

## Curriculum Vitae

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University of Colorado  
Laboratory for Atmospheric and Space Physics  
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### Education

B.S., Meteorology, Pennsylvania State University, 1983  
M.S., Atmospheric Science, University of Arizona, 1986  
Ph.D., Atmospheric Science, University of Arizona, 1989

### Professional Experience

Professor, University of Colorado, Laboratory for Atmospheric and Space Physics, Department of Atmospheric and Oceanic Science, 2009-present  
LASP Assistant Director for Science, Earth Atmosphere, 2020-2021  
Director, LASP/NASA Goddard Sun-Climate Research Center, 2010-present  
Associate Professor, University of Colorado, Laboratory for Atmospheric and Space Physics, Department of Atmospheric and Oceanic Science, 2004-2009  
Radiation Group Leader, Atmospheric Physics Branch, NASA Ames Research Center, 1994-2004  
Lecturer, San Jose State University, Department of Meteorology, 2000-2003  
Research Scientist, Atmospheric Physics Branch, NASA Ames Research Center, 1989-1994  
Research Assistant, Institute of Atmospheric Physics, University of Arizona, 1983-1989

### Professional Activities

Member, National Academies of Sciences, Engineering, and Medicine Committee on Earth Sciences and Applications from Space, 2022-present  
President of the IAMAS International Radiation Commission (IRC), 2020-present  
Bureau Member, Scientific Committee on Solar-Terrestrial Physics (SCOSTEP), 2019-present.  
Deputy Secretary General, International Association of Meteorology and Atmospheric Sciences (IAMAS), 2015-2018  
Secretary/Vice-president of the IAMAS International Radiation Commission (IRC), 2012-2020  
Member, Committee on *The Effects of Solar Variability on Earth's Climate: A Workshop, Space Studies Research Board*, National Research Council, 2011-2012  
Principal Investigator, NASA *Libera* Mission, 2020-present  
Principal Investigator, CLARREO Pathfinder Mission, 2016-present  
Principal Investigator, NASA Total and Spectral Solar Irradiance Sensor (TSIS), 2005-2020  
Member, NASA Living With a Star Targeted Research & Technology Program Steering Committee, 2011-2015.  
Member, IAMAS International Radiation Commission (IRC), 2009-present  
Member, Climate Absolute Radiance and Refractivity Observatory Decadal Survey Mission Science Working Group, 2008-2016

Member, Aerosol, Cloud, and Ecosystem (ACE) Decadal Survey Mission Science Working Group, 2008-present  
Member of the European Fleet for Airborne Research (EUFAR), 2006-present.  
Member, National Research Council Space Studies Board (SSB), Committee on Large Optical Systems in Space, 2005-2007  
Member, Steering Committee, Achieving Satellite Instrument Calibration for Climate Change, ASIC3, 2005-2007  
Member, Review Panel for the Marine Meteorology Division of Naval Research Laboratory Monterey, Science and Technology Program, 2006  
Member, Science Program Organizers, SORCE Science Meeting, 2003, 2006  
Member, Solar Radiation and Climate Experiment (SORCE), 1999-present  
Member, Triana/DSCOVR Science Team, 1998-present  
Member, NASA New Investigator Program NRA review panel, 2004, 2012.  
Member, NASA Radiation Science Program NRA review panel, 2003  
Mentor, ARM Shortwave Spectrometer, 2001-present  
Member, Atmospheric Radiation Measurement Program (ARM) Science Team, 1997-present  
Member, The Cirrus Regional Study of Tropical Anvils and Cirrus Layers - Florida Area Cirrus Experiment (CRYSTAL-FACE) Science Team, 2001-present  
Member, Southern African Regional Science Initiative –2000 Science Team  
Member, Chapman Conference on Atmospheric Absorption of Solar Radiation Program Committee, 2001  
Member, Atmospheric Radiation Measurement (ARM) Enhanced Shortwave Experiment (ARESE) II Science Team  
Member, Total Solar Irradiance Mission Science and Technical Approach evaluation panel, 1998  
Member, International Global Atmospheric Chemistry (IGAC), Focus on Atmospheric Aerosols, Direct Aerosol Radiative Forcing Activity, 1995-1999  
Member, First International Satellite Cloud Climatology Program (ISCCP) Regional Experiment, Phase III (FIRE III) Science Team, 1994-2000  
Science Team Leader, International Global Aerosol Program (IGAP), Radiative Effects of Aerosols, 1993

### **Professional Honors**

Elected President of the IAMAS International Radiation Commission (IRC), 2020  
Elected IAMAS liaison to SCOSTEP, 2019  
American Meteorological Society Fellow, 2018  
Elected Vice-president of the IAMAS International Radiation Commission (IRC), 2016  
NASA Group Achievement Award, TSIS, 2018  
NASA Group Achievement Award, ATTREX, 2016  
NASA Langley Henry J.E. Reid Award, 2015  
NASA Group Achievement Award, SORCE Return to Science, 2014  
NASA Robert H. Goddard Exceptional Achievement Award, LASP TCTE Team, 2013  
NASA Group Achievement Award, SEACRS, 2013  
Elected Secretary of the International Radiation Commission (IRC), 2012  
NASA Group Achievement Award, CLARREO Mission Concept Team, 2012  
Humboldt Research Award, Alexander von Humboldt Foundation, 2011  
NASA Group Achievement Award, Glory Project Team, 2011  
Elected to the International Radiation Commission (IRC), 2009

NASA Group Achievement Award, ARCTAS, 2009  
NASA Group Achievement Award, TC4 Science Team, 2008  
NASA Group Achievement Award, ICTE, 2007  
NASA Group Achievement Award, INTEX-NA Science Team, 2005  
NASA Group Achievement Award, CRYSTAL-FACE Science Team, 2003  
NASA Exceptional Scientific Achievement Medal, 1997  
NASA Group Achievement Award, FIRE Phase II Science and Operations Team, 1997  
NASA Ames Honor Award, Scientist, 1995  
NASA Ames Outstanding Performance Award, 1990

### Peer Reviewed Publications

- White M. G., K. Heuerman, P. S. Shaw, M. S. Stephens, N. A. Tomlin, C. Yung, J. H. Lehman, J. Rice, J. Rutkowski, C. Straatsma, P. Pilewskie, E. Richard and D. Harber, Decadal validation of the LASP TRF cryogenic radiometer by NIST, and establishment of a replacement room temperature standard. 2022 *Metrologia*, 59, 065006 DOI 10.1088/1681-7575/ac89f5 (2022).
- Shea, Y. L., Lukashin, C., Liu, X., Feldman, D. R., & Pilewskie, P., An entropy framework for evaluating reflectance observations for climate studies. *Earth and Space Science*, 9, e2019EA000795. <https://doi.org/10.1029/2019EA000795> (2022).
- Stephens, M., C. S. Yung, N. A. Tomlin, D. Harber, C. Straatsma, A. Dan, E., Freire Antunes, P. Pilewskie, O. Coddington, J. H. Lehman, Extremely broadband calibrated bolometers and microbolometer arrays for Earth radiation budget measurements, *Proc. SPIE 12234, Infrared Sensors, Devices, and Applications XII*, 1223403. doi: 10.1117/12.2633044 (2022)
- Cochrane, S. P., Schmidt, K. S., Chen, H., Pilewskie, P., Kittelman, S., Redemann, J., LeBlanc, S., Pistone, K., Segal Rozenhaimer, M., Kacenelenbogen, M., Shinozuka, Y., Flynn, C., Ferrare, R., Burton, S., Hostetler, C., Mallet, M., and Zuidema, P.: Biomass burning aerosol heating rates from the ORACLES (ObseRVations of Aerosols above CLouds and their intEractionS) 2016 and 2017 experiments, *Atmos. Meas. Tech.*, 15, 61–77, <https://doi.org/10.5194/amt-15-61-2022> (2022).
- Coddington, O. M., Richard, E. C., Harber, D., Pilewskie, P., Woods, T. N., Chance, K., et al., The TSIS-1 Hybrid Solar Reference Spectrum. *Geophysical Research Letters*, 48, e2020GL091709. <https://doi.org/10.1029/2020GL091709> (2021).
- Jing, X., X. Huang, X. Chen, D.L. Wu, P. Pilewskie, O. Coddington, and E. Richard, Direct Influence of Solar Spectral Irradiance on the High-Latitude Surface Climate *Journal of Climate* 34, 10; 10.1175/JCLI-D-20-0743.1(2021).
- Wright, L. A., B. C. Kindel, P. Pilewskie, N. P. Leisso, T. U. Kampe and K. S. Schmidt, Below-Cloud Atmospheric Correction of Airborne Hyperspectral Imagery Using Simultaneous Solar Spectral Irradiance Observations, *IEEE Transactions on Geoscience and Remote Sensing*, 59, 2, 1392-1409, , doi: 10.1109/TGRS.2020.3003209 (2021).
- Riihimaki LD, Flynn C, McComiskey A, Dan L, Blanchard Y, Chiu JC, Feingold G, Feldman DR, Gristey JJ, Herrera C, Hodges G, Kassianov E, LeBlanc SE, Marshak A, Michalsky JJ, Pilewskie P, Schmidt S, Scott RS, Sheal Y, Thome K, Wagener KR, and Wielicki B, The Shortwave Spectral Radiometer for Atmospheric Science: Capabilities and Applications from the ARM User Facility. *Bulleten of the American Meteorological Society*, 102 (3), ): E539-E554 (2021).
- Redemann, J., Wood, R., Zuidema, P., Doherty, S. J., Luna, B., LeBlanc, S. E., Diamond, M. S., Shinozuka, Y., Chang, I. Y., Ueyama, R., Pfister, L., Ryoo, J.-M., Dobracki, A. N., da Silva, A. M., Longo, K. M., Kacenelenbogen, M. S., Flynn, C. J., Pistone, K., Knox, N. M., Piketh, S. J., Haywood, J. M., Formenti, P., Mallet, M., Stier, P., Ackerman, A. S., Bauer, S. E., Fridlind, A. M., Carmichael, G. R., Saide, P. E., Ferrada, G. A., Howell, S. G., Freitag, S., Cairns, B., Holben, B. N., Knobelspiesse, K. D., Tanelli, S., L'Ecuyer, T. S., Dzambo, A. M., Sy, O. O., McFarquhar, G. M., Poellot, M. R., Gupta, S., O'Brien, J. R., Nenes, A., Kacarab, M., Wong, J. P. S., Small-Griswold, J. D., Thornhill, K. L., Noone, D., Podolske, J. R., Schmidt, K. S.,

- Pilewskie, P., Chen, H., Cochrane, S. P., Sedlacek, A. J., Lang, T. J., Stith, E., Segal-Rozenhaimer, M., Ferrare, R. A., Burton, S. P., Hostetler, C. A., Diner, D. J., Seidel, F. C., Platnick, S. E., Myers, J. S., Meyer, K. G., Spangenberg, D. A., Maring, H., and Gao, L.: An overview of the ORACLES (ObseRvations of Aerosols above CLouds and their intEractionS) project: aerosol–cloud–radiation interactions in the southeast Atlantic basin, *Atmos. Chem. Phys.*, 21, 1507–1563, <https://doi.org/10.5194/acp-21-1507-2021> (2021).
- Chen H, Schmidt S, King MD, Wind G, Bucholtz A, Reid EA, Segal-Rozenhaimer M, Smith WL, Taylor PC, Kato S, et. al. The effect of low-level thin arctic clouds on shortwave irradiance: evaluation of estimates from spaceborne passive imagery with aircraft observations. *Atmos. Meas. Tech.*, 14, 2673–2697, (2021).
- Gristey, J.J., Su, W., Loeb, N.G. Vonder Haar, T.H., Tornow, F., Schmidt, K.S. Hakuba, M.Z. Pilewskie, P., Russell, J.E., Shortwave Radiance to Irradiance Conversion for Earth Radiation Budget Satellite Observations: A Review. *Remote Sens.*, 13, 2640. <https://doi.org/10.3390/rs13132640>, (2021)
- Cochrane SP, Schmidt KS, Chen H, Pilewskie P, Kittelman S, Redemann J, LeBlanc S, Pistone K, Kacenelenbogen M, Rozenhaimer MS, et. al., Empirically derived parameterizations of the direct aerosol radiative effect based on ORACLES aircraft observations. *Atmos. Meas. Tech.*, 14, 567–593, <https://doi.org/10.5194/amt-14-567-2021> (2021).
- Mauceri, S., P. Pilewskie, T. Woods, S. Béland, and E. Richard, Intercomparing solar spectral irradiance from SORCE SIM. *Earth and Space Science*, 7, e2019EA001002. <https://doi.org/10.1029/2019EA001002> (2020).
- Stephens G, Freeman A, Richard E, Pilewskie P, Larkin P, Chew C, Tanelli S, Brown S, Posselt D, Peral E, The Emerging Technological Revolution in Earth Observations. *Bull. Amer. Meteor. Soc.*, 101, 3; 10.1175/BAMS-D-19-0146.1 (2020).
- Richard E., D. Harber, O. Coddington, G. Drake, J. Rutkowski, M. Triplett, P. Pilewskie, and Woods T. SI-traceable Spectral Irradiance Radiometric Characterization and Absolute Calibration of the TSIS-1 Spectral Irradiance Monitor (SIM). *REMOTE SENSING*. 12 (11): ARTN 1818. (2020).
- Mauceri S., E. Richard, P. Pilewskie, D. Harber, O. Coddington, S. Beland, M. Chambliss, S. Carson, Degradation Correction of TSIS SIM. *SOLAR PHYSICS*. 295 (11): ARTN 152. (2020).
- Mauceri, S., O. Coddington, D. Lyles, and P. Pilewskie, Neural Network for Solar Irradiance Modeling (NN-SIM), *Sol. Phys.* 294 (11) (2019).
- Mauceri S., B. Kindel, S. Massie, P. Pilewskie, Neural network for aerosol retrieval from hyperspectral imagery, *Atmos. Meas. Tech.*, 12 (11), 6017-6036 (2019).
- Cochrane S.P., K.S. Schmidt, H. Chen, P. Pilewskie, S. Kittelman, J. Redemann, S. LeBlanc, K. Pistone, M. Kacenelenbogen, M.S. Rozenhaimer, "Above-cloud aerosol radiative effects based on ORACLES 2016 and ORACLES 2017 aircraft experiments." *Atmos. Meas. Tech.*, 12 (12), 6505-6528 (2019).
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- Stephens G, Freeman A, Richard E, Pilewskie P, Larkin P, Chew C, Tanelli S, Brown S, Posselt D, Peral E, The Emerging Technological Revolution in Earth Observations. *Bull. Amer. Meteor. Soc.*, BAMS-D-19-0146.1. (2019).
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- Kren AC, Pilewskie P & Coddington O. Where does Earth's atmosphere get its energy? *J. Space Weather Space Clim.*, 7, A10, DOI: 10.1051/swsc/2017007. (2017)
- Pilewskie, Peter, Review of *Physics of Radiation and Climate*, *American Journal of Physics* 84, 566, doi: 10.1119/1.4948405 (2016).
- Coddington, O., J. L. Lean, P. Pilewskie, M. Snow, and D. Lindholm, A Solar Irradiance Climate Data Record, *Bull. Amer. Meteor. Soc.*, 97, 1519–1539, 1265-1282, DOI: 10.1175/BAMS-D-14-00265.1 (2016).
- Song, S., Schmidt, K. S., Pilewskie, P., King, M. D., Heidinger, A. K., Walther, A., Iwabuchi, H., Wind, G., and Coddington, O. M.: The spectral signature of cloud spatial structure in shortwave irradiance, *Atmos. Chem. Phys.*, 16, 13791-13806, doi:10.5194/acp-16-13791-2016 (2016).
- Kren, A. C., D. R. Marsh, A. K. Smith, and P. Pilewskie, Wintertime Northern Hemisphere Response in the Stratosphere to the Pacific Decadal Oscillation Using the Whole Atmosphere Community Climate Model. *J. Climate*, 29, 1031–1049, doi: 10.1175/JCLI-D-15-0176.1. (2016).
- Stephens, G. L., D. O'Brien, P. J. Webster, P. Pilewskie, S. Kato, and J.-I. Li, The albedo of Earth, *Rev. Geophys.*, 53, doi:10.1002/2014RG000449 (2015).
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- Roberts, Y. L., P. Pilewskie, D. R. Feldman, B. C. Kindel, and W. D. Collins, Temporal variability of observed and simulated hyperspectral reflectance, *J. Geophys. Res. Atmos.*, 119, 10,262–10,280, doi:10.1002/2014JD021566 (2014).
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### **Selected Invited Lectures, Extended Abstracts, Conference Proceedings, and Workshop Proceedings**

Pilewskie, Peter, Libera: Continuity of Earth's Radiation Budget Climate Data Record. NIST Boulder Seminar. 18 Dec. 2020.

Pilewskie, P., M. Hakuba and the Libera Science Team, Libera and Continuity of the ERB Climate Data Record. AGU Fall Meeting, 17 December 2020.

Pilewskie, Peter, New Earth-climate Measurements from Space: the Libera Mission. LASP Public Lecture. 11 Nov. 2020.

Pilewskie, Peter, Libera: Continuity of Earth's Radiation Budget Climate Data Record. LASP Seminar, 27 Aug. 2020

Pilewskie, Peter, Libera: Continuity of Earth's Radiation Budget Climate Data Record. ATOC Colloquium, 30 Oct. 2020.

Pilewskie, P., Libera and Continuity of the ERB Climate Data Record. CERES Science Team Meeting. 29 April 2020.

Pilewskie, Peter, The Sun and Earth's Climate from the Maunder Minimum to the Satellite Era, 17 Dec. 2019, Aristotle University, Thessaloniki, Greece

Pilewskie, Peter, and Steffen Mauzeri, Advances in Remote Sensing and Climate Monitoring from Shortwave Hyperspectral Observations, AGU Fall Meeting, San Francisco, 9-13 December 2019.

Pilewskie, Peter, The Sun and Earth's Climate from the Maunder Minimum to the Satellite Era, 6 Mar. 2019, Colorado State University, Atmospheric Sciences Colloquium.

Pilewskie, Peter, New Earth Science Missions from Space: Opportunities and Challenges, 21 Mar. 2019, University of Arizona, Earth Dynamics Observatory Colloquium

Pilewskie, Peter, The Sun and Earth's Climate from the Maunder Minimum to the Satellite Era, 22 Mar. 2019, University of Arizona, Hydrology and Atmospheric Sciences Colloquium

Pilewskie, Peter, Advances in remote sensing and climate monitoring from shortwave hyperspectral observations, 6 November 2018, Seoul National University, Seoul, Republic of Korea.

Pilewskie, Peter Sebastian Schmidt, Odele Coddington, and Erik Richard, Advances in remote sensing and climate monitoring from shortwave hyperspectral observations, American Geophysical Union Fall Meeting, 10–14 December 2018, Washington, DC.

Pilewskie, Peter, Greg Kopp, Erik Richard, Odele Coddington, Steffen Mauzeri, Tom Sparn and Tom Woods, TSIS-1 and continuity of the total and spectral solar irradiance climate data record, European Geosciences Union General Assembly 2018, Vienna, Austria, 9-13 April 2018.

Pilewskie, Peter, CLARREO Pathfinder on the International Space Station, 2017 Joint IAPSO-IAMAS-IAGA Assembly, 27 Aug. - 1 Sep., Cape Town, South Africa.

Pilewskie, Peter, Recent progress and remaining challenges in the measurement of atmospheric radiation. International Workshop on Atmospheric Scattering, Radiation and Remote Sensing, 120th anniversary of Zhejiang University, China. 26-28 June, 2017.

Pilewskie, Peter and Tom Sparn, Climate Monitoring from the International Space Station: TSIS and CLARREO Pathfinder. ISS R&D Conference, Washington DC, 17-20 July 2017.

Pilewskie, Peter, Sebastian Schmidt, Odele Coddington, and Greg Kopp, The Earth Climate Hyperspectral Observatory: Advances in Cloud and Aerosol Remote Sensing, European Geosciences Union General Assembly 2015, Vienna, Austria, 12-17 April 2015.

Pilewskie, Peter, An Overview of the Intra-atmospheric Chain in Sun-Earth-Climate Connections, SCOSTEP 13th Solar-Terrestrial Physics Symposium, Xi'An, China, 12-18 October 2014.

- Pilewskie, Peter. Information Content in Remote Sensing: A Perspective on Twomey's Influence on Present and Future Observations, 14th Conference on Atmospheric Radiation, Boston, MA, 7-11 July 2014.
- Pilewskie, P., Monitoring Earth's Climate with Shortwave Hyperspectral Reflectance, Gordon Research Conference on Radiation and Climate, Colby-Sawyer College, 8-11 July 2013.
- Pilewskie, P., TSIS: The Total and Spectral Solar Irradiance Sensor, 93rd Meeting of the American Meteorological Society, Third Conference on Transition of Research to Operations, 6-10 January 2013, Austin, TX.
- Pilewskie, P., An Overview of Historical, Current, and Planned Solar Irradiance Measurements, 4th International HEPPA Workshop, National Center for Atmospheric Research, 9-12 October 2012, Boulder, CO.
- Pilewskie, P., and T. Woods, Current and Future Measurements of Total and Spectral Solar Irradiance by NASA and NOAA, TOSCA Workshop on SSI Variability and Climate Modeling, Berlin, Germany, 14-16 May 2012.
- Pilewskie, P., Solar Spectral Irradiance and Climate, Boulder Solar Day, NCAR HOA, 18 March 2011.
- Pilewskie, P., Measurements of Solar Spectral Irradiance, International Space Studies Institute, Observing and modeling Earth's energy flows, Berne, 10-14 Jan., 2011.
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- Pilewskie, P., Input to the Climate System: A New Understanding of Solar Irradiance from the Solar Radiation and Climate Experiment, International Radiation Symposium, 3-8 August 2008, Foz do Iguaçu, Brazil.
- Pilewskie, P., S. Schmidt, O. Coddington, B. Kindel, P. McBride, Advances in quantifying the spectral radiative properties of clouds and aerosols from airborne field studies, IEEE International Geoscience & Remote Sensing Symposium, July 6-11, 2008, Boston.
- Pilewskie, P., B. Kindel, K.S. Schmidt, The Impact of Black Carbon on Cloud Radiative Forcing, American Geophysical Union Fall Meeting, 10-14 December 2007, San Francisco.
- Pilewskie, P., K.S. Schmidt, O. Coddington, R. Bergstrom, J. Redemann, Advances in Quantifying the Radiative Effects of Aerosol Particles on Climate from Airborne Field Studies, American Geophysical Union Fall Meeting, 10-14 December 2007, San Francisco.
- Pilewskie, P., Hyperspectral Solar Spectral Measurements and Applications, The Fourier Transform Spectroscopy and Hyperspectral Imaging and Sounding of the Environment Topical Meeting, February 12-15, 2007, Santa Fe, NM.
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- Pilewskie, P., SORCE, Glory, TSIS and the Importance of Solar Spectral Variability, Sun-Climate Center Seminar Series, NASA Goddard Space Flight Center, May, 2006.

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- Pilewskie, P., and Francisco P.J. Valero, Ground-Based Remote Sensing During FIRE IFO II. Extended abstracts, FIRE Cirrus Science Conference, Breckenridge, CO. June 14-17, 1993.
- Pilewskie P., Ground-based remote sensing of particle size in ice clouds, Extended abstracts, Amer. Meteor. Soc. Seventh Conf. on Atmospheric Radiation. San Francisco. 1990.
- Pilewskie P., Radiative Properties of Liquid Water and Ice Clouds, Annual Meeting of the Optical Society of America. Boston, MA. 1990.
- Pilewskie, P., and S. Twomey, 1986: Cloud spectral reflectance in the near-infrared. Extended abstracts, Amer. Meteor. Soc. Sixth Conf. on Atmospheric Radiation. Williamsburg, VA. 1986.

## **Contributions to National Academy of Science Decadal Survey on Earth Observations**

### **2017**

- Pilewskie, Peter, et al., Continuing the Total and Spectral Solar Irradiance Data Record: Response to the NAS 2017-2027 Decadal Survey RFI-2 Earth Science Theme: Climate Variability

### **2007**

- Hansen, J.E., M. I. Mishchenko, L.D. Travis, R. Burg, Y.J. Kaufman, B. Cairns, G. Rottman, G. Kopp, P. Pilewskie, and V. Martins: NASA Glory Mission (2005)
- Wielicki, B., K. Priestley, P. Pilewskie, J. Harder, F. Valero, J. Rice, J. Anderson, M. Mlynczak, J. Harries, W. Wiscombe, D. Siegel, C. McClain, T. Stone, T. Karl, J. Bates, K. Trenberth, and B. Barkstrom: Climate Calibration Observatory: NIST in Orbit (2005)

## Contributions to National Academy of Science Decadal Strategy for Solar and Space Physics

Pilewskie, P., G. Kopp, E. Richard, R. Cahalan, and W. F. Denig, The Total and Spectral Solar Irradiance Sensor: Response to the National Academy of Science Decadal Strategy for Solar and Space Physics (2010).

### Field Experiments (*participated on aircraft and/or ground-based platforms*)

Kuwait Oil Fire Experiment	1991
Pinatubo Airborne Mission	1991
FIRE II Cirrus Experiment	1991
Arctic Airborne Stratospheric Experiment II (AASE)	1992
Atlantic Stratocumulus Transition Experiment (ASTEX)	1992
Pilot Radiation Observation Experiment (PROBE)	1992
Tropical Ocean Global Atmosphere-Coupled Ocean Atmosphere Response Experiment (TOGA-COARE)	1993
Central Equatorial Pacific Experiment (CEPEX)	1993
Monterey Area Ship Tracks (MAST)	1994
Sulfates, Clouds, and Radiation-California (SCAR-C)	1994
The Arizona Program, <b>Principal Investigator</b>	1995
Subsonic Aircraft: Contrail and Cloud Effects Special Study (SUCCESS), <b>Principal Investigator</b>	1996
ARM Shortwave Intensive Operating Period, <b>Principal Investigator</b>	1997
FIRE III Arctic Cloud Experiment, <b>Principal Investigator</b>	1998
ARM Unmanned Aerospace Vehicle Kauai Experiment, <b>Principal Investigator</b>	1998
ARM Enhanced Shortwave Experiment (ARESE) II, <b>Principal Investigator</b>	2000
Puerto Rico Dust Experiment, <b>Principal Investigator</b>	2000
Southern African Regional Science Initiative -2000, <b>Principal Investigator</b>	2000
Aerosol Characterization Experiment – Asia, <b>Principal Investigator</b>	2001
The Cirrus Regional Study of Tropical Anvils and Cirrus Layers - Florida Area Cirrus Experiment, <b>Principal Investigator</b>	2002
ARM Unmanned Aerospace Vehicle Experiment, <b>Principal Investigator</b>	2002
ARM Aerosol Intensive Operating Period, <b>Principal Investigator</b>	2003
New England Air Quality Study, <b>Principal Investigator</b>	2004
DOE ARM Mixed Phase Arctic Cloud Experiment, <b>Principal Investigator</b>	2004
Intercontinental Chemical Transport Experiment, Megacity Initiative: Local and Global Research Observations, <b>Principal Investigator</b>	2006
Gulf of Mexico Atmospheric Composition and Climate Study, <b>PI</b>	2006
PACific Dust EXperiment (PACDEX), <b>Principal Investigator</b>	2007
Tropical Composition, Cloud and Climate Coupling (TC4) Experiment, <b>PI</b>	2007
Aerosol, Radiation, and Cloud Processes affecting Arctic Climate (ARCPAC), <b>PI</b>	2008
International Chemistry Experiment in the Arctic Lower Troposphere(ICEALOT), <b>PI</b>	2008
Research at the Nexus of Air Quality and Climate Change (CalNex), <b>PI</b>	2010
Airborne Tropical Tropopause Experiment (ATTREX), <b>PI</b>	2011-2013

## Current Funded PI-led Projects

Project Title: Libera  
Involvement: Principal-Investigator  
Funding Agency: NASA  
Period of Performance: 4/15/20-3/20/32  
Total award: \$ 166,846,574

Project Title: CLARREO Pathfinder  
Involvement: LASP Science Principal-Investigator  
Funding Agency: NASA LaRC  
Period of Performance: 10/1/2018 - 9/30/2025  
Total award: \$ 76,643,674

Project Title: Total and Spectral Solar Irradiance Sensor (TSIS) Mission  
Operations and Data Processing  
Involvement: Deputy Principal-Investigator  
Funding Agency: NASA  
Period of Performance: 3/15/18-3/14/23  
Total award: \$16,391,380

Project Title: Total and Spectral Solar Irradiance Sensor-2 (TSIS-2)  
Involvement: Co-Investigator  
Funding Agency: NASA GSFC  
Period of Performance: 8/6/19-3/20/23  
Total award: \$ 25,088,446

Project Title: Understand the Effect of Solar Spectral Irradiance Partition  
between the Visible and near-IR on High-latitude Surface Climate  
through a Bottom-up Mechanism  
Involvement: LASP Principal Investigator  
Funding Agency: NASA Heliophysics Living With a Star  
Period of Performance: 07/01/2021-06/30/2025  
Total award: \$145,002

Project Title: Atmosphere Observing System (AOS) SW Spectrometer (SWS)  
Study Tasks  
Funding Agency: NASA GSFC  
Period of Performance: 1/27/22 - 7/27/22  
Total award: \$124,836

Project Title: International Radiation Commission (IRC) President  
Administrative and Travel Support  
Involvement: PI  
Funding Agency: NASA  
Period of Performance: 10/1/20 - 9/30/24  
Total award: \$80,000



## **University Courses Taught**

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 6020:  
Atmospheric Radiation Seminar, Spring 2022, Fall 2021, Spring 2021, Fall 2020, Fall 2018,  
Fall 2013, Spring 2013, Fall 2012, Fall 2010, Spring 2010, Fall 2009, Spring 2009, Fall 2008,  
Spring 2008, Fall 2007, Fall 2005.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 4710:  
Atmospheric Physics; Spring 2018, Fall 2015, Spring 2014.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 6020: Seminar  
on Making Back of the Envelope and Order of Magnitude Estimations, Spring 2018.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 7500:  
Instrument Lab; Spring 2017, Spring 2011, Spring 2009, Spring 2007.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 4500: Remote  
Sensing; Fall 2017.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 7500:  
Instrument Lab; Spring 2017, Spring 2011, Spring 2009, Spring 2007.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 5235:  
Radiative Transfer and Remote Sensing; Spring 2020, Spring 2016, Spring 2006.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 1050: Weather  
and the Atmosphere; Spring 2015, Spring 2007.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC/ASTR 5560:  
Radiative Processes in Planetary Atmospheres; Fall 2022, Fall 2019, Fall 2014, Fall 2012,  
Spring 2010, Fall 2007, Fall 2004.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC/ASTR 5540:  
Mathematical Methods, Fall 2013.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 6020:  
Atmospheric Radiation Seminar, Fall 2018, Fall 2013, Spring 2013, Fall 2012, Fall 2010,  
Spring 2010, Fall 2009, Spring 2009, Fall 2008, Spring 2008, Fall 2007, Fall 2005.

University of Colorado, Department of Atmospheric and Oceanic Science, ATOC 4900-950,  
Independent Study, Spring 2022, Fall 2021, Summer 2009

San Jose State University, Department of Meteorology, Meteorology 163: Meteorological  
Instruments (lecture and lab). Spring 2003

San Jose State University, Department of Meteorology. Meteorology 10: Weather and Climate;  
Fall 2001, Spring 2001, Spring 2000.

Guest lecturer (one lecture/quarter), Santa Clara University, Physics Department: Introduction to  
Space Physics, 1996-2000

## **Primary Advisor to Graduate Students**

Odele Hofmann, ATOC Ph.D., 2005-2009  
Bruce Kindel, ATOC Ph.D., 2005-2010  
Patrick McBride, ATOC Ph.D., 2006-2012  
Brian Hinde, AERO, 2006-2007 (M.E.)  
Yolanda Roberts ATOC Ph.D., 2008-2012  
Neha Shanbhag, CS M.S., 2007-2009.  
Sam LeBlanc, ATOC Ph.D., 2009-2014.  
Andrew Kren, ATOC Ph.D., 2010-2015.  
Shi Song, ATOC Ph.D., 2010-2014.

Timothy Reid, ATOC Ph.D., 2010-2013.  
Tomoko Koyama, ATOC Ph.D., 2010-2014.  
Logan Wright, ATOC Ph.D, 2013-2018  
Steffen Mauceri, ATOC Ph.D, 2016-2019  
Julia Kent, ATOC M.S., 2016-2019  
Matt Weber, ASEN M.S., 2020-2021  
Mathew Van Den Heever, ASEN Ph.D., 2020-  
Matt Watwood, ATOC Ph.D., 2020-  
Andrew Buggee, ATOC Ph.D., 2020-  
McKenzie Hawkins, ATOC Ph.D., 2023-

### **Advisor to Undergraduate Students**

Fergus Mackenzie, 2021-2022

### **Advisor in the NASA Ames Astrobiology Academy (<http://academy.arc.nasa.gov/>):**

Patrick McKenna, University of Wisconsin, 1997  
Jessica Marquez, Princeton University, 1998  
Michael D. Obland, University of Montana, 1999  
Andrew H. Hock, Colgate University, 2000  
Sam Clanton, John Hopkins University, 2001  
Kelley Atkinson, Embry-Riddle Aeronautical University, 2003

### **Advisor to National Research Council Research Associates**

Dr. Maura Rabbette, Post-Doctoral Fellow, 1997-2000  
Dr. Manfred Wendisch (Institute for Tropospheric Research, Leipzig, Germany), Senior Fellow,  
2003-2004

### **Service Activities**

#### **ATOC**

2022-2023 Committees: ATOC Admissions Committee (Chair SPR 2022), Awards Committee, Colloquium Committee, Weiss Tenure Review (chair)  
2021-2022 Committees: ATOC Admissions Committee, Awards Committee, Weiss Tenure Review (chair)  
2020-2021 Committees: ATOC Admissions Committee (Chair), Awards Committee, ATOC Exam Committee  
2019-2020 Committees: Program Fees Committee (Chair); Awards Committee; ATOC Admissions Committee, ATOC Exam Committee  
2018-2019 Committees: Program Fees Committee (Chair); Awards Committee (Chair); Schmidt Reappointment committee (Chair); ATOC Admissions Committee, ATOC Exam Committee  
2017-2018 Committees: Program Fees Committee (Chair); Chair, ATOC Open Rank Faculty Search Committee; Awards Committee.  
2016-2017 Committees: Course Fees Committee (Chair), Chair, Weis Promotion Committee; Chair, ATOC Open Rank Faculty Search Committee; Awards Committee.

2015-2016 Committees: Course Fees Committee (Chair); Awards Committee, Space Committee; ATOC Climate Dynamics Faculty Search Committee.

2014-2015 Committees: Course Fees Committee (Chair); Comps Committee, Awards Committee, Space Committee; Aerospace Ventures Faculty Search Committee.

2013-2014 Committees: Laboratory and facilities Committee (Chair); Admissions Committee (Chair), Course Fees Committee (chair), Brian Toon Post-tenure review Committee.

2012-2013 Committees: Laboratory and facilities Committee (Chair); Admissions Committee (Chair), B. Toon tenure review committee, Fahey tenure committee.

2011-2012 Committees: Laboratory and facilities Committee (Chair); Course Fees committee

2010-2011 Committees: Laboratory and facilities Committee (Chair); Course Fees committee; PRP Committee (co-Chair)

2009-2010 Committees: Laboratory and facilities Committee (Chair); Course Fees committee; L. Avallone Promotion Committee; PRP Committee (co-Chair)

2008-2009 Committees: Laboratory and facilities Committee (Chair); ATOC Graduate Student Advisor; Course Fees committee; C. Randall Tenure & Promotion Committee

2007-2008 Committees: Laboratory and facilities Committee (Chair); Comprehensive Exam Committee (Chair); ATOC Graduate Student Advisor; Course Fees committee; L. Avallone Tenure Review Committee

2006-2007 Committees: Admissions; Laboratory and facilities Committee (Chair); C. Randall reappointment; ATOC faculty representative for CU NRC Research Doctoral Study Committee; ATOC Graduate Student Advisor; ATOC representative for CSES Director Search Committee

2005-2006 Committees: Admissions; Comprehensive Exams, Distinguished Lecturers (Chair); ATOC Graduate Student Advisor

2004-2005 Committees: Admissions; Distinguished Lecturers (Chair)

## **LASP**

2022-2023: Executive Committee, three promotion committees

2021-2022: Associate Director for Science, Earth Atmosphere; Executive Committee

2020-2021: Associate Director for Science, Earth Atmosphere; Executive Committee

2019-2020: Associate Director for Science, Earth Atmosphere; Executive Committee

2018-2019: Executive Committee, LASP Tenure Track Faculty Annual Review committee, Pink and Red Team Reviewer for LASP Discovery Proposal (HOVER).

2017-2018: Executive Committee; Chair, Eric Wolf Promotion Committee; Lars Kalnajs Promotion Committee.

2016-2017: Executive Committee; Chair, Eric Wolf Promotion Committee; Section Lead on LASP Self Study

2015-2016: Executive Committee; Faculty Evaluations Committee.

2014-2015: Executive Committee, Bruce Kindel Promotion Committee; Faculty Evaluations Committee.

2013-2014: Executive Committee, Steve Massie Hiring Committee, chair; RA Evaluations Committee; LASP EPO Advisory Committee.

2012-2013: Executive Committee, Odele Coddington Promotion Committee, LASP EPO Advisory Committee.

2011-2012: Executive Committee, Frank Eparvier Promotion Committee (chair)

2009-2010: Executive Committee; Marty Snow Promotion Committee; Frank Eparvier Promotion Committee (chair).  
2008-2009: Executive Committee.  
2007-2008: Executive Committee; LASP representative for space needs within College of Arts and Sciences; Michael King Hiring Committee (chair).

### **University of Colorado**

2010: Proposal review panel, for CU Boulder's Innovative Grant Program.  
2007: Proposal review panel, for CU Boulder's Innovative Grant Program.  
2005-2006: Member, Boulder Faculty Assembly, Academic Affairs Committee

### **Science Community**

Member, National Academies of Sciences Committee on Earth Sciences and Applications from Space  
President of the IAMAS International Radiation Commission (IRC), 2020-SCOSTEP Bureau, 2019-present.  
Scientific Organizing Committee, International Radiation Symposium (2021-2022)  
Organizing Committee, 2022 Sun-Climate Symposium.  
Chair, Organizing Committee, 2020 Sun-Climate Symposium.  
Scientific Organizing Committee, International Radiation Symposium (2019-2020)  
Co-convenor for two 2019 IUGG sessions and Chair of one session.  
Vice President of the IAMAS International Radiation Commission (IRC), 2016-2020  
Deputy Secretary General, International Association of Meteorology and Atmospheric Sciences (IAMAS), 2015-2017.  
Organizing Committee, Hyperspectral Imaging and Sounding of the Environment (HISE), Optical Society of America, Sentosa Island, Singapore, 5-8 November 2018.  
Convener, 2017 Joint IAPSO-IAMAS-IAGA Assembly, 27 Aug. - 1 Sep., Cape Town, South Africa., IAMAS Session Energy balance of the Earth  
Chair, Organizing Committee, 2018 Sun-Climate Symposium.  
Scientific Committee, 2nd International Conference on Airborne Research for the Environment (ICARE2017)  
Program Chair, Hyperspectral Imaging and Sounding of the Environment (HISE), Optical Society of America, Leipzig, Germany, 14-17 November 2016.  
Program Co-Chair, International Radiation Symposium 2016, The University of Auckland, New Zealand April 16-22 2016.  
Member, Committee on The Effects of Solar Variability on Earth's Climate: A Workshop, Space Studies Research Board, National Research Council, 2011-2012.  
Member, NASA Living With a Star Targeted Research & Technology Program Steering Committee, 2011-2016.  
Member of the International Radiation Commission (IRC), 2009-present; Secretary, 2012-2016; Vice-President, 2016-present.  
Member of science definition team for the NASA Climate Absolute Radiance and Refractivity Observatory (CLARREO) Decadal Survey Mission, 2007-2018.  
Member of science definition team for the NASA Aerosol, Clouds and Ecosystem (ACE) Decadal Survey Mission, 2007-2010.  
Member of the European Fleet for Airborne Research (EUFAR), 2006-present.

Invited participant, NASA workshop to assess the potential of Earth climate science with data from the Deep Space Observatory (DSCOVR; formerly Triana) satellite, May 2007.

Invited participant, National Research Council Workshop on Recovery of Climate Capabilities on NPOESS, Options to Ensure the Climate Record, June 2007.

Invited participant and co-Chair of Solar Breakout discussion, NASA CLARREO workshop, July 2007.

2005-2006: Member, National Research Council Space Studies Board (SSB), Committee on Large Optical Systems in Space.

2005-2006: Member, Steering Committee, Achieving Satellite Instrument Calibration for Climate Change, ASIC<sup>3</sup>