Dr. Joshua P. Schwarz Nov. 2019
Cooperative Institute for Research in Environmental Sciences (CIRES) 303 497 4637
National Oceanic and Atmospheric Administration (NOAA) Joshua.P.Schwarz@noaa.gov
325 Broadway R/CSD-6
Boulder, CO 80305

SPECIALIZED SCIENTIFIC COMPETENCE

- Airborne aerosol measurements
- Measurements of black carbon and bio-aerosol in the air and in precipitate.
- Development of new complex measurement systems in the laboratory and field.
- Written and oral communication of science results to the scientific community.

EDUCATION

Ph.D. Physics, 1998, University of Colorado, Boulder.
M.S. Physics, 1996, University of Colorado, Boulder.
B.S. Physics, 1993, University of Massachusetts, Amherst. Cum laude.

EMPLOYMENT HISTORY

2015 – Present **Research Physicist**, ZP-IV, National Oceanic and Atmospheric Administration
- Science-PI for the NOAA Black Carbon group

2013 – 2015 **Associate Editor,** Geophysical Research Letters

2003 – 2014 **Research Scientist III**. CIRES, University of Colorado/NOAA Earth System Research Laboratory, Chemical Sciences Division, Boulder, CO.

2001 – 2003 **Research Scientist**. Swiss Federal Office of Metrology and Accreditation (METAS), Bern, Switzerland.
- Spearheaded investigations into sources of systematic uncertainty in the METAS Electronic Kilogram Experiment.

1999 – 2001 **National Research Council Postdoctoral Fellow**. National Institute of Standards and Technology (NIST), Electricity Division, Fundamental Electrical Measurements Group, Gaithersburg, MD.
- Research into systematic error sources in the NIST Electronic Kilogram Experiment.

FIELD CAMPAIGNS

- 2020 Asian summer monsoon Chemical and CLimte Impact Project (ACCLIP) PI: SP2
- 2015- Present PI for Aerosol Science on the large aircraft component of FIREX-AQ
- 2016 - 2018 Atmospheric Tomography Experiment (NASA) PI: SP2
- 2016 FireX FireLab (NOAA) PI: SP2
- 2016 Korean – US Air Quality Study (NASA) PI: Humidified Dual SP2
- 2014: Twin-Otter Projects Defining Oil/gas Well emisioNs (NOAA) PI: SP2

– FIELD CAMPAIGNS continued –

- 2013: Studies of Emissions and Atmospheric Composition, Clouds, and Climate Coupling by Regional Surveys, TX/CA (NASA) PI: SP2
- 2013: South East Nexus, TN (NOAA): PI: SP2
- 2012: Deep Convective Clouds and Composition (DC3, NSF/NASA): PI: SP2
- 2011: Qinghai Lake Measurements, Qinghai, China (IEECAS)
- 2009/2010/2011 HIAPER Pole-to-pole Observations (NSF/NCAR)
- 2011: MacPex, Houston, TX (NASA), PI SP2.
- 2010 CalNex, Ontario, CA (NOAA)
- 2008 C3-STAR Pearl River Delta Campaign, Kaiping, China (PKU)
- 2008 Aerosol, Radiation, and Cloud Processes affecting Arctic Climate, Fairbanks, AK (NOAA)
- 2007 Tropical Composition, Cloud, and Climate Coupling, San Jose, Costa Rica (NASA)
- 2006 Texas Air Quality Study / Gulf of Mexico Atmospheric Composition and Climate Study, Houston, TX (NOAA)
- 2006 Costa Rican Aura Validation Experiment, San Jose, Costa Rica (NASA)
- 2004 Aura Validation Experiment, Houston, TX (NASA)

COLLABORATIVE ACTIVITIES

- Represented single-particle BC measurements at the 2011 Workshop on BC Reference Materials, Vienna, Austria
- Promoted discussion and a common approach to calibration within the SP2 community leading to intercomparisons between 8 SP2s during CalNex 2010.
- Provided instruction and support for the Single Particle Soot Photometer (SP2)
    - Junji Cao Group, Institute of Earth Environment, Chinese Academy of Sciences, 2011
    - Andreas Petzold Group, German Aerospace Center, 2008, 2010
    - Antony Clarke Group, University of Hawaii at Manoa, 2008
    - Hugh Coe Group, University of Manchester, 2006
    - Yutaka Kondo Group, University of Tokyo, 2006-2011
- Led NOAA involvement in the DMT SP2 Users Group Meeting 2008, 2009, 2011,2012.
    - Lectured about error sources, system alignment, SP2 detection limits and quality assurance, and SP2 calibration issues.
    - Advocated calibration and interpretation techniques to ensure quality measurements throughout the SP2 community.
    - Informed the SP2 community about the uncertainties associated with interpretation of BC content in liquids.
- Initiated, organized, and conducted SP2 inter-comparisons between NOAA, University of Hawaii, and University of Tokyo during ARCPAC, 2008.

- Supported the modeling community with BC data and interpretation. Vertical profiles of BC mass mixing ratios and degree of internal mixing were provided with careful explanation of detection uncertainties and limitations.
    - Johannes Hendricks group, DLR, Germany
    - Ken Carslaw group, University of Leeds, United Kingdom
    - Dorothy Koch group, NASA GISS/Columbia University, New York

– COLLABORATIVE ACTIVITIES continued –

- Reviewer for journals and funding agencies: Atmospheric Chemistry and Physics, Geophysical Research Letters, Journal of Geophysical Research, Atmospheric Measurement Techniques, Department of Energy, National Science Foundation
- Consulted on black carbon test materials, provided samples, standards, characterizations, and support
    - Jack Dibb Group, University of New Hampshire, 2013
    - Yutaka Kondo Group, University of Tokyo, 2011
    - Sarah Doherty Group, University of Washington, USA, 2011
    - Aerosol Physics Group, Paul Scherer Institute, Switzerland, 2010
    - 2010 AIDA SP2 Intercomparison Study, Institute of Meteorology and Climate Research, Karlsruhe Institute of Technology, Germany, 2010
    - Susanne Paulson Group, UCLA 2006, 2007
    - Yinon Rudich Group, Weizmann Institute, Israel, 2007

HONORS

- 2019 NOAA Oceanic and Atmospheric Research (OAR) Employee of the Year, Leadership.
- 2018 Invited Seminar Speaker, Pennsylvania State University Department of Meteorology and Atmospheric Science.
- 2017 CIRES Innovative Research Proposal Grant: Direct measurement of the Chlorine Radical
- 2017 NASA Group Achievement Award: KORUS-AQ, 2016
- 2015 Center for Advanced Study Fellowship, Ludwig Maximilians-University, Munich, Germany
- NASA Group Achievement Award: SEAC4RS, 2014
- 2013 CIRES Innovative Research Proposal Grant: Bioaerosol research.
- 2012 Colorado Governor's Award for High-Impact Research.
- NASA Group Achievement Award: MACPEX, 2011
- Keynote Speaker, Black carbon reference materials workshop, 2011.
- NASA Group Achievement Award: NOVICE Team, 2009.
- NASA Ames Research Center Group Achievement Award: TC4 Campaign, 2008.
- NRC Research Fellowship to work on the NIST Watt experiment, 1999-2001.
- American Geophysical Union Chapman Conference Travel Grant, 1997.
- University Fellowship at the University of Colorado based on performance on the Ph.D. comprehensive written exam, 1995.
- Phi Beta Kappa, 1993.

PEER-REVIEWED PUBLICATIONS (87, h-index = 31)

Hodzic, A., Campuzano-Jost, P., Bian, H., Chin, M., Colarco, P. R., Day, D. A., Froyd, K. D., Heinold, B., Jo, D. S., Katich, J. M., Kodros, J. K., Nault, B. A., Pierce, J. R., Ray, E., Schacht, J., Schill, G. P., Schroder, J. C., Schwarz, J. P., Sueper, D. T., Tegen, I., Tilmes, S., Tsigaridis, K., Yu, P., and Jimenez, J. L.: Characterization of organic aerosol across the global remote troposphere: a comparison of ATom measurements and global chemistry models, Atmos. Chem. Phys., 20, 4607–4635, https://doi.org/10.5194/acp-20-4607-2020, 2020.

Schwarz, J. P., Extrapolation of single particle soot photometer incandescent signal data, *Aerosol Science and Technology*, DOI: 10.1080/02786826.2019.1610154, 2019

Brock, C.A., C.J. Williamson, A. Kupc, K. Froyd, F. Erdesz, N. Wagner, M. Richardson, J.P. Schwarz, R.-S. Gao, J.M. Katich, P. Compuzano-Jost, B.A. Nault, J.C. Schroder, J.L. Jimenez, B. Weinzierl, M. Dollner, T. Bui, and D.M. Murphy, Aerosol size distributions during the Atmospheric Tomography (ATom) mission: methods, uncertainties, and data products, *Atmospheric Measurement Techniques*, *12*, 3081-3099, doi:10.5194/amt-12-3081-2019, 2019.

Li, H., K.D. Lamb, J.P. Schwarz, V. Selimovic, R.J. Yokelson, G.R. McMeeking, and A.A. May, Inter-comparison of black carbon measurement methods for simulated open biomass burning emissions, *Atmospheric Environment*, *206*, 156-169, doi:10.1016/j.atmosenv.2019.03.010, 2019.

Ullrich, R., C. Hoose, D.J. Cziczo, K. Froyd, J.P. Schwarz, A.E. Perring, T.V. Bui, C.G. Schmitt, B. Vogel, D. Rieger, T. Leiser, and O. Möhler, Comparison of modeled and measured ice nucleating particle composition in a cirrus cloud, *Journal of Atmospheric Sciences*, *76*, 1015-1029, doi:10.1175/JAS-D-18-0034.1, 2019.

Lamb, K. D., Perring, A. E., Samset, B., Peterson, D., Davis, S., Anderson, B. E., et al. (2018). Estimating source region influences on black carbon abundance, microphysics, and radiative effect observed over South Korea. Journal of Geophysical Research: Atmospheres, 123, 13,527–13,548. https://doi.org/10.1029/2018JD029257

Fösig, R., C. Hoose, D. J. Cziczo, K. D. Froyd, J. P. Schwarz, A. E. Perring, T. V. Bui, C. G. Scnmitt, B. Vogel, D. Rieger, T. Leisner, and O. Möhler, Comparison of modeled and measured ice nucleating particle composition in a cirrus cloud, *J. Atmos. Sci.,* 76, 1015-1029, 2019, DOI: 10.1175/JAS-D-18-0034.1

Yu, P., Froyd, K. D., Portmann, R. W.,Toon, O. B., Freitas, S. R., Bardeen, C. G., et al. (2019). Efficient in-cloud removal of aerosols by deep convection. *Geophysical Research Letters*, 46, 1061–1069. https://doi.org/10.1029/2018GL080544

Katich, J. M., B. H. Samset, T. P. Bui, M. Dollner, K. D. Froyd, P. Campuzano-Jost, B. A. Nault, J. C. Schroder, B. Weinzierl, and J. P. Schwarz (2018). Strong contrast in remote black carbon aerosol loadings between the Atlantic and Pacific basins. *JGR-Atmos*., 123, 13386-13395. https://doi.org/10.1029/2018JD029206

Ditas, J., N. Ma, Y. Zhang, D. Assmann, M. Neumaier, H. Riede, E. Karu, J. Williams, D. Scharffe, Q. Wang, J. Saturno, J. P. Schwarz, J. M. Katich, G. R. McMeeking, A. Zahn, M. Hermnn, C. A. M. Brenninkmeijer, M. O. Andreae, U. Pöschl, H. Su, and Y. Cheng (2018). Strong impact of wildfires on the abundance and aging of black carbon in the lowermost stratosphere, *PNAS,* 115(50), E11595-E11603. DOI: 10.1073/pnas.1806868115.

Emerson, E. W., Katich, J. M., Schwarz, J. P., McMeeking, G. R., & Farmer, D. K. (2018). Direct measurements of dry and wet deposition of black carbon over a grassland. *Journal of Geophysical Research: Atmospheres*, 123, 12,277-12,290. https://doi.org/10.1029/2018JD028954

Kaiser, J.C., J. Hendricks, M. Righi, P. Jöckel, H. Tost, K. Kandler, B. Weinzierl, D. Sauer, K. Heimerl, J.P. Schwarz, A.E. Perring, and T. Popp, Global aerosol modeling with MADE3 (v3.0) in EMAC (based on v2.53): model description and evaluation, *Geoscientific Model Development*, *12*, 541-579, doi:10.5194/gmd-12-541-2019, 2019.

B. Mason, N. L. Wagner, G. Adler, E. Andrews, C. A. Brock, T. D. Gordon, D. A. Lack, A. E. Perring, M. S. Richardson, **J. P. Schwarz**, M. A. Shook, K. L. Thornhill, L. D. Ziemba & D. M. Murphy (2018) An intercomparison of aerosol absorption measurements conducted during the SEAC4RS campaign,Aerosol Science and Technology, DOI: 10.1080/02786826.2018.1500012

Lund et al., Short Black Carbon lifetime inferred from a global set of aircraft observations, npj Climate and Atmospheric Science (2018) 1:31 ; doi:10.1038/s41612-018-0040-x

Milos Z. Markovic, Anne E. Perring, Ru-Shan Gao, Jin Liao, Andre Welti, Nick L. Wagner, Ilana B. Pollack, Ann M. Middlebrook, Thomas B. Ryerson, Michael K. Trainer, Carsten Warneke, Joost A. de Gouw, David W. Fahey, Philip Stier and Joshua P. Schwarz (2018). Limited impact of sulfate-driven chemistry on black carbon aerosol aging in power plant plumes, AIM Environmental Science, 5(3), 195-215, doi:10.3934/environsci.2018.3.195.

Khan, A. L., McMeeking, G. R., **Schwarz, J. P**., Xian, P., Welch, K. A., Berry Lyons, W., & McKnight, D. M. (2018). Near-surface refractory black carbon observations in the atmosphere and snow in the McMurdo Dry Valleys, Antarctica, and potential impacts of foehn winds. *Journal of Geophysical Research: Atmospheres*, 123, 2877–2887. https://doi.org/10.1002/2017JD027696

Y. Zhang, H Forrister, J Liu, J. Dibb, B. Anderson, **J. Schwarz**, A. Perring, J. L. Jimenez, P. Campuzano-Jost, Y Wang, A Nenes, and RRodney Weber, "Brown Carbon in the Upper Troposphere Affects Top of Atmosphere Radiative Forcing"Paper #NGS-2016-12-02513B] , 2017.

Robinson, E. S, R. S. Gao, **J. P. Schwarz**, D. W. Fahey, A. E. Perring, Fluorescence calibration method for single-particle aerosol fluorescence instruments, *AMT*, 2017

Reddington, C., K. Carslaw, P. Stier, N. Schutgens, H. Coe, D. Liu, J. Allan, J. Browse, K. Pringle, L. Lee, M. Yoshioka, J. Johnson, L. Regayre, D. Spracklen, G. Mann, A. Clarke, M. Hermann, S. Henning, H. Wex, T. Kristensen, W. Leaitch, U. Poeschl, D. Rose, M. Andreae, J. Schmale, Y. Kondo, N. Oshima, **J. Schwarz**, A. Nenes, B. Anderson, G. Roberts, J. Snider, C. Leck, P. Quinn, X. Chi, A. Ding, J. Jimenez, and Q. Zhang, 2017: THE GLOBAL AEROSOL SYNTHESIS AND SCIENCE PROJECT (GASSP) Measurements and modelling to reduce uncertainty. Bull. Amer. Meteor. Soc. doi:10.1175/BAMS-D-15-00317.1.

Khan, A. L., H. Dierssen, **J. P. Schwarz**, C. Schmitt, A. Chlus, M. Hermanson, T. H. Painter, and D. M. McKnight (2017), Impacts of coal dust from an active mine on the spectral reflectance of Arctic surface snow in Svalbard, Norway, *J. Geophys. Res. Atmos.*, 122, 1767–1778, doi:10.1002/2016JD025757.

Schwarz, J. P., B. Weinzierl, B. H. Samset, M. Dollner, K. Heimerl, M. Z. Markovic, A. E. Perring, and L. Ziemba (2017), Aircraft measurements of black carbon vertical profiles show upper tropospheric variability and stability, Geophys. Res. Lett., 44, doi:10.1002/ 2016GL071241.

Perring, A. E., **J. P. Schwarz**, M. Z. Markovic, D. W. Fahey, J. L., Jimenez, P. Campuzano-Jost, B. D. Palm, A. Wisthaler, T. Mikoviny, G. Diskin, G. Sachse, L. Ziemba, B. Anderson, T. Shingler, E. Crosbie, A. Sorooshian, R. Yokelson, and R.-S. Gao (2016*),* In-situ measurements of water uptake by black carbon - containing aerosol in wildfire plumes, *J. Geophys. Res. Atmos.,* 121*, doi:*10.1002/2016JD025688.

Katich, J. M., A. E. Perring, and **J. P. Schwarz** (2017), Optimized detection of particulates from liquid samples in the aerosol phase: focus on black carbon, *Aeros. Sci. Technol.*, doi:10.1080/02786826.2017.1280597

Doherty, S. J., D. A. Hegg, J. E. Johnson, P. K. Quinn, **J. P. Schwarz**, C. Dang, and S. G. Warren (2016), Causes of variability in light absorption by particles in snow at sites in Idaho and Utah, J. Geophys. Res. Atmos., 121, 4751–4768, doi:10.1002/2015JD024375.

Warneke, C., M. Trainer, J.A. de Gouw, D.D. Parrish, D.W. Fahey, A.R. Ravishankara, A.M. Middlebrook, C.A. Brock, J.M. Roberts, S.S. Brown, J.A. Neuman, B.M. Lerner, D. Lack, D. Law, G. Hübler, I. Pollack, S. Sjostedt, T.B. Ryerson, J.B. Gilman, J. Liao, J. Holloway, J. Peischl, J.B. Nowak, K. Aikin, K.-E. Min, R.A. Washenfelder, M. Graus, M. Richardson, M.Z. Markovic, N.L. Wagner, A. Welti, P.R. Veres, P. Edwards, **J.P. Schwarz**, T. Gordon, W.P. Dube, S. McKeen, J. Brioude, R. Ahmadov, A. Bougiatioti, J. Lin, T. Nenes, G.M. Wolfe, T. Hanisco, B.H. Lee, F.D. Lopez-Hilfiker, J.A. Thornton, F.N. Keutsch, J. Kaiser, J. Mao, and C. Hatch, Instrumentation and Measurement Strategy for the NOAA SENEX Aircraft Campaign as Part of the Southeast Atmosphere Study 2013, *Atmospheric Measurement Techniques*, *9*, 3063-3093, doi:10.5194/amt-9- 3063-2016, 2016.

Yu, P., O.B. Toon, C.G. Bardeen, A. Bucholtz, K.H. Rosenlof, P.E. Saide, A.D. Silva, L.D. Ziemba, K.L. Thornhill, J.-L. Jimenez, P. Campuzano-Jost, **J.P. Schwarz**, A.E. Perring, K.D. Froyd, M.J. Mills, and J.S. Reid, Surface dimming by the 2013 Rim Fire simulated by a sectional aerosol model, *Journal of Geophysical Research*, *121*(12), 7079-7087, doi:10.1002/2015JD024702, 2016.

Shingler, T., C. Ewan, O. Amber, M. Shiraiwa, A. Zuend, A. Beyersdorf, L. Ziemba, B. Anderson, L. Thornhill, A. E. Perring, **J. P. Schwarz**, P. Campazano-Jost, D. A. Douglas, J. L. Jimenez, J. W. Hair, T. Mikoviny, A. Wisthaler, and A. Sorooshian, Armin (2016), Airborne char- acterization of subsaturated aerosol hygroscopicity and dry refractive index from the surface to 6.5 km during the 4 SEAC RS campaign, J. Geophys. Res. Atmos., 121, 4188–4210, doi:10.1002/ 2015JD024498.

Kremser, S., L. W. Thomason, M. von Hobe, M. Hermann, Terry Deshler, Claudia Timmreck, Matthew Toohey Andrea Stenke, **Joshua P. Schwarz**, Ralf Weigel, Stephan Fueglistaler, Fred J. Prata, Jean-Paul Vernier, Hans Schlager, John E. Barnes, Juan-Carlos Antuña-Marrero, Duncan Fairlie, Mathias Palm, Emmanuel Mahieu, Justus Notholt, Markus Rex, Christine Bingen, Filip Vanhellemont, Adam Bourassa, John M. C. Plane, Daniel Klocke, Simon A. Carn, Lieven Clarisse, Thomas Trickl, Ryan Neely, Alexander D. James, Landon Rieger, James C. Wilson, and Brian Meland 016), Stratospheric aerosol—Observations, processes, and impact on climate, Rev. Geophys., 54, doi:10.1002/2015RG000511.

Liu, X., Y. Zhang, G. L. Huey, R. J. Yokelson, Y. Wang, J. L. Jimenez, P. Campuzano-Jost, A. J. Beyersdorf, D. R. Blake, Y. Choi, J. M. St. Clair, J. D. Crounse, D. A. Day, G. S. Diskin, A. Fried, S. R. Hall, T. F. Hanisco, L. E. King, S. Meinardi, T. Mikoviny, B. B. Palm, J. Peischl, A. E. Perring, I. B. Pollack, T. B. Ryerson, G. Sachse, **J. P. Schwarz**, I. J. Simpson, D. J. Tanner, K. L. Thornhill, K. Ullmann, R. J. Weber, P. O. Wennberg, A. Wisthaler, G. M. Wolfe, and L. D. Ziemba (2016), Agricultural fires in the

southeastern U.S. during SEAC4RS: Emissions of trace gases and particles and evolution of ozone, reactive nitrogen, and organic aerosol, *J. Geophys. Res. Atmos., 121,* 7383–7414, *doi:*10.1002/2016JD025040.

Gao, R.S., H. Telg, R.J. McLaughlin, S.J. Ciciora, L.A. Watts, M.S. Richardson, **J.P. Schwarz**, A.E. Perring, T.D. Thornberry, A.W. Rollins, M.Z. Markovic, T.S. Bates, J.E. Johnson, and D.W. Fahey, A light-weight, high-sensitivity particle spectrometer for PM2.5 aerosol measurements, *Aerosol Science and Technology*, *50*(1), 88-99, doi:10.1080/02786826.2015.1131809, 2016.

Brock, C.A., N.L. Wagner, B.E. Anderson, A. Beyersdorf, P. Campuzano-Jost, D.A. Day, G.S. Diskin, T.D. Gordon, J.L. Jimenez, D.A. Lack, J. Liao, M. Markovic, A.M. Middlebrook, A.E. Perring, M.S. Richardson, **J.P. Schwarz,** A. Welti, L.D. Ziemba, and D.M. Murphy, Aerosol optical properties in the southeastern United States in summer - Part 2: Sensitivity of aerosol optical depth to relative humidity and aerosol parameters, *Atmospheric Chemistry and Physics*, *16*, 5009-5019, doi:10.5194/acp-16-5009-2016, 2016.

He, C., Q. B. Li, K. N. Liou, L. Qi, S. Tao, and **J. P. Schwarz**, Microphysics-based Black Carbon Aging in a global CTM: Constraints from HIPPO Observations and Implications for Global Black Carbon Budget, *Atmos. Chem. Phys.,* acp-2015-887, 2016.

Ohata, S., **J. P. Schwarz**, N. Moteki, M. Koike, A. Takami, and Y. Kondo (2016), Hygroscopicity of materials internally mixed with black carbon measured in Tokyo, *J. Geophys. Res. Atmos.*, 121, doi:10.1002/2015JD024153.

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P. S. Kim, D. J. Jacob, J. A. Fisher, K. Travis, K. Yu, L. Zhu, R. M. Yantosca, M. P. Sulprizio, J. L. Jimenez, P. Campuzano-Jost, K. D. Froyd, J. Liao, J. W. Hair, M. A. Fenn, C. F. Butler, N. L. Wagner, T. D. Gordon, A. Welti, P. O. Wennberg, J. D. Crounse, J. M. St. Clair, A. P. Teng, D. B. Millet, **J. P. Schwarz**, M. Z. Markovic, and A. E. Perring Sources, seasonality, and trends of Southeast US aerosol: an integrated analysis of surface, aircraft, and satellite observations with the GEOS-Chem chemical transport model, *ACP,* 15, 10411-10433, doi:10.5194/acp-15-10411-2015, 2015.

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Carmichael, G. R.: Revealing important nocturnal and day-to-day variations in fire smoke emissions through a multiplatform inversion, Accepted in Geophys. Res. Lett., 2015.

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Perring, A. E, **Schwarz, J. P**., Baumgardner, D., Hernandez, M. T., Spracklen, D. V., Heald, C. L., Gao, R. S., Kok, G., McMeeking, G. R., McQuaid, J. B., and Fahey, D. W, Airborne observations of regional variation in fluorescent aerosol across the United States, *J. Geophys. Res. Atmos*., 120, doi:10.1002/2014JD022495 (2015).

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W. Beer, A. L. Eichenberger, B. Jeanneret, B. Jeckelmann, A. R. Pourzand, P. Richard, and **J. P. Schwarz**, Status of the METAS watt balance experiment, *IEEE Trans. Instr. Meas*, *52*, 626–630, 2003.

J. P. Schwarz, R. Liu, E. B. Newell, R. L. Steiner, E. R. Williams, D. Smith, Hysteresis and related error mechanisms in the NIST watt balance experiment, *J. Res. Natl. Inst. Stand. Technol., 106*, 627–640, 2001.

J. P. Schwarz, D. S. Robertson, T. M. Niebauer, and J. E. Faller, A new determination of the Newtonian constant of gravity using the free fall method, *Meas. Sci. Technol.*, *10*, 478–486, 1999.

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PRESENTATIONS

2015 GRC on Laser Diagnostics in Combustion, **Invited Lecture:** Non-pulsed LII applied to atmospheric black carbon characterization in the service of climate science, Waterville Valley, NH, 2015

2013 AGU Fall Meeting, **Oral Presentation:** Early inventory of black carbon particulate size in accumulated snow and ice, San Francisco, CA, 2013

12th AeroCom Workshop, **Oral Presentation:** The full HIPPO black carbon aerosol vertical profile dataset compared to AeroCom, Hamburg, Germany, 2013

Workshop on BC in the Andes, **Invited Lecture**: BC in ice, rain, snow, and air, San Jose, Chile, 2013

2012 AGU Fall meeting, **Poster Presentation**: Observation of Black Carbon Particulate Size in Snow, San Francisco, CA, December 2012

11th AeroCom Workshop **Oral Presentation:** Black carbon aerosol vertical profiles repeatedly measured from the polar southern to the polar northern hemispheres, Seattle, WA, September 2012.

Workshop on Black Carbon Reference Materials: **Keynote Lecture**: Challenges in calibrating/validating/ comparing SP2 measurements, Vienna, Austria, June 2011.

International Conference on Carbonaceous Particles in the Atmosphere, **Oral Presentation**: Quantifying the hygroscopicity of black-carbon aerosol in the ambient with measurements and theory, Vienna, Austria, June 2011.

SP2 User Group Meeting 2011, **Invited seminar**: SP2 response to black carbon mass, Boulder, CO, April 2011.

HIAPER Pole-to-pole Observations Science Meeting, **Oral Presentation**: Global-Scale Black Carbon Profiles Observed in the Remote Atmosphere and Compared to Models, Boulder, CO, March 2011.

German AeroSpace Center, **Invited seminar**: Black carbon aerosol quantified from the ground to 20 km, between 80N and 70S: observations and implications, Weßling, Germany, May 2010.

2009 AGU Fall meeting, **Oral Presentation**: In situ vertical profiles of black carbon aerosol over the Pacific, Arctic, and Antarctic Regions (80°N to 67°S Latitudes), San Francisco, CA, December 2009

SP2 User Group Meeting 2009, **Invited seminar**: Detection efficiency of the SP2, Boulder, CO, September 2009.

2009 Gordon Research Conference - Atmospheric Sciences, **Poster presentation**: Black carbon aerosol measured in situ from 80N to 67S, Waterville Valley, NH, September 2009.

University of Tokyo, **Invited seminar:** Overview of black carbon measurements at NOAA, Tokyo, Japan, October 2008.

3C-STAR field campaign, **Invited seminar:** Use and Utility of the Single Particle Soot Photometer, Kaiping, China, October 2008.

Droplet Measurement Technologies SP2 User Group Meeting, **Invited seminar**: Theoretical and experimental basis for measurement of black carbon aerosol optical size, Boulder, CO, September 2008.

2007 AGU Fall meeting, **Oral presentation**: Heating of the urban boundary layer by black carbon absorption of solar radiation, San Francisco, CA, December 2007.

2007 Gordon Research Conference - Atmospheric Sciences, **Poster presentation**: In situ measurements of the mixing state, light-scattering, and physical properties of black carbon, Big Sky, MT, August 2007.

NOAA Chemical Sciences Division Seminar Series, **Invited seminar**: Unraveling the black carbon puzzle, Boulder, CO, January 2007.

2006 AGU Fall Meeting, **Poster presentation**: In situ measurements of the mixing state and light-scattering properties of black carbon in the troposphere and lower stratosphere, San Francisco, CA, December 2006.

Aerodyne Research, Inc., **Invited seminar**: Hot science: quantifying black carbon with a single particle soot photometer, Billerica, MA, October 2006.

Costa-Rican Aura Validation Experiment science meeting, **Oral presentation**: Black carbon mixing states measured during CR-AVE with the NOAA single particle soot photometer, Greenbelt, MD, November 2006

2005 AGU Fall meeting, **Poster presentation:** Single-particle black carbon aerosol vertical profiles from the boundary layer to the lower stratosphere. San Francisco, CA, December 2005.

2004 AGU Fall meeting, **Oral presentation**: Characterization of a single particle soot photometer, San Francisco, CA, December 2004

First International Watt Balance Workshop, **Oral presentation**: Alignment issues in the METAS watt-balance experiment, Ottawa, ON, June 2002.

Physics and Astronomy Departmental Colloquium at the University of Kentucky, **Invited seminar**: The delicate balance of power: improving the SI with the NIST Watt Balance experiment, Lexington, KY, September 2000.

IOP Conference on the gravitational constant, theory and experiment 200 years after Cavendish, **Invited oral presentation**: The free-fall measurement of G, London, November 1998.

1997 AGU Chapman Conference on Microgal Gravimetry, **Invited oral presentation**: A new G determination, St. Augustine, FL, March 1997.