

John Kelly Kodros

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Research Interests

Climate and health impacts of particulate matter from combustion sources; air pollution; global and regional modeling; personal and ambient exposure sampling; health impact assessments

Education

Colorado State University – PhD, Atmospheric Science 2015 – 2018

Thesis: “Climate and health impacts of aerosol emissions from residential combustion sources in developing countries”

Advisor: Dr. Jeffrey Pierce

GPA: 4.00

Colorado State University – M.S., Atmospheric Science 2013 – 2015

Thesis: “Uncertainties in global aerosol and climate effects due to biofuel emissions”

Advisor: Dr. Jeffrey Pierce

GPA: 4.00

University of California, Berkeley – B.A., Atmospheric Science, Astrophysics 2008 – 2012

Honors Thesis: “Cloud retrieval algorithm for Titan”

Advisors: Dr. Kristie Boering and Dr. Mate Adamkovic

GPA: 3.447

Awards and Honors

ACCESS XIV (05/2017): Selected to participate in the 14th Atmospheric Chemistry Colloquium for Emerging Senior Scientists.

Herbert Riehl Memorial Award (05/2016): Awarded by the Department of Atmospheric Science to the graduate student who submits the best technical manuscript for publication in the previous 18-month period.

David L. Dietrich Scholarship (11/2015): Funded by Fort Collins company Air Resource Specialists (ARS), the award each year recognizes an ATS student who has excelled in air quality research.

AAAR Student Poster Competition Winner x2 (2014, 2015): Awarded at the American Association for Aerosol Research annual meeting for the best student poster.

Research Experience

Graduate Research Assistant

Department of Atmospheric Science, Colorado State University (2013-present)

- Global and regional modeling of aerosol radiation interactions and aerosol-cloud interactions
- Global and regional modeling of aerosol-health impacts from residential combustion sources
- Field campaign near Chennai, India to characterize cooking emissions and personal exposure (in charge of filter-based PM_{2.5} monitors for personal and indoor exposure concentrations)
- Laboratory campaign to characterize gas- and particle-phase emissions from stoves (in charge of sampler with gravimetric filters, portable SMPS, micro-aethalometer, nephelometer, 5 gas analyzer)
- Model evaluation using satellite and ground-based observations (AERONET, IMPROVE, SMPS/DMPS)
- Use of aircraft observations (NETCARE, ATom) to constrain uncertainties in model assumptions
- Emission inventory development
- Variance-based sensitivity analysis (FAST) on uncertain model input parameters
- Field and laboratory contributions: CEAMS, Colorado Cookstove Study

Undergraduate Research

Department of Astronomy, University of California, Berkeley (2010-2012)

- Development of algorithm to estimate cloud-top heights on Titan
- Analysis of remote sensing observations from Huygens probe
- Radiative transfer modeling
- KAIT supernova detection team (contributed to discovery of Supernovae 2011U, 2010is, 2010iz, 2010ig, 2010hs, 2010hw, 2010hy)

Publications

In Review

1. **Kodros, J. K.**, Hanna, S., Bertram, A., Leaitch, W. R., Schulz, H., Herber, A., Zanatta, M., Burkart, J., Willis, M., Abbatt, J., Pierce, J. R., Size-resolved mixing state of black carbon in the Canadian high Arctic and implications for simulated direct radiative effect, *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2018-171>, in review, 2018.
2. Eilenberg, S. R., Bilsback, K., Johnson, M., **Kodros, J. K.**, Lipsky, E. M., L'Orange, C., Pierce, J. R., Subramanian, R., Volckens, J., Robinson, A. L.: Field Measurements of Solid-Fuel Cookstove Emissions from Uncontrolled Cooking in China, Honduras, Uganda, and India *submitted to Atmospheric Environment*, 2018.
3. Bilsback, K.; L'Orange, C.; Johnson, M.; **Kodros, J. K.**; Eilenberg, S.; R, Subramanian; Lipsky, E.; Pierce, J. R.; Robinson, A.; Volckens, J.: Closing the Gap between Lab and Field Emissions from Biofuel Cookstoves: The Firepower Sweep Test Protocol, *submitted to Env. Sci. Tech.*, 2017.

Published

1. **Kodros, J. K.**, Carter, E., Brauer, M., Volckens, J., Bilsback, K. R., L'Orange, C., Johnson, M. and Pierce, J. R.: Quantifying the Contribution to Uncertainty in Mortality Attributed to Household, Ambient, and Joint Exposure to PM_{2.5} From Residential Solid Fuel Use, *GeoHealth*, doi:10.1002/2017GH000115, 2018.
2. David, L., Ravishankara, A., **Kodros, J. K.**, Venkataraman, C., Sadavarte, P., Pierce, J. R., Chaliyakunnel, S., Millet, D.: Aerosol optical depth over India, *in press Journal of Geophysical Research*, 2018.
3. Hughes, M., **Kodros, J.**, Pierce, J., West, M. and Riemer, N.: Machine Learning to Predict the Global Distribution of Aerosol Mixing State Metrics, *Atmos.* 2018, Vol. 9, Page 15, 9(1), 15, doi:10.3390/ATMOS9010015, 2018.
4. Petkovic, V., Kummerow, C. D., Randel, D. L., Pierce, J. R., **Kodros, J. K.**: Improving the Quality of Extreme Precipitation Estimates from Satellite Passive Microwave Rainfall Retrievals, *J. Hydrometeorology*, <https://doi.org/10.1175/JHM-D-17-0069.1>, 2017
5. **Kodros, J. K.** and Pierce, J. R.: Important global and regional differences in aerosol cloud-albedo effect estimates between simulations with and without prognostic aerosol microphysics, *J. Geophys. Res. Atmos.*, doi:10.1002/2016JD025886, 2017.
6. Bian, Q., Jathar, S. H., **Kodros, J. K.**, Barsanti, K. C., Hatch, L. E., May, A. A., Kreidenweis, S. M. and Pierce, J. R.: Secondary organic aerosol formation in biomass-burning plumes: theoretical analysis of lab studies and ambient plumes, *Atmos. Chem. Phys.*, 17(8), 5459-5475, doi:10.5194/acp-17-5459-2017, 2017.

7. **Kodros, J. K.**, Cucinotta, R., Ridley, D. A., Wiedinmyer, C. and Pierce, J. R.: The aerosol radiative effects of uncontrolled combustion of domestic waste, *Atmos. Chem. Phys.*, 16(11), 6771-6784, doi:10.5194/acp-16-6771-2016, 2016.
8. **Kodros, J. K.**, Wiedinmyer, C., Ford, B., Cucinotta, R., Gan, R., Magzamen, S. and Pierce, J. R.: Global burden of mortalities due to chronic exposure to ambient PM 2.5 from open combustion of domestic waste, *Environ. Res. Lett.*, 11(12), 124022, doi:10.1088/1748-9326/11/12/124022, 2016.
9. Schill, G. P., Jathar, S. H., **Kodros, J. K.**, Levin, E. J. T., Galang, A. M., Friedman, B., Link, M. F., Farmer, D. K., Pierce, J. R., Kreidenweis, S. M. and DeMott, P. J.: Ice nucleating particle emissions from photochemically-aged diesel and biodiesel exhaust, *Geophys. Res. Lett.*, doi:10.1002/2016GL069529, 2016.
10. Hodshire, A. L., Lawler, M. J., Zhao, J., Ortega, J., Jen, C., Yli-Juuti, T., Brewer, J. F., **Kodros, J. K.**, Barsanti, K. C., Hanson, D. R., McMurry, P. H., Smith, J. N. and Pierce, J. R.: Multiple new-particle growth pathways observed at the US DOE Southern Great Plains field site, *Atmos. Chem. Phys.*, 16(14), 9321-9348, doi:10.5194/acp-16-9321-2016, 2016.
11. Croft, B., Wentworth, G. R., Martin, R. V, Leaitch, W. R., Murphy, J. G., Murphy, B. N., **Kodros, J. K.**, Abbatt, J. P. D. and Pierce, J. R.: Contribution of Arctic seabird-colony ammonia to atmospheric particles and cloud-albedo radiative effect, *Nat. Commun.*, 7, 13444 [online] Available from: <http://dx.doi.org/10.1038/ncomms13444>, 2016.
12. **Kodros, J. K.**, Scott, C. E., Farina, S. C., Lee, Y. H., L'Orange, C., Volckens, J. and Pierce, J. R.: Uncertainties in global aerosols and climate effects due to biofuel emissions, *Atmos. Chem. Phys.*, 15(15), 8577-8596, doi:10.5194/acp-15-8577-2015, 2015.
13. Pierce, J. R., Croft, B., **Kodros, J. K.**, D'Andrea, S. D. and Martin, R. V.: The importance of interstitial particle scavenging by cloud droplets in shaping the remote aerosol size distribution and global aerosol-climate effects, *Atmos. Chem. Phys.*, 15(11), 6147-6158, doi:10.5194/acp-15-6147-2015, 2015.
14. Fuchs, B. R., Rutledge, S. A., Bruning, E. C., Pierce, J. R., **Kodros, J. K.**, Lang, T. J., MacGorman, D. R., Krehbiel, P. R. and Rison, W.: Environmental controls on storm intensity and charge structure in multiple regions of the continental United States, *J. Geophys. Res. Atmos.*, 120(13), 6575-6596, doi:10.1002/2015JD023271, 2015.
15. D'Andrea, S. D., Ng, J. Y., **Kodros, J. K.**, Atwood, S. A., Wheeler, M. J., Macdonald, A. M., Leaitch, W. R. and Pierce, J. R.: Source attribution of aerosol size distributions and model evaluation using Whistler Mountain measurements and GEOS-Chem-TOMAS simulations, *Atmos. Chem. Phys. Discuss.*, 15(17), 24805-24838, doi:10.5194/acpd-15-24805-2015, 2015.

Select Presentations

1. **Kodros, J. K.**, Carter, E., Brauer, M., Volckens, J., Bilsback, K. R, L'Orange, C., Johnson, M., Pierce, J. R.: "Quantifying the contribution to uncertainty in mortality attributed to household, ambient, and joint exposure to PM2.5 from residential solid-fuel use", International Aerosol Modeling Algorithm Conference, Davis, Ca, 12/2017 [podium presentation]
2. **Kodros, J. K.**, Volckens, J., Jathar, S., Pierce, J.R.: "Role of inter-regional variability in aerosol size distributions on respiratory deposition of PM2.5", American Association of Aerosol Research, Raleigh, North Carolina, 10/2017. [podium presentation]
3. **KODROS, J. K.**, Hanna, S., Bertram, A., Leaitch, W. R., Schulz, S., Herber, A., Zanatta, M., Burkart, J., Willis, M., Abbatt, J., Pierce, J. R., "Size-resolved Mixing State of Black Carbon in the Arctic and

Implications for Simulated Direct Radiative Forcing”, Gordon Research Conference in Atmospheric Chemistry, 8/2017. [poster]

4. **KODROS, J. K.**, “Climate and health impacts of aerosol emissions from residential combustion sources in developing countries”, Atmospheric Chemistry Emerging Senior Scientist XIV meeting, Brookhaven, NY, 7/2017. [podium presentation]
5. **KODROS, J. K.**, Pierce, J. R., “Why the aerosol indirect forcing using the mass-only aerosol representation in GEOS-Chem may never look quite right”, 8th International GEOS-Chem meeting, Boston, MA, 5/2017. [podium presentation]
6. **KODROS, J. K.**, Pierce, J. R., "Sensitivity of Cloud-Albedo Aerosol Indirect Effect on Assumed Aerosol Size Distribution Shape", American Association of Aerosol Research, Portland, OR, 10/2016. [poster]
7. **KODROS, J. K.**, Ford, B., Ridley, D. A., Cucinotta R., Wiedinmyer, C., Gan, R., Magzamen, S., Pierce, J. R., "The Aerosol Radiative Effects and Global Burden of Mortality from Uncontrolled Combustion of Domestic Waste", American Association of Aerosol Research, Portland, OR, 10/2016. [poster]
8. **KODROS, J. K.**, Ford, B., Ridley, D. A., Cucinotta R., Wiedinmyer, C., Gan, R., Magzamen, S., Pierce, J. R., "The Aerosol Radiative Effects and Global Burden of Mortality from Uncontrolled Combustion of Domestic Waste", International Global Atmospheric Chemistry, Breckenridge, CO, 9/2016. [poster]
9. **KODROS, J. K.**, Scott, C. E., Farina, S. C., Lee, Y. H., L'Orange, C., Volckens, J., Pierce, J. R., “Unconstrained Climate Impacts of Biofuel Combustion Due to Uncertain Carbonaceous Radiative and Cloud Effects”, American Association of Aerosol Research, Minneapolis, MN, 10/2015. [podium presentation]
10. **KODROS, J. K.**, Ford, B., Ridley, D. A., Cucinotta R., Wiedinmyer, C., Gan, R., Magzamen, S., Pierce, J. R., "The Aerosol Radiative Effects from Uncontrolled Combustion of Domestic Waste", American Association of Aerosol Research, Minneapolis, MN, 10/2015. [poster]
11. **KODROS, J. K.**, Pierce, J. R., “Investigating global aerosol and climate-forcing uncertainties due to biofuel emissions/properties in GEOS-Chem”, 7th International GEOS-Chem meeting, Boston, MA, 5/2015. [podium presentation]
12. **KODROS, J. K.**, Scott, C. E., Farina, S. C., Pierce, J. R., “Uncertainties in Global Aerosol and Climate Forcings from Biofuel Emissions”, American Association of Aerosol Research, Orlando, FL, 10/2014. [poster]

Memberships in Professional Organizations

American Association for Aerosol Research (AAAR); International Global Atmospheric Chemistry (IGAC); European Geophysical Union (EGU)

Reviewer for *Nature Communication*, *Journal of Geophysical Research*, *Atmospheric Chemistry and Physics*

Relevant Skills

- Proficient in Python, R, IDL, Fortran, and Unix environments
- Health impact assessments
- Familiar with satellite retrievals (e.g. MODIS, MISR, CALIPSO, OMI, GOME-2), surface and in-situ observations (e.g. IMPROVE, AERONET, SMPS/DMPS, UHSAS, SP2, personal PM_{2.5} exposure monitor)
- Extensive experience with global chemical-transport model (GEOS-Chem), climate model (GISS), and aerosol microphysical model (TOMAS)
- Variance-based sensitivity analysis (Fourier Amplitude Sensitivity Test)

- Aerosol optics (Mie theory, core/shell Mie theory) and radiative transfer (RRTMG)

Teaching and Mentoring

- Mentor for Research Experience for Undergraduates (REU) intern Rachel Cucinotta (Summer 2015)
- Teaching Assistant: Air Pollution (Fall 2016), Computational Methods (Spring 2017)

Training Courses

- Formation and Growth of Atmospheric Aerosols (Hyytiälä, Finland, 8/2016)
- R programming for biomass burning aircraft observations (Fort Collins, Co, 7/2017)
- EPA Environmental Benefits Mapping and Analysis Program Training (Fort Collins, Co, 6/2015)