. Louis, Missouri: August-September 2013". SEAC4RS Science Team Meeting, Boulder, CO, Apr. 15-18, 2014.

33. de Foy, B., **Wilkins, J. L.** "Power Plant NOx Emissions Estimated by OMI". 8th Air Quality Applications Science Team Meeting (AQAST8), Atlanta, GA, Dec. 3, 2014.

34. Fishman, J., Belina, K., Ghulam, A., and **Wilkins, J. L.** "The St. Louis Ozone Garden Project: Providing a National Model for Creating an Awareness of the Detrimental Effects of Air Pollution on Vegetation". 8th Air Quality Applications Science Team Meeting (AQAST8), Atlanta, GA, Dec. 3, 2014.

35. **Wilkins, J. L.**, de Foy, B. "Oversampling OMISO2 to Characterize Large Point Sources, Pollution Transport, and SO2 Lifetimes in the Atmosphere".
    - Sustainable Disaster Recovery Conference, St. Louis, MO, Nov. 14, 2013
    - Sigma Xi & IFSA Research Symposium & Spring Meeting, St. Louis, MO, Apr. 29, 2013
    - 19th Annual Graduate Student Symposium, St. Louis, MO, Apr. 26, 2013

- Abstract: A21B-0055, 2012 AGU Fall Meeting, San Francisco, California, Dec. 4, 2012

36. **Wilkins, J. L.**, MacCall, B. T. “Exploring Isothermal Layers in the Stable Atmospheric Boundary Layer”.
    - APS Meeting in March 2011, Dallas, TX, Mar. 22, 2011
    - Tenth Annual Posters-at-the-Capitol, Frankfort, KY, Feb. 10, 2011

37. **Wilkins, J. L.**, MacCall, B. T. “Introduction to Numerical Modeling of the Atmosphere”.
    - University of Louisville's Black Faculty and Staff Association, Louisville, KY, Apr. 20, 2010
    - KY-West VA Stokes Alliances for Minority Participation, Lexington, KY, Apr. 16, 2010
    - University-Wide Undergraduate Research Symposium, Louisville, KY, Apr. 13, 2010
    - APS Meeting in March 2010, Portland, OR, Mar. 16, 2010
    - Ninth Annual Posters-at-the-Capitol, Frankfort, KY, Jan. 28, 2010
    - Summer Research Opportunity Program Symposium, Louisville, KY, Jul. 29, 2009

Research Experience

2021-current **Howard University, Interdisciplinary Studies Department, Howard University Program in Atmospheric Science (HUPAS).**
Assistant Professor
Start date: August 16, 2021 | End date: Current

2020-2021 **Fellowship US FS AirFire Team and the University of Washington School of Environmental and Forest Sciences.**
Postdoctoral Research Scientist
Start date: July 11, 2020 | End date: August 16, 2021
Supervisor: Dr. Ernesto Alvarado
Research Mentor: Dr. Susan O’Neill
- Update meteorological and fire emissions inputs to air quality and trajectory models for near-real time and retrospective analysis.
- Integrate and evaluate satellite data platforms into machine learning and data fusion techniques.
- Designing new data tools for end users of fire and smoke products.

2016-2020 **US EPA National Exposure Research Lab, Computational Exposure Division, Atmospheric Model Application and Analysis Branch**,
Postdoctoral Physical Scientist (GS-12)
Start date: July 10, 2016 | End date: July 10, 2020

Supervisor: Jacky Rosati-Rowe (919) 541-9429 (can be contacted)
Research Mentor: Dr. George Pouliot

- Developed and designed extramural research projects related to air quality studies focusing on impacts from emission sources; e.g. investigated wildland fire impacts using remote sensing (satellite and lidar) and air monitoring equipment measurements for ambient concentrations of volatile organic compounds, particulate matter, and toxic pollutants (e.g. Ozone, Nitrogen Dioxides, Carbon Monoxides, and Sulfur Dioxides), to evaluate and improve the performance of CMAQ and SMOKE with improved emissions inventories for policy analysis and interpretation.
- Collaborated with NASA Health and Air Quality Applied Science Team and NOAA Forecast team to develop, evaluate, and quantify model performance for fire plume rise approaches and emission inventories.
- Created and reviewed quality assurance project plans to perform technical assessments and statistical analysis involving ambient monitored air concentrations, air toxics, and pollution produced from wild and prescribed fires for development of multi-pollutant emissions inventories and criteria air pollutants per the Clean Air Act Sections 103, 105, and 110.
- Developed and assisted with remote sensing studies with the purpose of improving emissions factors, emissions inventories, and emissions testing and control technologies for the incorporating into an air quality modeling and to improve air quality measurement studies.
- Assisted in prescribed burns field studies and chamber air quality research to develop emissions inventories for emissions-related policy using the Aerostat to measure and sample a broad variety of compounds including carbon monoxide, carbon dioxide, fine particulate matter, black/brown carbon, elemental organic carbon, semi-volatile organics and volatile organics.
- Supported the EPA's Office of Air Quality Planning and Standards' regulatory efforts for indoor and outdoor air quality, working on air quality data and tools development and supported programs such as the industrial air pollution, point source apportionment, and exceptional events rule.
- As a member of the CMAQ model development team, developed models (using R-code program and FORTRAN) to support EPA wildland fire emissions regulatory efforts and emissions inventory development (National Emissions Inventory)
- Identified and promoted a new compliance and permitting approach for stationary and non-stationary sources (Method-9 update for smoke stacks, mobile source emissions, and prescribed burns permits) using innovative lidar measurement techniques.
- (2017-current) Procured an EPA internal grant to design and air quality study expanding the NASA Bio-indicator Ozone Garden project to the Raleigh-Durham area to study the impacts of monitored ambient air concentrations of ozone and particulate matter on plants. Duties of the

project include: analyzing the collected data, identifying discrepancies in technical reports and data sets, determining if the collected environmental data are consistent with technical information from air monitoring and satellite sources. Partnered with NASA, SLU, and USDA-ARS to create three ozone gardens and recruited over 540 students and volunteers, to build, manage, and conduct research projects at the gardens.

- Presented at professional, scientific, and technical conferences, wrote technical and scientific materials, and training materials related to best method practices and research conducted (e.g. mini MicroPulse Lidar and modeling wildland fire) for federal, state, and multi-agency groups.

2011 - 2016 **NASA Air Quality Applied Science Team, Department of Earth and Atmospheric Science, Saint Louis University,**

Research Assistant

Start date: August 1, 2011 | End date: May 14, 2016

Advisor: Dr. Benjamin de Foy

- Dissertation: "The Influence of Wildfires and Stratospheric-Tropospheric Exchange on Ozone During SEACIONS Mission Over St. Louis, MO"
- Master Thesis: "Oversampling OMI SO2 to characterize large point sources, pollution transport and SO2 lifetimes in the atmosphere"
- Studied and investigated hazardous pollutants (volatile and semi-volatile compounds) and criteria air pollutants affects from stationary and non-stationary sources and their impacts on human health and the environment.

2013 - 2016 **Open-Air Crop Agriculture, Center for Sustainability, Saint Louis University,**

Research Assistant

Advisor: Dr. Abuduwasit Ghulam

Start date: August 1, 2013 | End date: May 14, 2016

- Assisted in research collecting data from remote sensing instruments, using remote sensing tools such as ArcGIS, and ENVI+IDL tools to analyze $PM_{2.5}$ (fine particulate matter) and ozone trends. [Focus: The characterization of landuse/landcover change temporally and spatially in Leaf Area Index effects on determining MODIS PM2.5 AOD distribution and pollution]
- Conducted chemical analysis of environmental samples of soil and leaves within the laboratory UV/Visible Spectrometer, Mass Spectrometer, and infrared technologies.
- Orchestrated and conducted field missions to investigate plant damage due to ozone. [Focus: Designed and implemented plant stress studies, created two ozone research education gardens in Louisville, KY at two local high schools involving ~80 students, utilized SLU's three ozone gardens to measure ozone damage to plants, and co-led the measurement team for a field study containing five different soybean cultivars.]

2013 **Studies of Emissions, Atmospheric Composition, Clouds, and Climate**

Coupling by Regional Surveys (SEAC^{4}RS) Mission and Southeast America Consortium for Intensive Ozonesondes Network Study (SEACIONS), National Aeronautics and Space Administration (NASA),
Research Assistant
Start date: August 1, 2013 | End date: September 30, 2013
Advisor: Dr. Jack Fishman

- Balloon launch lead for the St. Louis University team, managed daily ozonesonde preparations, trouble shooting, and launches (31 ozonesondes and radiosondes launched), and supervised and trained five students from SLU. For more information please see: http://croc.gsfc.nasa.gov/seacions/
- Served as lead forecaster for daily weather briefings and ran trajectory models to forecast balloon trajectory. Created an ozonesonde recovery system and handled community outreach.
- Advised on technical issues related to ambient monitoring and point source (power plant and wildland fires) monitoring of criteria air pollutants; Sulfur dioxide, Ozone, and Nitrogen dioxides.
- Developed training materials, determined training needs, made training arrangements and served as the technical expert on the content of training (delivery and evaluation).
- Designed novel scientific research for a new modeling approaches for connecting weather to fire plumes using smoke modeling assessments.

2011 - 2012 **Department of Earth and Atmospheric Science, Saint Louis University**,
Summer Research Assistant
Start date: June 1, 2011 (2012) | End date: August 1, 2011 (2012)
Advisor: Dr. Robert Pasken

- Updated scripts to run a localized WRF-ARW model in preparation for an Air Quality modeling.
- Used ensemble modeling techniques to compare forecasted severe weather events from Quantum Weather (Saint Louis University) to the National Weather Service in the St. Louis region, to mitigate causes of significant damage to the region's electricity grid.
- Investigated forest fire impacts due to climate change on indoor and outdoor air quality and hazardous air pollutants.
- Conducted data assimilation and analysis for quality assurance of monitor placement.

2009 - 2011 **United Parcels Service (UPS),**

Assistant Meteorologist

Start date: April 1, 2009 | End date: May 18, 2011

- Served as weather observer and assistant for various meteorological duties, including forecasting flight paths, future weather patterns of concern, and extreme weather.
- Analyzed model output, forecasted fog, snow, lightening, and rain for flight operations.

2009 - 2011 **Department of Physics and Astronomy, University of Louisville,**

Research Assistant

Start date: August 1, 2009 | End date: May 18, 2011

Advisor: Dr. Benjamin MacCall

- Assisted in research and program development, set up the computer network and the Local Data Manager, created two atmospheric science labs, and performed shell scripting and programming for turbulence modeling.
- Senior Thesis: “Improving the pressure gradient calculations in the National Taiwan/Purdue University Non-hydrostatic model”.

2010 **National Weather Service,** Volunteer

Advisor: Randy Baker

Start date: June 1, 2010 | End date: August 18, 2010

- Assisted in severe weather forecasting, worked with the Information technology staff to update scripts in python, worked with the Hydro Meteorological Tech forecasting floods and maintenance on river gauges across western Kentucky, and assisted in routine maintenance of the Weather Radar data and parts at the Fort Knox site.

2010 **University of Louisville, Summer Research Opportunity for Undergraduates,** Researcher

Start date: June 1, 2010 | End date: August 1, 2010

Advisor: Dr. Benjamin MacCall

- Undergraduate thesis "Exploring Isothermal Layers in the Stable Atmospheric Boundary Layer". Simulated the stable atmospheric boundary layer and implemented a radiation code into the National Taiwan University/Purdue University Non-hydrostatic model. Link: http://issuu.com/jodycofer/docs/posters2011webversionnov22]

2009 **University of Louisville, Internship for High Energy Physics,** Intern

Advisor: Dr. David N. Brown

Start date: January 1, 2009 | End date: August 1, 2009

- Researched high energy particle physics using the BaBar experiment at

SLAC National Accelerator Laboratory.

Outreach: Invited Talks and Presentations

1. **Wilkins, J. L.** Invited Guest Speaker "Modeling fire and pollution: Improving the vertical allocation of smoke in a chemical transport model", at the North Carolina Museum of Natural Sciences "Science Café", Raleigh, NC, June 13, 2019.

2. **Wilkins, J. L.** Assisted in creating a Special Session on "EPA Wildland Fire Research: The Intersection of Emissions, Ambient Characterization and Public Health Outcomes", at the International Association for Wildland Fire Conference, Missoula, MT, May 24, 2018.

3. **Wilkins, J. L.** Invited guest speaker on "Working for the environment" at the Southern School of Energy & Sustainability, Durham, NC, Apr. 25, 2018.

4. **Wilkins, J. L.** Presentation to high school students studying agriculture science about impacts of air quality on plants, Durham, NC, Jan. 29, 2018.

5. **Wilkins, J. L.** Panel discussion [Career Conversations Series] "Ag, Food, Natural Resources". Hillside High, Durham, NC, Oct. 19, 2017.

6. **Wilkins, J. L.** "Speed mentoring at EPA", for Research Triangle High School Policy Day, Research Triangle Park, NC, Oct. 19, 2017.

7. **Wilkins, J. L.**, Witter, K. "Interviewing a Scientist: a Q&A for 3rd graders". Durham, NC, May 11, 2017.

8. **Wilkins, J. L.** "MiniMPL LiDAR demonstration to Regional-ORD Community of Science Networking Program EPA-AIRS measurements station". Research Triangle Park, NC, May 10, 2017.

9. **Wilkins, J. L.**, Witter, K. Durham Earth Day Festival, presented at the EPA outreach booth, Durham, NC, Apr. 23, 2017.

10. **Wilkins, J. L.** Inaugural planting day for Durham Hubfarm ozone garden project presentation. Durham, NC, Apr. 21, 2017.

11. **Wilkins, J. L.** "How to become a professional" panel. Chapel Hill High School, Chapel Hill, NC, Apr. 20, 2017.

12. **Wilkins, J. L.** "Plants? What does that have to do with the EPA". Wilburn Elementary, Raleigh, NC, Mar. 10, 2017.

13. **Wilkins, J. L.** "MiniMPL LiDAR demonstration and training at the EPA-AIRS measurements station". Research Triangle Park, NC, Mar. 6, 2017.

14. **Wilkins, J. L.**, Witter, K. "US EPA NERL STEM Outreach projects and ozone gardens". Network and Leadership Training Organization month seminar series, Research Triangle Park, NC, Feb. 23, 2017.

15. **Wilkins, J. L.**, Brandon, N. "How the EPA uses Physics". 2017 American Physical Society (APS) Local Links Meeting, AKD Conference Center, Research Triangle Park, NC, Feb. 8, 2017.

16. **Wilkins, J. L.** STEMtastic Job Shadow Day at EPA with the Southern School of Energy & Sustainability, Research Triangle Park, NC, Feb. 7, 2017.

17. **Wilkins, J. L.** "So what is it like to work at the EPA?" EPA College Day speaker/speed mentoring session participant, Research Triangle Park, NC, Feb. 2, 2017.

18. **Wilkins, J. L.** Speed mentoring at EPA, with NCCU BRITE Program, Research Triangle Park, NC, Jan. 20, 2017.

19. **Wilkins, J. L**. Speed mentoring event at EPA, with CAARE's College Life Project, Research Triangle Park, NC, Nov. 7, 2016.

20. **Wilkins, J. L.** Nature tour for group of 3rd graders at Science HUB FARM, Durham, NC, Nov. 2, 2016.

21. **Wilkins, J. L.** "How does the EPA use physics", American Physical Society Local Links Meeting, Durham, NC, Oct. 25, 2016.

Service

2018 - 2021 International Association of Wildland Fire Conference's Steering Committee
2017 - 2021 Keep Durham Beautiful, Board Member (Vice President)
2017 - 2020 Durham Public Schools HubFarm, Board member

Professional Memberships

- NASA Health and Air Quality Applied Science Team
- Community Multiscale Air Quality (CMAQ) modeling system development team
- International Association of Wildland Fire
- Fire Science Exchange Network
- American Geophysical Union
- National Postdoctoral Association
- Sigma Pi Sigma, National Physics Honor Society
- Sigma Xi, The Scientific Research Society
- National Society of Black Physicists
- American Physical Society

Instrumentation Expertise

- Field Scout Digital Moisture Sensor (TDR 300)
- Spectral Revolution Portable Spectroradiometer (PSR-3500)
- Plant Canopy Analyzer (LAI-2200C)
- Vaisala RS80-15N radiosonde
- Electrochemical concentration cell (ECC) Ozonesondes
- Sigma Space Miniature MicroPulse Lidar
- Vaisala Ceilometer (CL-51)
- Electrostatic precipitators (wet and dry types)
- Fabric Filters
- Wet scrubbers
- Catalytic reactor, catalysts
- Carbon Absorbers
- Spray Chambers (dry absorbers)
- Aerostat

Computer/Programming Experience

Proficient: C programming language, MATLAB, R-Programming, Perl scripting language, Fortran, IDL/ENVI, Geographic Information System (GIS) ArcGIS, NCAR Command Language, WRF-ARW model, Community Multiscale Air Quality (CMAQ) modeling system, Sparse Matrix Operator Kernel (SMOKE) modeling system, FLEXPART, HYSPLIT, Network Common Data Format, Local Data Manager, Internet Data Distribution, Microsoft suite, FX-Net, WDSS-II, git, GR-Level 2, LaTeX, Sigma Space Micro Pulse Lidar software, and Xcode.

Familiar: Comprehensive Air Quality Model with Extensions (CAMx),

Maple(software), Hierarchical Data Format, Python scripting language, Mathematica, C++, PLT Scheme, DrScheme, Blue J, Alice, Java, AWIPS, SVN/CVS, Model Evaluation Tool, and Bufkit

Computer systems: Linux/Unix, Supercomputing, SUN, Mac, and Windows