Laura Riihimaki, PhD

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EDUCATION

University of Oregon, Eugene, OR
Ph.D. in Physics, August 2008
Thesis: Evaluating Long-term Changes and their Causes in Surface Solar Irradiance in Oregon
Advisors: Frank Vignola and Gregory Bothun
Wheaton College, Wheaton, IL
B.S. in Physics, May 2001, *Magna Cum Laude*

APPOINTMENTS

Research Scientist, Cooperative Institute for Research in the Environmental Sciences (CIRES),
   NOAA ESRL Global Monitoring Division, Boulder, CO, 2019-present
Research Scientist, Atmospheric Sciences and Global Change Division, Pacific Northwest
   National Laboratory, Richland, WA, 2011-2019
Adjunct Instructor of Physics, Washington State University Tri-Cities, Richland, WA, 2012
Postdoctoral Research Associate, Atmospheric Sciences and Global Change Division, Pacific
   Northwest National Laboratory, Richland, WA, 2008-2011
Graduate Research Assistant, University of Oregon, Physics, Eugene, OR, 2004-2008

FUNDED PROJECTS

ARM Climate Research Facility Translator, Manage data product development and operations of
   over 20 operational products; (2013-2019)
*Co-Investigator, "*Development of the Next Weather Research and Forecasting Model – Improv-
   ing Solar Forecasts," DOE Solar Energy Technologies Office Solar Forecasting 2 project
   (2018-2020)
Co-Principal Investigator, "Data Assessment and Assimilation for Atmospheric Radiation Meas-
   urement Data Using Dynamic Bayesian Networks," PNNL LDRD seed project (2018)
*Co-Investigator, "*Integrated Cloud, Land-Surface, and Aerosol System Study (ICLASS)," ASR
   SFA project renewal, (2017-2020)
*Co-Investigator, "*Use of Remote Sensing and In-Situ Observations to Develop and Evaluate Im-
   proved Representations of Convection and Clouds for the Accelerated Climate Model for En-
   ergy,*"* DOE Climate Model Development and Validation (CMDV) grant, (2016–2019)
Co-Investigator, "Macro-physical Properties of Shallow Cumulus from Integrated ARM Observa-
   tions," ASR Data Products project, (2016-2018)
Principal Investigator, AML Radiometer Quickstarter Project, (2016)
Principal Investigator, "Identifying Cloud Phase from ARM Remote Sensors," PNNL LDRD
   project awarded through the PNNL Signature Discovery Initiative, (2014-2016)

AWARDS

PNNL Outstanding Performance Award for organizing UW Instrument Short Course (2017)
PNNL EBSD BEST Successful Renewal Effort iCLASS proposal (2017)

PNNL EBSD BEST Collaboration Award: National Lab Science Day on Capitol Hill (2016)
PNNL EBSD BEST Major Proposal Award: CMDV-MCS proposal (2016)
PNNL Outstanding Performance Award for organizing Rad Jam Coding Event (2015)
Fitzner-Eberhardt Award for STEM Education and Outreach (2014)
PNNL Outstanding Performance Award for mentoring students (2010)
NSF GK-12 Fellowship, University of Oregon (2003-2008)
Inducted into Wheaton College Honor Society (2001)
Physics Merit Scholarship, Wheaton College, full tuition scholarship (1999-2000)
Robert C. Byrd Scholarship, academic achievement scholarship (1997-2001)

PUBLICATIONS

Lim, K-S, LD Riihimaki, Y Shi, D Flynn, J Kleiss, LK Berg, WI Gustafson Jr., Y Zhang, K Johnson, (*in review*), Long-term cloud type retrieval using a combination of active remote sensors and a total sky imager at the ARM SGP site, *J. Atmos. Oceanic Tech*.

Riihimaki, LD, RA Houze Jr., LA McMurdie, and K Dorsey (2019), Training a new generation of data-savvy atmospheric researchers, *Eos, 100,* https://doi.org/10.1029/2019EO114793. Published on 30 January 2019.

Tang, Q, S Xie, Y Zhang, TJ Phillips, JA Santanello, DR Cook, LD Riihimaki, and KL Gaustad (2018), Heterogeneity in Warm-Season Land-Atmosphere Coupling Over the U.S. Southern Great Plains, *Journal of Geophysical Research: Atmospheres*, *123*(15), 7867-7882, doi:10.1029/2018JD028463.

Kleiss J, E Riley, CN Long, LD Riihimaki, LK Berg, V Morris, EI Kassianov (2018), Cloud Area Distributions of Shallow Cumuli: A New Method for Ground-Based Images. *Atmosphere* 9(7), 258, doi:10.3390/atmos9070258.

Riihimaki, LD, JC Comstock, S Collis, C Flynn, S Giangrande, J Monroe, C Sivaraman, S Xie (2018), *Translator Plan: A Coordinated Vision for Fiscal Years 2018-2020* (No. DOE/SC-ARM-17-039). DOE Office of Science Atmospheric Radiation Measurement (ARM) Program (United States), https://www.osti.gov/servlets/purl/1418461.

Riihimaki, L. D., J. M. Comstock, E. Luke, T. J. Thorsen, and Q. Fu (2017), A case study of microphysical structures and hydrometeor phase in convection using radar Doppler spectra at Darwin, Australia, *Geophysical Research Letters*, *44*(14), 7519-7527, doi:10.1002/2017GL074187.

Kassianov EI, JC Barnard, CJM Flynn, LD Riihimaki, LK Berg, and DA Rutan (2017), Areal-Averaged Spectral Surface Albedo in an Atlanic Coastal Area: Estimation from Ground-Based Transmission, *Atmosphere* 8(7):123. doi:10.3390/atmos8070123

Kassianov EI, MS Pekour, CJ Flynn, LK Berg, J Beranek, A Zelenyuk, C Zhao, LYR Leung, PL Ma, LD Riihimaki, JD Fast, JC Barnard, AG Hallar, I McCubbin, EW Eloranta, A McComiskey, and PJ Rasch (2017), Large Contribution of Coarse Mode to Aerosol Microphysical and Optical Properties: Evidence from Ground-based Observations of a Transpacific Dust Outbreak at a High-Elevation North American Site, *Journal of the Atmospheric Sciences*, 74(5):1431-1443. doi:10.1175/JAS-D-16-0256.1

Riihimaki, LD, JM Comstock, KK Anderson, A Holmes, E Luke (2016), A Path towards uncertainty assignment in an operational cloud phase algorithm from ARM vertically pointing active sensors, *Advances in Statistical Climatology, Meteorology and Oceanography*, 2, 49-62, doi:10.5194/ascmo-2-49-2016.

Lim, K-S, LD Riihimaki, JM Comstock, B Schmid, C Sivaraman, Y Shi, G McFarquhar (2016), Evaluation of long-term surface-retrieved cloud-droplet number concentration with in situ aircraft observations, *J. Geophys. Res.*, 121(5):2318-2331. doi:10.1002/2015JD024082.

Arkin, A, et al. (2016), Biological and Environmental Research Exascale Requirements Review. An Office of Science review sponsored jointly by Advanced Scientific Computing Research and Biological and Environmental Research, March 28-31, 2016, Rockville, Maryland. United States, doi:10.2172/1375720.

Berg, LK, LD Riihimaki, Y Qian, H Yan, M Huang (2015), The Low-Level Jet over the Southern Great Plains determined from observations and reanalyses and its impact on moisture transport, *J. Climate*, 28, 6682-6706, doi:10.1175/JCLI-D-14-00719.1.

Kassianov EI, JC Barnard, CJ Flynn, LD Riihimaki, J Michalsky, and GB Hodges (2014), Areal-averaged and spectrally-resolved surface albedo from ground-based transmission data alone: Toward an operational retrieval, *Atmosphere*, 5(3):597-621, doi:10.3390/atmos5030597.

Riihimaki, L., and C.N. Long (2014), Spatial variability of surface irradiance measurements at the Manus ARM site, *J. Geophys. Res.*, 119, 5475–5491, doi:10.1002/2013JD021187.

Riihimaki, L., S.A. McFarlane, and J. Comstock (2012), Climatology and formation of tropical mid-level clouds at the Darwin ARM site, *J. Climate*, 25, 6835-6850, doi:10.1175/JCLI-D-11-00599.1.

Riihimaki, L., S.A. McFarlane, C. Liang, S. Massie, N. Beagley, and T. Toth (2012), Comparison of methods to determine tropical tropopause layer cirrus formation mechanisms, *J. Geophys. Res., 117*, D06218, doi:10.1029/2011JD016832.

Riihimaki, L., and S.A. McFarlane (2010), Frequency and morphology of tropical tropopause layer cirrus from CALIPSO observations: Are isolated cirrus different from those connected to deep convection?, *J. Geophys. Res., 115*, D18201, doi:10.1029/2009JD013133.

Riihimaki, L., F. Vignola, and C.N. Long (2009), Analyzing Increasing Direct Normal Irradiance in Oregon for Changes Due to Aerosols, *J. Geophys. Res., 114*, D00D02, doi:10.1029/2008JD010970.

Riihimaki, L., and F. Vignola (2008), Establishing a Consistent Calibration Record for Eppley PSPs, proceedings of Solar 2008 Annual Conference, Am. Sol. Energy Soc., San Diego, Cal., 3-8 May. (peer-reviewed)

Lohmann, S., L. Riihimaki, F. Vignola, and R. Meyer (2007), Trends in direct normal irradiance in Oregon: Comparison of surface measurements and ISCCP-derived irradiance, *Geophys. Res. Lett., 34*, L02705, doi: 10.1029/2006GL027322.

Riihimaki, L., F. Vignola, S. Lohmann, R. Meyer, and R. Perez (2006), Long-term variability of global and beam irradiance in the Pacific Northwest, proceedings of Solar 2006 Annual Conference, Am. Sol. Energy Soc., Denver, Col., 9-11 Jul. (peer-reviewed)

Riihimaki, L., and F. Vignola (2005), Trends in direct normal solar irradiance in Oregon from 1979-2003, proceedings of ISES Solar World Congress, Am. Sol. Energy Soc., Orlando, Fla., 6-12 Aug. (peer-reviewed)

MEETINGS AND PRESENTATIONS (PAST 4 YEARS)

Leader/Organizer, ARM SW Spectral Radiometer Strategy Review, Boulder, CO, 2019

*Invited Presentation, "*Incorporating Observed Solar Variability into Model Forecasts: New Developments in WRF-Solar v2*",* AGU Fall Meeting, 2018

Speaker, "Identifying mixed-phase conditions in cloud radar Doppler spectra: Progress towards an automated algorithm", AGU Fall Meeting, 2018

Lead Instructor, High School Teacher Climate Science Workshop, Immersive learning 3-day workshop for high school teachers in WA State Education Service District 123, 2018

Poster presenter, "Using machine learning to identify mixed-phase conditions in cloud radar Doppler spectra", AMS Cloud Physics/Atmospheric Radiation, 2018

Speaker, "Using machine learning to identify cloud phase with radars and lidars", PNNL TechFest, 2018

Invited Plenary Speaker, "ARM Translator 3 Year Vision", ARM/ASR PI Meeting, 2018

Poster presenter, "Gridding cloud and irradiance to quantify variability at the ARM Southern Great Plains site", AGU Fall Meeting, 2017

Co-organizer and instructor, PNNL/UW Graduate Short Course on Instrumentation, 2017

Invited Keynote Speaker, "Identifying mixed-phase conditions in convective clouds with vertically pointing active sensors", AMS Radar Meteorology, 2017

Lead Instructor, STEM-IT Now, immersive, week-long workshop on physical science for primary teachers in WA State Education Service District 123, 2017
Breakout session organizer and multiple oral presentations, ARM Developer's Meeting, 2017
Leader/Organizer, DOE ARM Translator Planning Workshop, 2017
Speaker, "Identifying cloud types for more effective use of ARM observations in model validation and statistical analysis", AMS Annual Meeting, 2017
Poster presenter, "Observing microphysical structures and hydrometeor phase in convection with ARM active sensors", AGU Fall Meeting, 2016
Breakout session organizer and multiple oral presentations, ARM Developers Meeting, 2016
Speaker, Climate 102: Understanding climate variability, extreme events, & long-term climate change, ACCO Climate Fundamentals Academy, 2016
Science and Environment Presenter, National Lab Science Day on Capitol Hill, 2016
Breakout session organizer, Multiple oral and poster presentations, ASR/ARM PI Meeting, 2016
Invited speaker, "Accuracy and stability of surface observations", Workshop on Atmospheric Radiation Science, 2016
Invited participant, ARM MFRSR planning meeting, 2016
Invited participant, "Atmospheric Radiation Measurement Climate Research Facility: Next Generation Needs", DOE Biological and Environmental Research and Exascale Computing needs for User Facilities Workshop, 2015
Poster presenter, "A Path Towards Operational Uncertainty of Cloud Phase Identification", Radiation and Climate Gordon Research Conference, 2015
Invited talk, "Measuring Cloud Microphysical Properties at the ARM Climate Research Facility", invited talk, Lewis & Clark College Physics seminar, 2015
Breakout session organizer and multiple presentations, ASR Science Team Meeting, 2015

PROFESSIONAL ACTIVITIES AND SERVICE

DOE ARM AAF Radiometer Mentor, 2019-present
DOE ARM SPN1 Mentor, 2019-present
DOE ARM Infrastructure Science Team, 2017-2018
DOE ASR ARM Coordination Team, 2016-2018
Lead Translator, DOE ARM Climate Research Facility, 2016-2018
Organizer, PNNL ASGC Rad Jam, weekend science analysis jam, 2015
ARM Translator, DOE ARM Climate Research Facility, 2013-2019
DOE ASR/ARM Broadband Radiation Group, 2013-2018
Co-Leader, PNNL Atmospheric Sciences and Global Change Division Science Social seminar series, 2013-2016
ARM science outreach, Science demonstrations and activities at multiple outreach events annually at community and PNNL events, 2013-2018
Community speaker, Public presentations on climate science at multiple venues including Columbia Basin College Planetarium, Chiawana High School, Puget Sound Energy Wind Power, Richland Public Library, 2013-2018
DOE ASR Cloud Aerosol Precipitation Interactions Working Group Steering Committee, 2013-2015
Lead instructor, PNNL/ESD 123 immersive science training workshops for local K-12 teachers, 2013-2018
Instructor, course on Climate Change with the Kennewick Community Education Program, 2013
Organizing Committee Member, PNNL Postdoctoral Poster Session, 2010
Peer Reviewer, reviewed articles in J. Geophysical Research, Geophysal Research Letters, J. Climate, Solar Energy, Nature Communications, Geoscience and Remote Sensing Letters, Environmental Research Letters, Journal of Atmospheric and Ocean Technology, Atmospheric Measurement Techniques, 2008-present