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EDUCATION

B.S. (Physics) Anhui Normal University, China, 1990
M.S. (Optics) Chinese Academy of Sciences, 1994
Ph.D. (Meteorology) University of Utah, 2000

PROFESSIONAL EXPERIENCE

Professor, 8/2018-present, Department of Atmospheric and Oceanic Sciences and Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder
Professor, 08/2014- 07/2018, Department of Atmospheric Science, University of Wyoming
The Templeton Faculty Fellow 05/2013- present, the College of Engineering and Applied Science, University of Wyoming
Chief scientist, Alpenglow Instruments LLC, 2013-2021
Chief scientist, NSF Wyoming King Air facility, 7/2006- 07/2018
Department remote sensing group leader, 7/2006- 07/2018
Associate Professor, 7/2009- 07/2014, Department of Atmospheric Science, University of Wyoming
Assistant Professor, 12/2004- 6/2009, and *Remote sensing group leader (since 2006),* Department of Atmospheric Science, University of Wyoming
Assistant Research Scientist, 2/2002-12/2004, GEST Center, University of Maryland, Baltimore County and NASA Goddard Space Flight Center
Assistant Research Professor, 7/2001- 1/2002, Department of Meteorology, University of Utah
Post-doctoral Research Associate, 5/2000-6/2001, Department of Meteorology, University of Utah
Graduate Research Assistant, 9/96-4/2000, Department of Meteorology, University of Utah
Assistant Researcher, 7/94-8/96, Atmospheric Optics Division, Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Sciences
Researcher Assistant, 7/90-8/91, Atmospheric Optics Division, Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

HONORS AND AWARDS

The Sam D. Hakes Outstanding Graduate Research and Teaching Award, the University of Wyoming College of Engineering and Applied Science and the Wyoming Alpha Chapter of Tau Beta Pi, (2015)
NASA Group Achievement Award for the NASA CloudSat Algorithm Development Team for: "Exemplary performance in the development and implementation of the CloudSat Standard Data Product algorithms" (2008)
National Science Foundation (NSF) CAREER Award (2007)
The Third Award of Science and Technology Advances, China (1998)
The Second Award of Science and Technology Advances, Chinese Academy of Sciences (1997)

CORPORATE ACTIVITIES

2013-2021 Chief Scientist and co-founder: Alpenglow Instruments LLC

TEACHING INTERESTS

Remote sensing atmosphere and ocean, cloud and precipitation physics, atmospheric physics and chemistry atmospheric radiation, radar and satellite meteorology, and atmospheric boundary layer.

TEACHING EXPERIENCE

The University of Maryland, Baltimore County

- PHYS 622 *Atmospheric Physics II,* cloud physics section, Spring 2003

The University of Wyoming

- ATSC2000 *Introduction to Meteorology* (4 credits), Fall 2006, 2007
- ATSC4650 *ATSC Research* (3 credit), Fall 2011
- ATSC4900 *Problems in Atmospheric Sci*, (3 credit), Spring 2011
- ATSC5000 *Physical Meteorology I* (4 credits), Fall 2005
- ATSC5002 *Atmospheric Radiation* (3 credits), Fall 2009,2010
- ATSC5003 *Problems in Energetics and Radiation* (1 credit), Fall 2009,2010
- ATSC5210 *Cloud and Precipitation system* (3 credits), Fall 2006, 2007, 2008, 2009, 2011,2012,2013, 2014, 2015, 2016, 2017
- ATSC5370 *Meteorological Instrumentation* (3 credits), Spring 2006, 2016
- ATSC5600 *Advanced Cloud Microphysics* (3 credit), Spring 2010, Spring 2015

The University of Colorado, Boulder

- ATOC4500 *Remote Sensing* (3 credits), Spring 2019, 2020
- ATOC4500/7500 Instrumentation lab (3 credits), Fall 2019
- ATOC/ASEN5235 Introduction to Atmospheric Radiative Transfer and Remote Sensing (3 credits), Spring 2021, 2022
- ATOC4815/5815, Scientific Programming, Data Analysis and Visualization Laboratory (3 credits), Fall 2020, 2021
- FYSM1000: First Year Seminar (3 credits), spring 2019

The University of Science and Technology of China and Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Sciences

- A short course on: *Fundamentals and Current Issues of Atmospheric Aerosols and Clouds*, Spring 2012 (sabbatical leave)

Others

- 1997: Volunteer presenter of air pressure demonstration experiments at local elementary schools for the Hansen Planetarium in Salt Lake City, Utah.
- 4/1990-5/1990: Physics teacher at the 9th high school of Wuhu City, China.
- 3/1986-4/1986: Teacher at the Jiuhua elementary school, GuiChi, China.

RESEARCH INTERESTS

Atmospheric remote sensing

Airborne and ground-based and remote sensing instrument development for vapor, temperature, wind, cloud, and aerosol observations;

Aerosol, cloud, and precipitation retrieval algorithm development by integrating multiple active, and passive remote sensor measurements.

Atmospheric boundary layer and air-land/ocean/ice interactions

Atmospheric boundary layer structures and processes

The transfer of heat, moisture, and particles at the interface of air-land/ocean/ice.
The parameterization of atmospheric boundary layer

Atmospheric water cycle and climate change

Variability of atmospheric water vapor, cloud and precipitation, especially using airborne observations;
Linkages of aerosol, water vapor, cloud and precipitation over different scales.

Cloud physics and parameterizations

Cloud physics study by using measurements from ground and space-based multiple remote sensors and from airborne remote sensors and in situ probes;
Cloud parameterization development and verification for numerical models.

FIELD CAMPAIGN EXPERIENCE

1) Optical particle counter operator, Tibet Visibility Study, China, Summer 1990 and 1991
2) PI, Yellow Mountain Sun-photometer Calibration Experiment, China, Oct 1991
3) University of Utah lidar and radar operator, ARM 1997 Fall Cloud IOP, Lamont, OK, Sept-Oct 1997
4) Co-I, NASA AIRS Validation Campaign-GSFC, Greenbelt, MD, 2003
5) Co-I, deploy Wyoming Cloud Lidar on C-130, Ice in Cumulus Experiment- Layer Clouds (ICE-L), Rocky Mountains, Colorado, November-December 2007
6) PI, The Wyoming Airborne Integrated Cloud Observation (WAICO) Experiment, Laramie, WY, Jan-Mar 2008 and 2009
7) PI, The Wyoming King Air PBL Exploratory Experiment (KAPEE), Laramie, WY, June 2010
8) Co-PI, Colorado Airborne Multi-Phase Cloud Study (CAMPS), Northern Colorado, Dec 2010-Feb 2011
9) PI for C-130 lidar and radar, Ice in Cumulus Experiment- Tropical (ICE-T), St. Croix, July 2011
10) Co-I for King Air deployment, The PECAN (Plains Elevated Convection at Night) Campaign, June-July 2015
11) PI, MARLi King Air Testing, Laramie, WY and Redding, CA, June 2016
12) Co-I, ARISTO-2016, Broomfield, CO, 1-19 August 2016
13) Co-PI, NOAA P-3 Raman lidar deployment for NOAA VORTEX-SE 2018, March-April, 2018
14) Co-PI, NOAA P-3 Raman lidar deployment for NSF TORUS (Targeted Observation by Radars and UAS of Supercells)-2019, May-June, 2019.
15) Co-I, King Air deployment, The Chequamegon Heterogeneous Ecosystem Energy-balance Study Enabled by a High-density Extensive Array of Detectors (CHEESEHEAD), July-September 2019
16) Co-I, NOAA P-3 Raman lidar deployment for 2020 NOAA hurricane research field campaign.
17) Co-I, NOAA P-3 Raman lidar deployment for ONR TCRI experiment in 2021
18) Co-I, SWEX, 2022

PUBLICATIONS

Refereed archival journal papers – ALL (136 total, denotes Wang's group students or researchers as the first authors, https://publons.com/researcher/AAB-1528-2021/ --H factor = 41, and https://scholar.google.com/citations?user=AD8PvBkAAAAJ&hl=en -- H factor = 48**)**

1. **Wang, Z.**, H. Hu, and J. Zhou, 1996a: Dual differential absorption lidar: A new method to reduce effectively the effect of aerosols on ozone measurements. *ACTA Meteorologics Sinica* (in Chinese), **54**, 437-446.
2. **Wang, Z.**, J. Zhou, H. Hu, and Z. Gong, 1996b: Evaluation of dual Differential absorption lidar based on Raman shifted Nd:YAG or KrF laser for tropospheric ozone measurements. *Applied Physics*, **B62**, 143-147.
3. Zhou, J., **Z. Wang**, J. Han and H. Hu, 1996: Variability of aerosol optical properties over Hefei during the period from September 1993 to September 1994. *ACTA Meteorologica Sinica*, **10**, 81-95.
4. **Wang, Z.**, H. Nakane, H. Hu, and J. Zhou, 1997: Three-wavelength dual-DIAL measurements of stratospheric ozone in the presence of volcanic aerosols. *Appl. Opt.*, **36**, 1245-1252.

5. Han, J., J. Zhou, **Z. Wang**, and H. Hu, 1997: Precipitable water measurements with sun-photometer. *ACTA Meteorologics Sinica*, **11**, 95-104.
6. Hu, H., **Z. Wang**, Y. Wu, and J. Zhou, 1998: UV-DIAL system for measurements of stratospheric ozone. *Chinese Journal of Atmospheric Sciences*, **21**, 701-708.
7. Sassen, K., G. G. Mace**, Z. Wang**, S. M. Sekelsky, and R. E. McIntosh, 1999: Continental stratus clouds: a case study using coordinated remote sensing and aircraft measurements. *J. Atmos. Sci.*, **56**, 2345-2358.
8. **Wang, Z.**, and K. Sassen, 2000: Ozone destruction in continental stratus clouds: An aircraft case study. *J. Appl. Meteor*., **39**, 875-886.
9. **Wang, Z.**, and K. Sassen, 2001: Cloud type and macrophysical property retrieval using multiple remote sensors. *J. Appl. Meteor.,* **40**, 1665-1682.
10. Sassen, K., J. M. Comstock, **Z. Wang**, and G. G. Mace, 2001: Cloud and Aerosol Research at FARS: The Facility for Atmospheric Remote Sensing. *Bull*. *Am*. *Meteor*. *Soc*., **82**, 1119-1138.
11. Sassen, K., J. M. Comstock, and **Z. Wang**, 2001: Parameterization of the radiative properties of midlatitude middle and high level clouds. *Geophys. Res. Lett.,* **28**, 729-732.
12. Stephens, G. L., D. G. Vane, R. Boain, G. G. Mace, K. Sassen, **Z. Wang**, A. Illingworth, E. O'Conner, W. B. Rossow, S. L. Durden, S. Miller, R. Austin, A. Benedetti, and C. Mitrescu, 2002: The CloudSat mission and the EOS constellation: A new dimension of space-based observations of clouds and precipitation. *Bull. Amer. Meteor. Soc.*, **83**, 1771–1790.
13. **Wang, Z.** and K. Sassen, 2002a: Cirrus cloud microphysical property retrieval using lidar and radar measurements: II midlatitude cirrus microphysical and radiative properties. *J. Atmos. Sci.,* **59**, 2291-2302.
14. Sassen, K., **Z. Wang**, V. I. Khvorostyanov, G. L. Stephens and A. Bennedetti, 2002: Cirrus cloud ice water content radar algorithm evaluation using an explicit cloud microphysical model. *J. Appl. Meteor.*, **41**, 620-628.
15. **Wang, Z.** and K. Sassen, 2002b: Cirrus cloud microphysical property retrieval using lidar and radar measurements: I algorithm description and comparison with in situ data. *J. Appl. Meteor.*, **41**, 218-229.
16. Sassen, K., W. P. Arnott, D. O'C. Starr, G. G. Mace, **Z. Wang**, and M. R. Poellot, 2003: Midlatitude cirrus clouds derived from hurricane Nora: A case study with implications for ice crystal nucleation and shape. *J. Atmos. Sci.,* **60**, 873-891.
17. Sassen, K., **Z. Wang**, C. Platt, and J. Comstock, 2003: Parameterization of Infrared Absorption in Midlatitude Cirrus Clouds. *J. Atmos. Sci.,* **60,** 428–433.
18. **Wang, Z**., D. Whiteman, B. Demoz, and I. Veselovskii, 2004a: A new way to measure cirrus cloud ice water content by using ice Raman scatter with Raman lidar. *Geophys. Res. Lett.,* Vol. 31, L15101, doi:10.1029/2004GL020004.
19. Whiteman, D. N., B. Demoz, and **Z. Wang,** 2004: Subtropical cirrus cloud extinction to backscatter ratios measured by Raman Lidar during CAMRX-3. *Geophys. Res. Lett*., doi:10.1029/2004GL020003.
20. **Wang, Z**., K. Sassen, D. Whiteman, and B. Demoz 2004b: Studying altocumulus plus virga with ground-based active and passive remote sensors. *J. Appl. Meteor.,***43**, 449-460.
21. **Wang, Z.,** G. M. Heymsfield, L. Li, and, A. J. Heymsfield, 2005: Retrieve optically thick ice cloud microphysical properties by using airborne dual-wavelength radar measurements. *J. Geophys. Res.*, **110**, D19201, doi:10.1029/2005JD005969.
22. Matrosov, S. Y., A. J. Heymsfield, and **Z. Wang**, 2005: Dual-frequency radar ratio of nonspherical atmospheric hydrometeors. *Geophys. Res. Lett.*,**32**,L13816 10.1029/2005GL023210.
23. Heymsfield, A. J, **Z. Wang**, and S. Matrosov, 2005: Improved radar ice water content retrieval algorithms using coincident microphysical and radar measurements. *J. Appl. Meteor.,* **44***,* 1391-1412.
24. Gochis, D., and other co-authors, 2005: Meeting summary of UCAR/NCAR junior faculty forum on future scientific directions: the water cycle across scales working group. *Bull. Amer. Meteor. Soc.*, **86**, 1743-1746.
25. Atlas, D., **Z. Wang**, and D. Duda, 2006: Contrails to Cirrus - Morphology, Microphysics, and Radiative Properties. *J. Appl. Meteor.,**45,*** 5-19.
26. Whiteman, D. N., B. Demoz, P. Di Girolamo, DIFA J. Comer, I. Veselovskii, K. Evans, **Z. Wang**, M. Cadirola, K. Rush, G. Schwemmer, B. Gentry, S. H. Melfi, B. Mielke, D. Venable,

T. Van Hove, 2006: Raman Water Vapor Lidar Measurements During the International H2O Project. I. Instrumentation and Analysis Techniques, *J. Atmos. Oceanic Technol.*, **23**, 157-169 .

27. Whiteman, D. N., B. Demoz, P. Di Girolamo, J. Comer, I. Veselovskii, K. Evans, **Z. Wang**, D. Sabatino, G. Schwemmer, B. Gentry, R-F. Lin, A. Behrendt, V. Wulfmeyer, E. Browell, R. Ferrare, S. Ismail, J. Wang, 2006: Raman Water Vapor Lidar Measurements During the International H2O Project. II. Case Studies, *J. Atmos. Oceanic Technol.*, **23**, 170-183.
28. Whiteman, D. N., F. Russo, B. Demoz, L. M. Miloshevich, I. Veselovskii, S. Hannon, **Z. Wang**, H. Vömel, F. Schmidlin, B. Lesht, P. J. Moore, A. S. Beebe, A. Gambacorta, C. Barnet, 2006: Analysis of Raman lidar and radiosonde measurements from the AWEX-G field campaign and its relation to Aqua validation. *J. Geophys. Res.*, *111*, D09S09, doi:10.1029/2005JD006429.
29. Belay Demoz, Cyrille Flamant, Tammy Weckwerth, David Whiteman, Keith Evans, Frédéric Fabry,Paolo Di Girolamo, David Miller, Bart Geerts, William Brown, Geary Schwemmer, Bruce Gentry, Wayne Feltz, and **Z. Wang**, 2006: The Dryline on 22 May 2002 during IHOP-2002: Convective-Scale Measurements at the Profiling Site, *Monthly Weather Review,* **134**, 294-310.
30. Comstock, J. M., et al. *2007:* An Intercomparison of Microphysical Retrieval Algorithms for Upper Tropospheric Ice Clouds, *Bull. Amer. Meteor. Soc.,* DOI:10.1175/BAMS-88-2-191.
31. Turner, D. D., *et al.*, 2007: Thin Liquid Water Clouds: Their Importance and Our Challenge, *Bull. Amer. Meteor. Soc.,* DOI:10.1175/BAMS-88-2-177.
32. **Wang, Z**., 2007: A refined two-channel microwave radiometer liquid water path retrieval for cold regions by using multiple-sensor measurements*, IEEE Geoscience & remote sensing letters,* **4**, 591-595.
33. Heymsfield, A. J., et al., 2008: Testing and Evaluation of Ice Water Content Retrieval Methods using Radar and Ancillary Measurements. *J. Appl. Meteor.*, **47**,153-163.
34. Sassen, K. and **Z**. **Wang**, 2008: Early Results from CloudSat: Applying the Cloud Type Algorithm around the Globe, *Geophys. Res. Lett*. **35**, L04805, doi:10.1029/2007GL032591.
35. Kahn, B. H., M. T. Chahine, G. L. Stephens, G. G. Mace, R. T. Marchand, **Z. Wang**, A. Eldering, R. E. Holz, R. E. Kuehn, D.G. Vane and C. D. Barnet, 2008: Cloud type comparisons of AIRS, CloudSat, and CALIPSO cloud height and amount, *Atmos. Chem. Phys*., **8**, 1231–1248, 2008.
36. Luo, Y., K. Xu, H. Morrison, G. M. McFarquhar, **Z. Wang**, and G. Zhang, 2008: Multi-Layer Arctic Mixed-Phase Clouds Simulated by a Cloud-Resolving Model: Comparison with ARM Observations and Sensitivity Experiments, *J. Geophys. Res.*, 113,D12208, doi:10.1029/2007JD00956.
37. **Wang, Z.,** G. Stephens, T. Deshler, C. Trepte, T. Parish, D. Vane, D Winker, D. Liu and L. Adhikari, 2008: The Connection of Antarctic Polar Stratospheric Clouds with Tropospheric Cloud Systems, *Geophys. Res. Lett*., 35, L13806, doi:10.1029/2008GL034209 .
38. Liu, Z., Liu, D., Huang, J., Vaughan, M., Uno, I., Sugimoto, N., Kittaka, C., Trepte, C., **Wang, Z.**, Hostetler, C., and Winker, D. 2008a: Airborne dust distributions over the Tibetan Plateau and surrounding areas derived from the first year of CALIPSO lidar observations, *Atmos. Chem. Phys.*, 8, 5045-5060.
39. Liu, D., **Z. Wang**, Z. Liu, D. Winker and C. Trepte, 2008b: A Height Resolved Global View of Dust Aerosols from the First Year CALIPSO Lidar Measurements, *J. Geophys. Res.*, 113, D16214, doi:10.1029/2007JD009776.
40. Leon, D. C., **Z. Wang**, and D. Liu, 2008: Global assessment of the frequency and characteristics of drizzle from marine stratocumulus and other low clouds over the ocean using one year of data from CloudSat and CALIPSO, *J. Geophys. Res.*, 113, D00A14, doi:10.1029/2008JD009835.
41. Sassen, K., Z. **Wang**, and D. Liu, 2008: The global distribution of cirrus clouds from CloudSat/CALIPSO measurements, *J. Geophys. Res.*, **113,** D00A12, doi:10.1029/2008JD009972.
42. Stephens, G. L., et al., 2008: The CloudSat Mission: Performance and early science after the first year of operation, *J. Geophys. Res.*, **113**, D00A18, doi:10.1029/2008JD009982.
43. Klein, S. A., et al. 2009: Intercomparison of model simulations of mixed phase clouds observed during the ARM Mixed-Phase Arctic Cloud Experiment, Part I: Single layer cloud, *Q. J. Roy. Meteor. Soc.* , DOI: 10.1002/qj.416.
44. Morrison, H., et al. 2009: Intercomparison of model simulations of mixed phase clouds observed during the ARM Mixed-Phase Arctic Cloud Experiment, Part II: Multi layered cloud, *Q. J. Roy. Meteor. Soc.* , DOI: 10.1002/qj.415.

45. Pratt, K. A., Paul J. DeMott, Jeffrey R. French, **Z. Wang**, Douglas L. Westphal, Andrew J. Heymsfield, Cynthia H. Twohy, Anthony J. Prenni & Kimberly A. Prather. In situ detection of biological particles in cloud ice-crystals. *Nature Geoscience*, 2009; DOI: 10.1038/ngeo521.
46. **Wang, Z.,** P. Wechsler, W. Kuestner, J. French, A. Rodi, B. Glover, M. Burkhart, and D. Lukens, 2009: Wyoming Cloud Lidar: instrument description and applications, *Optics Express* Vol. 17, Iss. 16, pp. 13576–13587.
47. Sassen, K., **Z. Wang**, and D. Liu, 2009: Cirrus Clouds and Deep Convection in the Tropics: Insights from CALIPSO and CloudSat, *J. Geophys. Res.*, D00H06, doi:10.1029/2009JD011916.
48. Hu, Y., D. Winker, M. Vaughan, B. Lin, A. Omar, C. Trepte, D. Flittner, P. Yang, S. L. Nasiri, B. Baum, W. Sun, Z. Liu, **Z. Wang**, S. Young, K. Stamnes, J. Huang, R. Kuehn, R. Holz 2009: CALIPSO/CALIOP Cloud Phase Discrimination Algorithm, *Journal of Atmospheric and Oceanic Technology*, 26, 2293-2309.
49. Zhang, D., **Z. Wang**, and D. Liu, 2010: A Global View of Mid-level Liquid Layer Topped Stratiform Cloud Distributions and phase partition from CALIPSO and CloudSat Measurements, *J. Geophys. Res.*, *115*, D00H13, doi:10.1029/2009JD012143.
50. Adhikari, L., **Z. Wang**, and D. Liu, 2010: Microphysical Properties of Antarctic Polar Stratospheric Clouds and Their Dependence on Tropospheric Cloud Systems, *J. Geophys. Res.*, *115*, D00H18, doi:10.1029/2009JD012125.
51. Pratt, K. A., C. H. Twohy, A. J. Heymsfield, S. M. Murphy, P. J. DeMott, J. G. Hudson, R. Subramanian, **Z. Wang**, J. H. Seinfeld, K. A. Prather, 2010: In-situ Chemical Characterization of Aged Biomass Burning Aerosols Impacting Cold Wave Clouds**,** *J. Atmos. Sci.*, **67**, 2451–2468.
52. Heymsfield, A., P. C. Kennedy, S. Massie, C. Schmitt, **Z. Wang**, S. Haimov, A. Rangno, 2010: Aircraft-induced hole punch and canal clouds: inadvertent cloud seeding. BAMS, **91**, 753–766. doi: 10.1175/2009BAMS2905.1
53. Eidhammer, T., P. J. DeMott, A. J. Prenni, M. D. Petters, C. H. Twohy, D. C. Rogers, J. Stith, A. Heymsfield, **Z. Wang**, K. A. Pratt, K. A. Prather, S. M. Murphy, J. H. Seinfeld, R. Subramanian, and S. M. Kreidenweis, 2010: Ice initiation by aerosol particles: measured and predicted ice nuclei concentrations versus measured ice crystal concentrations in an orographic wave cloud, *J. Atmos. Sci.*, **67**, 2417-2436.
54. Twohy, C. H., P. J. DeMott, K. A. Pratt, R. Subramanian, G. L. Kok, S. M. Murphy, T. Lersch, K. A. Prather, A. J. Heymsfield, **Z. Wang**, 2010: Relationships of Biomass Burning Aerosols to Ice in Orographic Wave Clouds, *J. Atmos. Sci.*, **67**, 2451-2468.
55. Deng, M., G. G. Mace, **Z. Wang**, and H. Okamoto, 2010: TC^4 Validation for Ice Cloud Profiling Retrieval Using CloudSat Radar and CALIPSO Lidar, *J. Geophys. Res.*, *115*, D00J15, doi:10.1029/2009JD013104.
56. Atlas, D. and **Z. Wang**, 2010: Contrails of small and very large optical depth, Journal of the Atmospheric Sciences, **67**, P3065-3073.
57. Zhao, M. and **Z. Wang**, 2010: Comparison of Arctic clouds between ECMWF simulations and ACRF long-term observations at the NSA Barrow Site, *J. Geophys. Res.*, 115, D23202, doi:10.1029/2010JD014285.
58. Heymsfield, A. J., G. Thompson, H. Morrison, RM Rasmussen, P. Minnis, **Z. Wang**, D. Zhang, 2011: Formation and spread of aircraft-induced holes in clouds. *Science*, **333**, 77-81.
59. Heymsfield, A. J., P. R. Field, M. Bailey, D. Rogers, J. Stith, C. Twohy, **Z. Wang**, S. Haimov, 2011: Ice in Clouds Experiment- layer clouds Part I: ice growth rates derived from lenticular wave growth penetrations, *J. Atmos. Sci.*, **68**, 2628–2654.doi: http://dx.doi.org/10.1175/JAS-D-11-025.1.
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61. **Wang, Z.** et al., 2012: Single aircraft integration of remote sensing and in situ sampling for the study of cloud microphysics and dynamics. BAMS, **93**, 653–766. doi: 10.1175/BAMS-D-11-00044.1.
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63. Zhao, C., et al. (2012), Toward understanding of differences in current cloud retrievals of ARM ground-based measurements, *J. Geophys. Res.*, doi:10.1029/2011JD016792.

64. Sassen, K. and **Z. Wang**, 2012: The Clouds of the Middle Troposphere: Composition, Radiative Impact, and Global Distribution, Surv Geophys (2012) 33:677–691,DOI 10.1007/s10712-011-9163-x
65. Zhang, D., **Z. Wang**, A. J. Heymsfield, J. Fan, D. Liu, and M. Zhao: 2012, Quantifying the impact of dust on heterogeneous ice generation in midlevel supercooled stratiform clouds, *Geophys. Res. Lett.*, 39, L18805, doi:10.1029/2012GL052831.
66. Liu, D., Y. Wang, **Z. Wang**, and J. Zhou, 2012: The Three-dimensional Structure of trans-Atlantic Africa Dust transport: a new perspective from CALIPSO lidar Measurements, *Advances in Meteorology,* doi:10.1155/2012/850704.
67. Deng, M., G. G. Mace, **Z. Wang**, R. P. Lawson, 2013: Evaluation of Several A-Train Ice Cloud Retrieval Products with In Situ Measurements Collected during the SPARTICUS Campaign. *J. Appl. Meteor. Climatol.*, **52**, 1014–1030.doi: http://dx.doi.org/10.1175/JAMC-D-12-054.1.
68. Liu, B., and **Z. Wang**, 2013: Improved calibration method for depolarization lidar measurement, *Opt. Express,* **21**, 14583-14590.
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70. Yin J., D. Wang, G. ZHAI, and Z. Wang 2013: Observational Characteristics of Cloud Vertical Profiles over the Continent of East Asia from the CloudSat Data. ACTA METEOROLOGICA SINICA, 27, p26-39.
71. Adhikari, L. and **Z. Wang**, 2013: An A-train satellite based stratiform mixed-phase cloud retrieval algorithm by combining active and passive sensor measurements, British Journal of Environment and Climate Change, Vol.: 3, Issue: 4 (Oct-Dec)-Special Issue, DOI : 10.9734/BJECC/2013/3055. (http://www.sciencedomain.org/abstract.php?iid=323&id=10&aid=2532#.Uq8vjaWgPst)
72. Luo, T., R. Yuan, and Z. Wang, 2014: Lidar-based remote sensing of atmospheric boundary layer height over land and ocean, Atmos. Meas. Tech., 7, 173-182, doi:10.5194/10.5194/amt-7-173-2014.
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74. Zhang, D., T. Luo, D. Liu, **Z. Wang**, 2014: Spatial Scales of Altocumulus Clouds Observed with Collocated CALIPSO and CloudSat Measurements, *Atmospheric Research*, DOI: 10.1016/j.atmosres.2014.05.023.
75. Wang, Z., D. Liu, **Z. Wang**, Y. Wang, P. Khatri, J. Zhou, T. Takamura, and G. Shi (2014), Seasonal characteristics of aerosol optical properties at the SKYNET Hefei site (31.90°N, 117.17°E) from 2007 to 2013, J. Geophys. Res. Atmos., 119, 6128–6139, doi:10.1002/2014JD021500.
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135. Deng, M., Z. Wang, J. French, and R. M Volkamer, 2021: Wildfire Smoke Observations in the Western US from the Airborne Wyoming Cloud Lidars during the 2018 Fire and Smoke Projects (A55S-1685), the AGU Fall Meeting, New Orleans, LA & Online Everywhere, 13-17 December 2021.

Books and book chapters (paper or electronic) – ALL

1. Hu, H., **Z. Wang** and J. Zhou, 1996: Imaginary refractive index of aerosol derived from simultaneous measurements with lidar and OPC, in *Advances in Atmospheric Remote Sensing with Lidar*, Edited by A. Ansmann, R. Neuber, P. Rairoux and U. Wandinger, Springer, 59-62.
2. **Wang, Z.**, H. Hu, J. Zhou and Z. Gong, 1996: Comparisons of three-wavelength dual-DIAL with aerosol correction method for DIAL, in *Advances in Atmospheric Remote Sensing with Lidar*, Edited by A. Ansmann, R. Neuber, P. Rairoux and U. Wandinger, Springer, 407-410.
3. Pelon, J., G. Vali, G. Ancellet, G. Ehret, P. H. Flamant, S. Haimov, G. Heymsfield, D. Leon, J. B. Mead, A. L. Pazmany, A. Protat, **Z. Wang**, and M. Wolde, 2013: LIDAR and RADAR Observations. *Airborne Measurements for Environmental Research: Methods and Instruments*, M. Wendisch and J.-L. Brenguier, Eds., Wiley-VCH Verlag GmbH & Co. KGaA, Weinheim, Germany. Retrieved from http://onlinelibrary.wiley.com/doi/10.1002/9783527653218.ch9/summary.

Thesis

Wang, Z., *Lidar Measurements of Stratospheric Ozone Profile*, M. S. Thesis, Anhui Institute of Optics and Fine Mechanics, the Chinese Academy of Sciences, 1994. Advisor: Prof. Huanling Hu.

Wang, Z., *Cloud Property Retrieval Using Combined Ground-based Remote Sensors*, Doctoral Dissertation, University of Utah, 2000. Advisor: Dr. Kenneth Sassen.

Seminars and talks

1. 07/1994, the 17th International Lidar Research Conference, Sendai, Japan, Dual-DIAL measurement of ozone profiles.
2. 08/1996, The Institute of Atmospheric Physics (IAP), the Chinese Academy of Sciences, L625 lidar measurements of stratospheric aerosol and ozone.
3. 04/2000, University of Utah, Cloud Property Retrieval Using Combined Ground-based Remote Sensor*s*.
4. 10/2001, GEST and NASA/GSFC, Cloud Property Retrieval Using Combined Ground-based Remote Sensor*s*.
5. 04/2002, CloudSat Science Team Meeting, Monterey, CA: A Combined Radar Lidar Approach for Classifying Clouds.
6. 07/2002, the 21st ILRC Meeting: Lidar Remote Sensing in Atmospheric and Earth Science, Quebec City, Canada: Mixed phase cloud properties derived from Raman lidar and depolarized lidar measurements: A case study.
7. 11/2002, The ARM cloud property working group meeting, Broomfield, Colorado: Studying Altocumulus with Virga with Ground-based Active and Passive Remote Sensors: Initial Results.
8. 11/2002, the CALIPSO Science Team Meeting, Williamsburg, VA: CloudSat Cloud Classification.

9. 03/2003, CloudSat and CALIPSO science team meeting, Broomfield, Colorado: Combined Lidar and Radar Approaches for Characterizing Clouds.
10. 03/2003, CloudSat and CALIPSO science team meeting, Broomfield, Colorado: Studying Altocumulus Plus Ice Virga with Ground-based Active and Passive Remote Sensors.
11. 04/2003, invited seminar, Florida State University, Department of Meteorology, Tallahassee, FL: Study Clouds and Water Vapor by Combining Active and Passive Remote Sensors.
12. 06/2003: CloudSat data development meeting, Pingree Park, Colorado: Status of Lidar and Radar Cloud Scenario Classification.
13. 11/2003, the CALIPSO Science Team Meeting, Williamsburg, VA: Status of Lidar and Radar Cloud Scenario Classification.
14. 10/2003, The ARM cloud property working group meeting, Broomfield, Colorado: An Improved Cloud Classification Algorithm for the Integrated Cloud Products.
15. 10/2003, The ARM cloud property working group meeting, Broomfield, Colorado: Studying Altocumulus Plus Ice Virga with Ground-based Active and Passive Remote Sensors**.**
16. 05/2004, CloudSat science team meeting, Laguna, CA: Status of Lidar and Radar Cloud Scenario Classification.
17. 05/2004, CloudSat science team meeting, Laguna, CA: Retrieval Ice Water Content and Size Profile by Combining CloudSat and CALIPSO Measurements.
18. 05/2004, NASA A-train Multisensor workshop, Laguna, CA: Study of Mixed-phase Clouds by Integrating Active and Passive Remote sensing.
19. 07/2004, the 22nd International Laser Radar Conference, Matera, Italy: A new way to measure cirrus cloud ice water content by using ice Raman scatter with Raman lidar.
20. 09/2004, invited seminar, University of Wyoming, Laramie, WY: Combining Multiple Remote Sensors to Study Cloud Microphysical Properties.
21. 11/2004, The Fourth International Asia-Pacific Environmental Remote Sensing Symposium: Remote sensing of the atmosphere, ocean, environment, and space, Honolulu, Hawaii: Optically Thick Ice Cloud Microphysical Property Retrieval Using Airborne Two-frequency Radars.
22. 01/2005, ARM Cloud Property Working Group meeting, Reston, Virginia: Measure Cirrus Cloud Ice Water Content by Observing Ice Raman Scatter with Raman Lidar.
23. 01/2005, AMS Annual Meeting, 8th Conference on Polar Meteorology and Oceanography,: Arctic mixed-phased cloud microphysical properties retrieved from ground-based active and passive remote sensors.
24. 03/2005, ARM science team meeting, Daytona Beach, Florida, Florida: Arctic Mixed-phase Cloud Properties Derived From Multi-year ARM NSA Observations (CPWG break out section).
25. 05/2005, CloudSat science team meeting, Santa Fe, New Mexico: Combining CloudSat radar and CALIPSO lidar to derive ice water content profile.
26. 11/2005, ARM cloud property working group meeting (mixed-phase cloud group), Annapolis, Maryland: The Seasonal and Interannual Variations of Mixed-phase Cloud Properties Observed at the NSA Site.
27. 11/2005, ARM cloud property working group meeting (high cloud group), Annapolis, Maryland: Retrieve Optically Thick Ice Cloud Microphysical Properties by Using Airborne Dual-Wavelength Radar Measurements
28. 11/2005, ARM cloud property working group meeting (Low optical depth cloud group), Annapolis, Maryland: Comparing LWP Retrieved from MWR and Multiple-sensor Measurements at the NSA site.
29. 04/2006, invited seminar, University of Hawaii: Study cloud properties with ground-based, airborne and satellite-based multiple remote sensors measurements.
30. 10/2006, CloudSat science team meeting, Hawaii: CloudSat Cloud Type Classification Standard Data Production.
31. 11/2006, ARM cloud property working group meeting, Annapolis, Maryland: Improving MWR LWP Retrievals at the NSA site with Multiple-sensor Measurements and Retrievals.
32. 12/2006, AGU Fall Meeting, San Francisco, CA: Spatial Scales of Different Types of Clouds as Revealed by CloudSat Radar Measurements: Initial Results.
33. 12/2006, AGU Fall Meeting, San Francisco, CA: Cirrus Cloud Optical and Microphysical Property Measurements with Raman Lidar.
34. 12/2006, AGU Fall Meeting, San Francisco, CA: Study Optically Thick Ice Clouds with Airborne Dual-wavelength Radar Measurements.
35. 06/2007, CloudSat and CALIPSO science team meeting, San Francisco, CA: CloudSat Cloud Type Classification Standard Data Production.

36. 06/2007, CloudSat and CALIPSO science team meeting, San Francisco, CA: Study Aerosol, cloud, and Drizzle interaction with the A-Train data
37. 10/2007, A-train Lilli Symposium, Lille Grand Palais (http://www.lillegp.com), France, 22-25 October, 2007: STUDY THE INTERACTIONS OF CLOUD, AEROSOL AND DRIZZLE IN MARINE STRATOCUMULUS WITH A-TRAIN DATA.
38. 11/2007, ARM cloud property working group meeting, Annapolis, Maryland: Mixed-phase or Drizzling Cloud Retrieval.
39. 12/2007, AGU Fall meeting San Francisco, CA: An Analysis of Cloud Scale Vertical Motions, Upper Tropospheric Humidity, and Cirrus Microphysical Properties in Relation to the Large-Scale Atmospheric State (Leader author, J. Comstock).
40. 01/2008, Symposium on Recent Developments in Atmospheric Applications of Radar and Lidar, New Orleans, USA, The global distribution of drizzle in marine stratocumulus observed by CloudSat and CALIPSO.
41. 06/2008, the 24th International Laser Radar Conference, Boulder, USA: A New Insight Of Trans-Atlantic African Dust Transport With CALIPSO Lidar Measurements (Liu, D., Z. Wang and Z. Liu).
42. 07/2008, The GEWEX cloud assessment meeting 2008, New York, USA: Mixed-phase Clouds observed from CloudSat and CALIPSO.
43. 08/2008, CloudSat science team meeting, Seattle, USA: The Connection of Antarctic Polar Stratospheric Clouds with Tropospheric Cloud Systems as revealed by the A-train data.
44. 08/2008, CloudSat science team meeting, Seattle, USA: A global view of ice generation in supercooled altocumulus clouds.
45. 09/2008, the ICE-L workshop, Boulder, USA: Ice generation in mixed-phase clouds.
46. 11/2008, ARM cloud property working group meeting, Lansdowne, VA, USA: Optically thick ice cloud microphysical property retrieval by combining MMCR and WACR measurements.
47. 11/2008, ARM cloud property working group meeting, Lansdowne, VA, USA: A six-year Arctic mixed-phase cloud microphysical property data set derived from multiple sensor observations.
48. 12/2008, AIOFM, China: Aerosol, cloud and climate changes: Challenges and opportunities.
49. 12/2008, USTC, China: A-train Satellite Observations and Their Applications for Aerosol and Cloud Studies.
50. 01/09, Chinese Academy of Meteorology, Beijing: Multi-sensor Cloud Observations from Surface, Aircraft, and Space.
51. 03/09, ARM Science Team Meeting: Retrieving precipitating mixed-phase cloud properties and A suggestion for a new focus on cloud microphysical process study in the ARM program
52. 07/2009, CloudSat and CALIPSO Science team meeting, Madison, WI: The abundance and challenge of mixed-phase clouds: a new perspective from CloudSat and CALIPSO measurements.
53. 09/2009, ARM cloud property working group meeting, Boulder, CO: A global view of mixed-phase clouds and unique contributions of ARM observations.
54. 07/2010, AMS 13th Conference on Cloud Physics, Portland, OR: A global view of mixed-phase cloud distribution and ice generation in them with A-train satellite measurements.
55. 01/2011,CloudSat and CALIPSO science team meeting, Montreal, Canada: Exploring heterogeneous ice generation with CloudSat and CALIPSO observations.
56. 08/2011, University of Alabama Huntsville/ NASA: Observing and understanding of Clouds: challenges and opportunities.
57. 09/2011, DOE ASR working group meeting: Quantifying dust impacts on ice generation in supercooled stratiform clouds.
58. 09/2011, DOE ASR working group meeting: Algorithm overview for water clouds.
59. 12/2011, AGU Fall meeting: Quantifying the Dust Impacts on the Ice Generation in Supercooled Stratiform Clouds.
60. 01/2012, Beijing Normal University: Multi-sensor cloud observations
61. 03/2012, Weather Modification Office, China Meteorological Administration: Airborne cloud, aerosol and water vapor observations by combining in situ sampling and remote sensing.
62. 03/2012, Lanzhou University, China: Advancing atmospheric remote sensing capability by combining multiple remote sensors.
63. 04/2012, Kyushu University, Japan: Observing and Understanding Clouds: Challenges and Opportunities
64. 05/2012, Nanjing University of Information Science & Technology (NUIST), China: Airborne cloud, aerosol and water vapor observations by combining in situ sampling and remote sensing

65. 05/2012, Weather Modification Office, Qinhai Meteorological Administration: Integrated airborne observations of cloud, aerosol and water vapor and their applications.
66. 08/2012, 16th International Conference on Clouds and Precipitations: Quantifying the dust impacts on the ice generation in supercooled stratiform clouds by combining remote sensing and in situ measurements.
67. 09/2012, University of Wyoming: Chasing aerosols and clouds from my hometown in China to Kyoto, Japan.
68. 12/2012, Xiamen University, China: An Overview of Current Ship-based Air and Sea Observations; New Observational Capabilities for Better Understanding Clouds in Weather and Climate System.
69. 03/2013, The 4th Atmospheric System Research (ASR) Science Team Meeting, Maryland: Quantifying the dust impacts on the Ice generation in supercooled stratiform clouds.
70. 03/2013, Beijing Meteorological Administration, China: New observational capabilities for better understanding clouds in weather and climate system.
71. 04/2013, ISCCP at 30: What Do We Know and What Do We Still Need to Know? NY: Ice Generation in middle-level clouds and their relationships with aerosols, dynamics, and thermodynamics.
72. 07/2013, Workshop on Ice in Clouds and Precipitation: Addressing and Solving Measurement Problems, Zurich, Switzerland: Topic 11 – New sensors, platforms and Analysis techniques Part 2.
73. 07/2013, Davos Atmosphere and Cryosphere Assembly 2013, Davos, Switzerland: Exploring the connection between aerosol and ice generation in stratiform mixed-phase clouds by combining satellite and airborne observations.
74. 08/2013, Weather Modification Office, Hebei Meteorological Administration, China: Wyoming King Air Observation Capabilities and Applications.
75. 08/2013, The 6th International Conference on Atmosphere, Ocean, and Climate Change, Hong Kong: Multi-sensor Remote Sensing of Cloud Macrophysical and Microphysical Properties with the A-train Satellites.
76. 10/2013, ICE-T workshop, NCAR: Observing Ice Formation at warm temperatures-the importance of biological IN.
77. 01/2014, JCET, UMBC: Multi-platform Multi-sensor Cloud Observations and Their Applications for Stratiform Mixed-phase Cloud Study.
78. 03/2014, DOE/ASR science team meeting: Lidar Based Cloud Droplet Concentration Retrieval in Supporting Aerosol-Cloud Interaction Study in Low Clouds.
79. 09/2014, NSF Workshop on Airborne Radiometry for Water Vapor and Liquid Water Retrievals, NCAR: The Wyoming King Air and Mixed-Phase Clouds.
80. 11/2014, CloudSat/CALIPSO science team meeting: Retrieve Stratiform Mixed-phase Cloud Properties with Multi-sensor Measurements from A-Train Satellites.
81. 1/2015, the Seventh Symposium on Lidar Atmospheric Applications, Phoenix, AZ: A global view of ice generation in mixed-phase clouds by combining CALIPSO lidar and CloudSat radar measurements.
82. 3/2015: The 6th Atmospheric System Research (ASR) Science Team Meeting: Observing ice generation in developing convective clouds.
83. 6/2015, Opportunities to Improve the Representation of Clouds and Aerosols in Climate Models with National Collection Systems, Unclassified Workshop, the National Academies: Derived Cloud Properties.
84. 7/2015, The Twenty Seventh International Laser Radar Conference, New York City, NY: AIRBORNE RAMAN LIDAR AND ITS APPLICATIONS FOR ATMOSPHERIC PROCESS STUDIES.
85. 03/2016: invited seminar, The University of Arizona: Advancing Atmospheric Observational Capabilities Through Combining Multi-Sensor Measurements and Developing Novel Airborne Instrumentation.
86. 03/2016: CloudSat and CALIPSO science team meeting: Day-night Stratiform Mixed-phase Cloud Property Retrievals by Combining Active and Passive Measurements from A-Train Satellites.
87. 10/2016: Seminar, University of Utah: Recent Advances in University of Wyoming King Air Observation Capabilities
88. 12/2016: 2016 AGU Fall meeting: Evaluation of Global Dust Distribution Estimated by CAM5 with A-train Satellite Observations.
89. 01/2017: 97th American Meteorological Society Annual Meeting: Integrated Remote Sensing and In-situ Sampling Capability of University of Wyoming King Air.
90. 01/2017: 97th American Meteorological Society Annual Meeting: Multi-function Airborne Raman Lidar (MARLi): Design and Initial Testing Results.

91. 02/2017: Seminar, Colorado State University: Recent Advances in University of Wyoming King Air Observation Capabilities
92. 02/2017: Invited seminar, University of Michigan: Develop New Atmospheric Observation Capabilities to Advance Cloud and Boundary Layer Process Studies.
93. 03/2017: Invited seminar, CU-Boulder: Develop New Atmospheric Observation Capabilities to Advance Cloud and Boundary Layer Process Studies.
94. 04/2017: Seasonal and Inter-annual Variation of Cloud Type Revealed by 10- year CloudSat and CALIPSO Measurements and Its Implications, The A-train Symposium, 2017, JPL.
95. 05/2017: Multi-function Airborne Raman Lidar (MARLi): Design and Initial. The 10th International Symposium on Tropospheric Profiling.
96. 6/2017: Global Cloud Type Distributions: ISCCP Cloud Type to CloudSat Type, at the Clouds, their Properties, and their Climate Feedbacks: A symposium to celebrate William B. Rossow's science contributions and retirement, New York, June 6-8 2017
97. 07/2017: invited seminar, University of Wyoming King Air Observation Capabilities, Chengdu Information and technology University and USTC, China.
98. 10/2017: Product Update: Cldclass, Cldclass-Lidar, CloudSat Algorithm Developing Meeting, JPL.
99. 11/2017: Profiling Atmospheric Boundary Layer Water Vapor, Temperature, and Aerosol Structures with Airborne Raman Lidars, VORTEX-SE 2017 Fall Workshop
100. 04/2018: Seasonal and Internal-annual Cloud Type Variations as Revealed by 11-year CloudSat and CALIPSO Measurements and Its Implications, CloudSat/CALIPSO Science Team meeting, Boulder 2018.
101. 06/2018: Observing Storm and PBL Interactions with Airborne Raman Lidar During the PEACN, 23rd Symposium on Boundary Layers and Turbulence, Oklahoma City, OK June 11-15 2018.
102. 10/2018: The Potentials and Limitations of Using Space-Based Elastic Lidar Measurements for PBL Height Determinations, NASA Sounder Science Team Meeting, October 1-5, 2018 Greenbelt Md
103. 10/2018: Characterization of Polar Mixed-phase Clouds and Tropical Convective Clouds, MODIS/VIIRS Science Team Meeting, October 15 –19, 2018; Silver Spring, MD.
104. 07/2019: PBL Observations with Airborne and Space-based Lidars, USTC China (Invited).
105. 08/2019: Using Satellite and Airborne Lidar for Atmospheric Process Study, Ocean University of China (Invited).
106. 08/2019: Cloud, Aerosol, and PBL Observations with Satellite and Airborne Lidars, Shanghai Institute of Optics and Fine Mechanics (invited).
107. 08/2019: airborne profiling to study L-A processes, Land-Atmosphere Feedback Workshop Land-Atmosphere Feedback Workshop, 27 August 2019, Boulder, CO
108. 09/2019: 2B-CLDCLASS, 2B-CLDCLASS-Lidar, and Lidar-AUX updates, CloudSat Algorithm Development Working Group Meeting, SSEC, UW-Madison 24-25 September 2019.
109. 11/19 Improved Tropical Convective Cloud Characterization by Combining MODIS with CloudSat Radar and CALIPSO Lidar Measurements, MODIS science team meeting 2019.
110. 11/19 Mixed-phase cloud macrophysical and microphysical properties from A-train Satellites, 8th International EarthCARE science workshop (Invited Keynote).
111. 3/20 Temperature-dependent liquid-ice mass partition for stratiform mixed-phase clouds as derived from the A-train Satellite measurements, CloudSat/CALIPSO science team meeting.
112. 6/20 Warm Boundary Layer Processes and Parameterization: The Synergy of Observation Analysis and Modeling, DOE ASR annual meeting.
113. 11/20 The Potentials of Raman Lidar Observations on the NOAA P-3 for Hurricane Research, NOAA NEw and improved Observing Technologies And Enhanced Concept of operations working group (NEOTAC invited).
114. 12/20 Cloud Type Dependent Radiative Forcing using CloudSat and Other A-train Measurements, Libera science team meeting.
115. April 23, 2021, Lidar Observations of Aerosols, Clouds, and PBL Structures, CLIMATE/ATMOSPHERIC SCIENCE & ENGINEERING COLLOQUIUM, University of Iowa (Invited).
116. 12/2021: Re-construct Convective Structure and Lifecycle by fusing CloudSat, CALIPSO and MODIS Measurements, NASA AOS integrated cloud product working group.
117. 12/2021: Polar Mixed-phase Cloud Retrievals With A-train Measurements, NASA AOS integrated cloud product working group.
118. 02/2021: Raman Lidar Observations during 2020 Hurricane Season, NOAA 2020 Hurricane Field Program Science Debrief Series.

119. 11/2021: Split-shortwave channel for aerosol applications, Librea Science team meeting.
120. 08/2021: MARLi Observation capability to support CAESAR, NSF CAESAR mission planning meeting.

RESEARCH GRANTS AND CONTRACTS (Total: Leading PI-14.1 millions; Co-PI-18.4 millions)

Supported – external – past

Agency	Reference	PI	Period of Funding	Amount Requested	Title
DOE	ARM	Wang	12/15/02-12/30/04	$70,497	Using Radar, Lidar and Radiometer Measurements to Classify Cloud Type and Study Middle-level Cloud Properties
NASA/JPL	CloudSat	Wang	08/01/02-12/30/04	$100,000	CloudSat Level 2 Cloud Scenario Classification Standard Product Development
NASA/GSFC	EOS Recom-petition	Wang	01/1/05-12/31/07	$121,331	Assessment of Cloudy Condition within Aqua/AIRS Footprint by combining Aqua/MODIS Measurements and Ground-based Lidar and Radar Measurements.
DOE	ARM	Wang	07/01/05-6/30/06	$36,000	Using Radar, Lidar and Radiometer Measurements to Classify Cloud Type and Study Middle-level Cloud Properties
NASA/GSFC	Lidar simulation model	Wang	06/06/06-06/05/08	$13,733	NASA DEVELOPING A LIDAR SIMULATION MODEL WITH THE GCE MODEL RESULTS AS INPUTS
NASA	CloudSat	Wang	08/2007-07/2010	$300,000	Study Global Ice Cloud and Arctic Mixed-phase Cloud Microphysical Properties by Combining CloudSat Radar, CALIPSO Lidar, and MODIS Measurements.
DOE	ARM	Wang	07/1/06-06/30/10	$366,000	Using Radar, Lidar and Radiometer Measurements to Classify Cloud Type and Study Middle-level Cloud Properties
NSF	ATMOS	Vali	3/07-3/10	$465,000	Diagnoses of Ice Initiation in Clouds (1.2 month for Wang)
NSF	CAREER	Wang	05/2007-4/2013	$587,206	Developing New Airborne Cloud, Aerosol and Water Vapor Observation Capabilities by Synergizing Remote Sensors and in Situ Probes on the University of Wyoming King Air
NASA	CloudSat/CALIPSO	Wang	9/2010-12/2013	$518,498	Study Global Mixed-phase Cloud Properties by Combining CloudSat Radar, CALIPSO Lidar, and MODIS Measurements
NSF	CAMPS	Wang as UW PI	5/2010 – 4/2014	$179,102	Collaborative Research: Colorado Airborne Multi-Phase Cloud Study (CAMPS). Project PI-Linnea Avallone, CU
NSF	King Air	Al Rodi, Co-PI Wang	1/2009–6/2014	$5,954,664	King Air National Facility
NSF	ICE_T	Wang, Co-PI: Snider and Leon	12/2010-11/2014	$538,084	Exploiting synergies between remote sensing and in situ measurements during ICE-T to better understand ice generation in tropical clouds
NASA/JPL	CloudSat	Wang	4/2005-9/2015	$1,456,697	CloudSat Level 2 Radar-only (2B-CLDCLASS) and Combined Radar-Lidar (2B-CLDCLASS-LIDAR) Cloud Scenario Classification Standard Product Improvement and Validation and the Enhanced Ice Microphysical Product Development.
NASA	EPSCoR	Johnson Co-I: Geerts, Wang, Haimov,	9/2013-8/2016	$750,000	Research Capacity Building using a new Dual-frequency Airborne Radar System in support of NASA GPM and ACE Ground Validation Experiments

		Wechsler			
DOE	ASR	Wang	9/2011–8/2016	$537,799	Improving Mixed-phase Cloud Parameterization in Climate Model with the ACRF Measurements
NASA	CloudSat/ CALIPSO	Wang	8/2013-8/2017	$521,131	Mixed-phase cloud property and process study with CloudSat, CALIPSO and other A-train measurements
NSF	MRI	Wang	9/2013-8/2017	$1,719,971 (1.21 million form NSF)	Development of a Multi-function Airborne Raman Lidar (MARLi) for Atmospheric Process Studies
NSF	PECAN	Geerts, Co-PI: Parish, Wang	1/15-12/18	$750,000	Airborne measurements of the nocturnal low-level jet and wave disturbances in the stable boundary layer in PECAN
NSF	King Air	Rodi, Co-PI: Wang, French	1/14-12/18	$9,350,100	University of Wyoming King Air as a National Facility
DOE	ASR	Liu	6/1/2015 – 5/30/2018	$560,000	Improving Predictability of Mixed-Phase Clouds and Aerosol Interactions in the Community Earth System Model (CESM) with ARM Measurements
NASA	PBL	PI- Z. Wang	11/2019 – 10/2020	$98,939	A Proposal to Participate in the Decadal Survey Incubation Study Team of Planetary Boundary Layer
NSF	BB-Flux	Z. Wang	5/2018-4/2021	$49,972	Biomass burning flux measurements of trace gases and aerosols (BB-FLUX) using SOF on the Wyoming King Air (sub-contract)
DOE	ASR	PI X. Liu, Co-I Z. Wang	09/1/2018 – 8/31/2022	$588,188	Improving GCM Predictability of Mixed-Phase Clouds and Aerosol Interactions at High Latitudes with ARM Observations

Supported – external – current

Agency	Reference	PI	Period of Funding	Amount Requested	Title
NASA/ JPL	CloudSat	Z. Wang	10/2015 -9/2023	**$**1,200,000	CloudSat Level 2 Radar-only (2B-CLDCLASS) and Combined Radar-Lidar (2B-CLDCLASS-LIDAR) Cloud Scenario Classification Standard Product Improvement and Validation and the Enhanced Ice Microphysical Product Development.
NSF	MSRI	CU PI-Zhien Wang, Co-PIs: R. Hardesty and J. Lundquist	10/19 – 9/2024	$ 2,883,672 (CU part)	The Next Generation Wyoming King Air Atmospheric Research Aircraft
DOE	ASR	PI Z. Wang, Co-PI L. Xue	10/2019 – 9/2022	$618,309	Understanding Processes Controlling the Temporal and Spatial Variations of PBL Structures over the ARM SGP Site
NSF	SWEX	CU PI Wang	10/2019 1/2023	$135,841	Collaborative Research: Sundowner Winds Experiment in Santa Barbara, CA (SWEX)
NSF	VORTEX -SE	PI- Z. Wang, Co-PIs: M. Xue, and C. Ziegler	6/2019 – 6/2022	$387,711	Collaborative Research: Observing and Understanding PBL Heterogeneities and Their Impacts on Tornadic Storms During VORTEX-SE 2018 Field Experiment
NASA	AQUA	Z. Wang	11/2018 – 10/2022	$582,580	Understanding the seasonal and interannual variations of tropical convective cloud systems with multi-satellite data fusion
NASA	CCST	Z. Wang	10/2022 -9/2025	$575,307	Characterizing Polar Mixed-phase Cloud Properties and Variations with CloudSat, CALIPSO, and Other A-Train Satellite Measurements
ONR	TCRI	Z. Wang	8/2021- 8/2024	$370,351	Observing Atmospheric Boundary Layer Property and Processes Associated Rapid Intensification in TCs
NSF	CAESAR	Z. Wang Co-PI: John Ca	**Conditionally funded depending on C-130 availability in 2023**	$814,997	CAESAR: Characterizing and Understanding Atmospheric Boundary Layer Fluxes, Structure and Cloud Property Evolution in Arctic Cold Air Outbreaks.
NASA	ARCSIX	Z. Wang	4/2022- 6/2027	$452,620	Observing Arctic cloud, moisture and aerosol structures during ARCSIX

STUDENT THESES AND DISSERTATIONS SUPERVISED

Current
MS students:

PhD students:
Kang Yang
Guo Luo
James Kasic
Ethan Murry
Brennan Dettmann

Graduated
MS students: Loknath Adhikari (Summer 2007)
Kyoko Taniguchi (Fall 2007)
Nicole Hasting (Fall 2009)
Liran Peng (Summer 2013)
Sujan Khanal (Fall 2013)
Rebecca Marie Pauly (Summer 2015)
Kang Yang (Fall 2017)
Guo Luo (Fall 2017)

PhD students: Ming Zhao (Summer 2011)
Damao Zhang (Fall 2012)
Loknath Adhikari (Fall 2012)
Jing Yang (Summer 2018)
Sujan Khanal (Spring 2019)

POSTDOCTORAL /RESEARCH ASSOCIATES

Dong Liu	September 2006-August 2009
Miao Qun	January 2007- December 2009
Dave Leon	2008-2011
Renmin Yuan	September 2010-October 2010
Bo Liu	August 2009-July 2010
Loknath Adhikari	December 2012- April 2013
Tao Luo	September 2010- October 2016
XueBin Li	March 2013 –March 2014
Qiang Zhao	May 2013- October 2013
Damao Zhang	December 2012- January 2017
Meg Mahat	September 2013- Feburary 2014
Decheng Wu	January 2015- January 2017
Hailing Xie	October, 2020- present
Yufei Chu	October, 2020- present

PROFESSIONAL AND SCIENTIFIC SERVICE

Membership
- American Meteorological Society (AMS)
- American Geophysical Union

Professional committee service
- NASA AOS/ACCP mession (pre-phase A) algorithm working group member (2021-22).
- NASA PBL incubation study team (2020-21)
- Member, The NSF ICE-T experiment steering committee (2010-2013)

- Member, Committee on Laser Atmospheric Studies, American Meteorological Society (2011-now)
- Member, ARM /ASR Science Team (2003 –current)
- Member, NASA CloudSat/CALIPSO Science team (2007-Current)
- Participant, UCAR/NCAR Junior Faculty Forum on Future Scientific Directions of Atmospheric Water Cycle, Boulder, Colorado, June 18-20, 2003
- Member, NASA CloudSat algorithm developing team (2002- current)
- Section co-chair, Third Symposium on Lidar Atmospheric Applications in the 87th AMS annual meeting.

Journal Editor:

- FRONTIERS IN REMOTE SENSING, SPECIALTY CHIEF EDITOR LIDAR SENSING (2020-)
- Journal of Meteorological Research (2016-)

Journal referee service (since 2004)

- 2004: *J. Appl. Meteor*. (2), *Mon. Wea. Rev*. (1)
- 2005: J. Appl. Meteor. (1), Geophysical Res. Lett. (1), J. Geophys. Res. (3)
- 2006: J. Appl. Meteor. (1), Geophysical Res. Lett. (1), J. Geophys. Res. (2), *J. Atmos. Sci.* (1), *J. Climate* (1), *J. Atmos. Oceanic Tech.* (1)
- 2007: J. Appl. Meteor. (1), Geophysical Res. Lett. (1), J. Geophys. Res. (2), Tellus B (1)
- 2008: J. Geophys. Res. (3), J. Appl. Meteor. (2), *J. Atmos. Oceanic Tech.* (1), *J. Atmos. Oceanic Tech.* (1), Transactions of Geoscience and Remote Sensing (1)
- 2009: J. Geophys. Res. (5), J. Appl. Meteor. (1), J. Climate (1)
- 2010: J. Geophys. Res. (3), J. Atmos. Sci. (1), ACPD(1), QJRMS(1), J. Climate (1), Remote Sensing (1)
- 2011: J. Geophys. Res. (6), J. Atmos. Sci. (1), QJRMS(1), J. Appl. Meteor. (1)
- 2012: J. Geophys. Res. (4), J. Atmos. Sci. (1), J. Atmos. Oceanic Tech. (1), Optical Express (1)
- 2013: J. Geophys. Res. (3), Geophysical Res. Lett. (1), Journal of Atmospheric and Solar-Terrestrial Physics (1), J. Appl. Meteor. Climate (1)
- 2014: J. Geophys. Res. (4), Geophysical Res. Lett. (2), , J. Appl. Meteor. Climate (2), ACPD(1), QJRMS(1)
- 2015: J. Geophys. Res. (6), Geophysical Res. Lett. (2), ACP(2), Nature (1), J. Atmos. Sci. (2)
- 2016: total 7
- 2017: total 6
- 2018: total 8
- 2019: total 9
- 2020: total 8
- 2021: total 10

Book review service (since 2004)

- Principles of Atmospheric Physics, Jones and Bartlett Publishers

Proposal reviewer service (since 2004)

- Individual proposal reviewing for NASA, DOE, NSF, NOAA, NERC UK
- NASA Measures review panel, August 21-23, 2012
- DOE ASR review panel, July 16-18, 2013
- NASA Terra-Aqua atmospheres panel, September 23-26, 2013
- NASA EVI-4 reviewer panel, 2017
- NASA EVI-4 reviewer panel, 2018
- NASA DISCOVR panel 2018
- NASA ESROGSS panel 2020
- NASA GPM panel 2021

Department:

- Graduate Advisor (since 2005)

- Graduate Student Coordinator (2005-2010)
- Remote Sensing group leader (since 2006)
- The chief scientist of Wyoming King Air national facility (since 2009)
- Chair of departmental head selection committee (2016)
- Poster conference committee (2018-19)
- Graduate admissions committee (2018-)
- Technology committee (2018- , chair 2020-)
- Prof. Katja Friedrich's Promotion (2021)

College/University:

- College Academic Programs Committee (2005-2009)
- College Technology Committee (2005-2009)
- College Graduate Studies and Research Committee (2005-2012)
- College Tenure and Promotion Committee (2009-2012, 2014-2018)
- Faculty Council (Since June 2013-2018)
- College Chair of the Sam D. Hakes Outstanding Graduate Research and Teaching Award selection committee (2018)
- The Executive Advisory Council, the Graduate School (2021-)