

## Curriculum Vitae

Fred A. Best

Distinguished Research Engineer

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### Work Experience

- 2023-present Distinguished Research Engineer at SSEC. Provide technical support for SSEC instrument research and development programs and for the development of enabling technologies for weather and climate satellite applications.
- 2023 Honorary Fellow and Emeritus, University of Wisconsin-Madison
- 2023 Retired from University of Wisconsin-Madison
- 2018-2022 Engineering Team Lead at SSEC. Oversee and coordinate all aspects of engineering at SSEC, with emphasis on scientific instrument research and development and deployment in the field. This role includes leading research and development efforts to advance technologies and techniques that enable new or enhance existing capabilities for the next generation weather and climate related remote sensing instrumentation. A key activity also includes major proposal development.
- 2018-2022 Member of the SSEC Leadership Team. Provide leadership support to the SSEC Director, and Executive Director, including the development and execution of strategic initiatives, along with resolution of non-routine issues that can benefit from the perspective of a former director.
- 2017-2022 Collaborator with Professor Caroline Alexander's cancer research lab, providing thermal modeling and heat transfer analysis in support of metabolic research experiments using laboratory mice. This work includes providing input to the design of experiments and help with interpretation of the results.
- 2015-present UW-Madison Institutional Representative and Member of the Technical Advisory Board for NASA's Wisconsin Space Grant Consortium (WSGC).
- 2011-present Awarded "Distinguished" title by the University of Wisconsin--Madison
- 2010-2017 "Key member" of NASA's Climate Absolute Radiance and Refractivity Observatory (CLARREO) Climate Benchmark Mission Team. Provided expertise to formulate the infrared instrument requirements and conduct the instrument design, including the detailed design and research and development of the on-board calibration and verification system.
- 2008-2020 Co-investigator and team coordinator for a NASA Instrument Incubator Program (IIP) project that involved research and development of enabling

technologies for NASA's CLARREO Mission. This work culminated with the CLARREO infrared prototype instrument that demonstrated (under laboratory vacuum conditions) the unprecedented 0.1 K performance required for the CLARREO climate benchmark instrument. This work also included instrument enhancements for reducing programmatic risk for the eventual spaceflight mission.

- 2005-2008 Project research leader on SSEC's internally funded On-Orbit Absolute Temperature Calibration program and inventor of a novel scheme that uses the transient temperature melt signatures from different reference materials to provide an absolute temperature scale on-orbit. The technique is suitable for NASA's CLARREO Mission due to its extremely low mass and high accuracy, along with its ability to meet the fundamental requirement that measurements be verified on-orbit with traceability to SI absolute standards.
- 2003-2016 Co-investigator for NASA and NOAA projects related to risk reduction, calibration, and validation of the operational polar orbiting high spectral resolution infrared sounding instruments, including CrIS and AIRS.
- 2000-2005 Program Manager and technical research and development lead for the On-board Blackbody Calibration Subsystem for the NASA New Millennium Program's Geostationary Fourier Transform Spectrometer (GIFTS) instrument. This highly successful project significantly exceeded performance goals and set the stage for the next generation of technology developments, including absolute radiometric calibration on-orbit.
- 1999-2018 Technical Director of the UW Space Science and Engineering Center. This role involved leading the Center's hardware research and development programs and technical computing group, along with quality assurance and safety. This responsibility included cultivating, coordinating, mentoring, and maintaining a world-class team of up to 50 engineers, technicians, and students to work on a wide variety of instrument hardware and software developments for ground-based, aircraft-based, and spaceflight applications.
- 1999-2015 Advisor to the UW Engineering Physics department for their senior capstone design course and mentor to numerous NASA Zero gravity program student experiment teams. Collaborated with faculty and won a NASA grant to be part of the X-HAB Academic Innovation Challenge. The grant funded a 2-semester design course where student teams from around the country competed for the best design, which UW won in 2011. Mr. Best served as technical advisor and student mentor on this project.
- 1994-1996 Program Manager and lead mechanical systems engineer for the research and development of the Skin-Layer Ocean Heat Flux Instrument (SOHFI), with Dr. Lawrence Sromovsky as PI. The scientific rationale and concept for this instrument came from Dr. Verner Suomi, founder of SSEC. SOHFI made untended in-situ measurements of the ocean surface heat flux, a key parameter for understanding global climate change.

- 1989-2015 Program Manager and lead mechanical systems engineer for all UW-SSEC high-resolution infrared spectroscopy hardware research and development programs, and related field campaigns. UW-SSEC is recognized as a world leader in developing and deploying state-of-the-art Fourier Transform Spectrometer-based systems with high absolute radiometric accuracy. Several hardware programs and major studies have resulted from our successful pioneering development of the High-resolution Interferometer Sounder (HIS) instrument (developed in 1985), with Dr. Henry Revercomb as PI, including the Atmospheric Emitted Radiance Interferometer (AERI) funded by DOE and the Scanning HIS (funded by DOE and NASA), which flies on the NASA ER-2 and WB-57 research aircraft, and is still used by NASA to validate weather satellite measurements. Mr. Best is listed as a co-inventor for the technology behind the highly successful AERI instrument that has been licensed through WARF to ABB Bomem, Inc. of Quebec.
- 1986-1989 Program Manager and lead mechanical systems engineer for the refurbishment and calibration of the Net Flux Radiometer (NFR), that was part of the Galileo entry probe mission to Jupiter. The efforts at UW included analysis, design, fabrication, and test of spaceflight instrumentation, as well as characterization and calibration testing of the NFR instrument. While serving in this role Mr. Best was key to uncovering the mechanism behind the mechanical failures of the NFR infrared detectors (observed before the instrument transfer to UW), and assembled an industry team of experts to successfully re-manufacture new detectors using more sophisticated fabrication techniques.
- 1984-1986 Lead mechanical engineer for the NASA funded Diffuse X-Ray Spectrometer (DXS) instrument (Professor William Kraushaar followed by Dr. Wilton Sanders, PI), which was successfully launched on Space Shuttle Mission STS-54 in 1993. Responsibilities included the mechanical design, stress and vibration analysis, and environmental testing of this instrument. Late in the program, while serving in this role, Mr. Best discovered the mechanism behind a particularly vexing pressure leak problem and designed an elegant solution that involved only minor modifications, allowing the DXS to meet its flight schedule on the Space Shuttle.
- 1984-1985 Lead mechanical engineer for the joint NASA and NOAA supported High-resolution Interferometer Sounder (HIS) instrument (Professor William Smith, PI) that flew on the NASA ER-2 high altitude aircraft. This instrument vastly improved the vertical resolution of temperature and humidity measurements of the atmosphere (leading to better weather forecasts) and served as a prototype for future operational space flight instruments.
- 1978-1985 Joined UW Space Science and Engineering Center working as lead mechanical engineer for the NASA Hubble Space Telescope High Speed Photometer (HSP) instrument (Professor Robert Bless, PI). In this role Mr. Best was responsible

for the instrument structural and opto-mechanical design, analysis, fabrication, and testing. The phone-both sized HSP was one of the original scientific instruments on-board the Hubble and was built entirely at the UW. While extremely successful, the instrument was ultimately removed to make room for Hubble's corrective optics.

**Education** B. S. Engineering Physics, University of Wisconsin-Madison, 1978.

### **Awards**

- 2015 NASA Harry Reid Award for Outstanding Paper—lead author Bruce Wielicki, titled: “Achieving climate change absolute accuracy in orbit.”
- 2015 Group Achievement Award for the Hurricane and Severe Storm Sentinel series of sub-orbital aircraft flights to investigate the factors influencing hurricane intensity change.
- 2012 NASA Group Achievement Award as part of the Suomi NPP Satellite Development team, for extraordinary dedication, skill, teamwork and perseverance in developing and delivering of the Suomi NPP Project Mission for the Nation.
- 2011 Awarded the “Distinguished” title by the University of Wisconsin-Madison
- 2012 NASA Group Achievement Award as part of the CLARREO Mission Concept Team for exceptional and innovative approaches to the mission design of CLARREO.
- 2007 NASA Group Achievement Award for TC4 Aircraft Cloud Study Mission in Costa Rica and Panama.
- 1996 Co-recipient of a NASA Group Achievement Award in recognition of the exceptional achievement of designing, constructing, implementing, and obtaining scientific data from Jupiter with the Net Flux Radiometer on-board the Galileo Probe.
- 1995 NASA Group Achievement Award in recognition of outstanding accomplishments and contributions to the highly successful Airborne Southern Hemisphere Ozone Experiment (ASHOE/MAESA).
- 1992 NASA Certificate of Recognition for significant contributions made in the development and successful operation of the Diffuse X-Ray Spectrometer (DXS) on the Space Shuttle Mission STS-54.
- 1991 NASA Certificate of Recognition for contributions to the Hubble Space Telescope Program.
- 1990 Co-recipient of a NASA Group Achievement Award for outstanding contributions to the successful completion of the Hubble Space Telescope High Speed Photometer.
- 1990 NASA Certificate of Appreciation for contributions to the Galileo project and its successful launch on the Space Shuttle.
- 1990 Co-recipient of a NASA Group Achievement Award in recognition of contributions to the development of the Galileo Probe spacecraft.

### Peer Reviewed Publications:

- Taylor, Joseph K., Revercomb, H.E., Best, Fred A., and Tobin, Dave C. (2020). The Infrared Absolute Radiance Interferometer (ARI) for CLARREO. *Remote Sensing*, 12, 1915. doi:10.3390/rs12121915
- Kasza, I., Adler, D., Nelson, D., Yen, E., Dumas, S., Ntambi, J., MacDougald, O., Hernando, D., Porter, W., Best, F., Alexander, C. (2019). Evaporative Cooling Provides a Major Metabolic Energy Sink. *Molecular Metabolism*, Volume 27, pp.47-61.
- Wielicki, Bruce A., Young, D.F., Mlynczak, M.G., Thome, K.J., Leroy, S., Corliss, J., Anderson, J.G., Ao, C.O., Bantges, R., Best, F., Bowman, K., Brindley, H., Butler, J.J., Collins, W., Dykema, J.A., Doelling, D.R., Feldman, D.R., Fox, N., Huang, X., Holz, R., Huang, Y., Jin, Z., Jennings, D., Johnson, D.G., Jucks, K., Kato, S., Kirk-Davidoff, D.B., Knuteson, R., Kopp, G., Kratz, D.P., Liu, X., Lukashin, C., Mannucci, A.J., Phojanamongkolkij, N., Pilewskie, P., Ramaswamy, V., Revercomb, H., Rice, J., Roberts, Y., Roithmayr, C.M., Rose, F., Sandford, S., Shirley, E.L., Smith, W.L. Sr., Soden, B., Speth, P.W., Sun, W., Taylor, P.C., Tobin, D., and Xiong, X. (2013). Achieving climate change absolute accuracy in orbit. *Bulletin of the American Meteorological Society*, Volume: 94, issue: 10, pp.1519-1539. Reprint # 7093
- Tobin, David; Revercomb, H., Knuteson, R., Taylor, J., Best, F., Borg, L., DeSlover, D., Martin, G., Buijs, H., Esplin, M., Glumb, R., Han, Y., Mooney, D., Predina, J., Strow, L., Suwinski, L., and Wang, L. (2013). Suomi-NPP CrIS radiometric calibration uncertainty. *Journal of Geophysical Research-Atmospheres*. Volume: 118, Issue: 18, 2013. doi:10.1002/jgrd.50809. Reprint # 7079
- Gero, P. Jonathan, Taylor, Joseph K., Best, Fred A., Garcia, Raymond K., and Revercomb, Henry E. (2012). On-orbit absolute blackbody emissivity determination using the heated halo method. *Metrologia*, Volume: 49, Issue: 2, S1-S8. Reprint # 6631
- Tobin, David C., Revercomb, Henry E., Knuteson, Robert O., Best, F.A., et al. (2006). Radiometric and spectral validation of Atmospheric Infrared Sounder observations with the aircraft-based Scanning High-Resolution Interferometer Sounder. *Journal of Geophysical Research*. Volume 11. Doi:10.1029/2005JD006094. Reprint # 5054
- Knuteson, R.O., Best, F.A., DeSlover, D.H., Osborne, B.J., Revercomb, H.E., and Smith, W.L. Sr. (2004). Infrared land surface remote sensing using high spectral resolution aircraft observations. *Advances in Space Research*. Volume 33, Issue 7, pp.1114-1119. Reprint # 3720
- Knuteson, R.O., Revercomb, H.E., Best, F.A., Ciganovich, N.C., Dedecker, R.G., Dirx, T.P., Ellington, S.D., Feltz, W.F., Garcia, R.K., Howell, H.B., Smith, W.L., Short, J.F., and Tobin, D.C. (2004). Atmospheric Emitted Radiance Interferometer, Part I: Instrument design. *Journal of Atmospheric and Oceanic Technology*, Volume 21, Issue 12, pp.1763-1776. Reprint # 4082
- Knuteson, R.O., Revercomb, H.E., Best, F.A., Ciganovich, N.C., Dedecker, R.G., Dirx, T.P., Ellington, S.D., Feltz, W.F., Garcia, R.K., Howell, H.B., Smith, W.L., Short, J.F., and Tobin, D.C. (2004). Atmospheric Emitted Radiance Interferometer, Part II: Instrument

- performance. *Journal of Atmospheric and Oceanic Technology*, Volume 21, Issue 12, 2004, pp.1777-1789. Reprint # 4083
- Minnett, P.J., Knuteson, R.O., Best, F.A., Osborne, B.J., Hanafin, J.A., and Brown, O.B. (2001). The Marine-Atmospheric Emitted Radiance Interferometer: A high-accuracy, seagoing infrared spectroradiometer. *Journal of Atmospheric and Oceanic Technology*. Volume 18, Issue 6, 2001, pp.994-1013. Reprint # 3060
- Tobin, D.C., Best, F.A., Brown, P.D., Clough, S.A., Dedecker, R.G., Ellingson, R.G., Garcia, R.K., Howell, H.B., Knuteson, R.O., Mlawer, E.J., Revercomb, H.E., Short, J.F., van Delst, P.F. W., and Walden, V.P. (1999). Downwelling spectral radiance observations at the SHEBA ice station: Water vapor continuum measurements from 17 to 26 microns. *Journal of Geophysical Research*, Volume 104, pp.2081-2092. Reprint # 2605
- Sromovsky, L.A., Anderson, J.R., Best, F.A., Boyle, J.P., Sisko, C.A., and Suomi, V.E. (1999). The Skin-layer Ocean Heat Flux Instrument (SOHFI). Part I: Design and laboratory characterization. *Journal of Atmospheric and Oceanic Technology*, Volume 16, Issue 9, pp.1224-1238. Reprint # 2630
- Sromovsky, L.A., Anderson, J.R., Best, F.A., Boyle, J.P., Sisko, C.A., and Suomi, V.E. (1999). The Skin-layer Ocean Heat Flux Instrument (SOHFI). Part II: Field measurements of surface heat flux and solar irradiance. *Journal of Atmospheric and Oceanic Technology*, Volume 16, Issue 9, pp.1239-1254. Reprint # 2631
- Sromovsky, L.A., Best, F.A., Collard, A.D., Fry, P.M., Revercomb, H.E., Freedman, R.S., Orton, G.S., Hayden, J.L., Tomasko, M.G., and Lemmon, M.T. (1996) Solar and thermal radiation in Jupiter's atmosphere: Initial results of the Galileo probe Net Flux Radiometer. *Science*, Volume 272, Issue 526, pp.851-854. Reprint # 2268
- Smith, W.L., Revercomb, H.E., Knuteson, R.O., Best, F.A., Dedecker, R., Howell, H.B., and Woolf, H.M. (1995). Cirrus cloud properties derived from High Spectral Resolution Infrared Spectrometry during FIRE II. Part I: The High-resolution Interferometer Sounder (HIS) systems. *Journal of the Atmospheric Sciences*, Volume 52, Issue 23, pp.4238-4245. Reprint # 2221
- Sromovsky, L.A., Best, F.A., Revercomb, H.E., and Hayden, J. (1992). Galileo Net Flux Radiometer experiment. *Space Science Reviews*, Volume 60, pp.233-262. Reprint # 1289

### **Book Chapter**

- Taylor, J. K., Tobin, D.C., Best, F.A., Garcia, R.K., Loveless, M.L., Revercomb, H.E., Smith W.L. Sr. (2021). Chapter 9: "High-Altitude Aircraft Radiometric Calibration-Validation Campaigns;" *Field Measurements for Passive Environmental Remote Sensing, Elsevier*

## Conference Papers and Reports

- Borbás, Eva E., Adler, D.P., Best, F.A., Knuteson, R.O., L'Ecuyer, T.S., Loveless, M., Olson, E.R., Revercomb, H.E., Taylor, J.K. (2021). Ground-based far-infrared emissivity measurements with the University of Wisconsin Absolute Radiance Interferometer (ARI). *SPIE*. DOI <http://dx.doi.org/10.1117/12.2594834>
- Fox, N., Hewison, T., Kopp, G., Wielicki (editors), with Best, F.A. (one of several contributing authors). (2021). SI-Traceable Space-based Climate Observing system: a CEOS and GSICS Workshop, *National Physical Laboratory*, London, UK. Workshop Report.
- Taylor, Joseph K., Revercomb, H.E., Smith, W.L., Knuteson, R.O., Tobin, D.C., Best, F.A., Gero, P.J., Glumb, R.J. (2020). Expedient Implementation of a Hyperspectral Imaging Infrared Sounder (HIIS) in geostationary orbit; *IGARS 2020 IEEE Geoscience and Remote Sensing Symposium*; DOI: 10.1109/IGARSS39084.2020.9324078
- Taylor, Joseph K., Tobin, D.C., Revercomb, H.E., Best, F.A., Garcia, R.K., Knuteson, R.O., Feltz, M., Padula, F.P., and Goodman, S.J. (2019). Calibration Validation of GOES-16 Advanced Baseline Imager (ABI) with the Airborne Scanning High-Resolution Interferometer Sounder (S-HIS); *American Meteorological Society*
- Taylor, Joseph K., Revercomb, H.E., Best, F.A., Knuteson, R.O., Tobin, D.C., Gero, P.J., Adler, D., and Mulligan, M.P. (2019). An On-orbit Infrared Inter-calibration Reference Standard for Decadal Climate Trending of the Earth; *SPIE*
- Taylor, Joseph K.; Tobin, D.C.; Revercomb, H.E.; Best, F.A.; Garcia, R.K.; Merrelli, A. and Goldberg, M.D. (2017). Cold scene calibration validation of the Cross-track Infrared Sounder (CrIS) with the aircraft-based Scanning High-resolution Interferometer Sounder (S-HIS). Boston, MA, *American Meteorological Society*, Abstract 1325
- Revercomb, H.E., Knuteson, R.O., Tobin, D.C., Best, F.A., Taylor, J.K., Martin, G., Gero, P.J., Adler, D., Pettersen, C., Mulligan, M., and Thielman, D. (2017). Progress toward achieving an IR radiance records for decadal climate trending: Fundamental questions, challenges, and assessments. Washington, DC, *American Geophysical Union*, Abstract A12B-03
- Smith, William L. Sr.; Revercomb, H.E., Glumb, R.J., Best, F., Gumley, L., Knuteson, R., Larar, A.M., Petersen, R., Taylor, J.K., Tobin, D., and Velden, C.S. (2017). Weather Alert Remote Nowcasting (WARN) satellite mission. Boston, MA, *American Meteorological Society*, Abstract J6.2.A
- Best, F.A., Revercomb, H.E., Taylor, J.K., Gero, P.J., Adler, D., Pettersen, C., Knuteson, R.O., Tobin, D., Wong, J., Schwarz, M., Thielman, D., Mulligan, M., and Dykema, J.A. (2016). Absolute Radiance Interferometer (ARI) for the CLARREO Pathfinder: On-orbit verification and test (Part 2). Boston, MA, *American Meteorological Society*, Abstract 6.3
- Revercomb, H., Best, F.A., Tobin, D., Knuteson, B., Smith, N., Smith, W.L., and Weisz, E. (2016). Monitoring climate from space: A metrology perspective. Bellingham, WA, *SPIE-The International Society for Optical Engineering*, Paper 98810F Reprint # 8146

- Revercomb, H., Best, F.A., Taylor, J., Gero, J., Tobin, D., Knuteson, B., Adler, D., Pettersen, C., Mulligan, M., Wong, J., Schwarz, M., and Thielman, D. (2016). Climate benchmark quality IR measurement for CLARREO: Status of the Absolute Radiance Interferometer (ARI). Darmstadt, Germany, *European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)*
- Smith, William L. Sr., Revercomb, H.E., Best, F.A., Glumb, R.J., Klaes, K.D., Knuteson, R.O., Mango, S.A., Robin, D.C., and Santek, D.A. (2016). CrIS - The evolution of the operational advanced sounder. Boston, MA, *American Meteorological Society*, Abstract 1.4
- Taylor, Joseph K., Tobin, D.C., Revercomb, H.E., Best, F.A., Garcia, R.K., Merrelli, A., and Goldberg, M. (2016). Calibration validation of the Cross-track Infrared Sounder (CrIS) with the aircraft-based Scanning High-resolution Interferometer Sounder (S-HIS). Boston, MA, *American Meteorological Society*, Abstract 380
- Wagner, Timothy J., Smith, N., Best, F., Eloranta, E., Feltz, W.F., and Olson, E. (2016). SPARC: A mobile facility for a new generation of atmospheric research. Boston, MA, *American Meteorological Society*, Abstract 390
- Wielicki, Bruce A., Cooke, Roger M., Golub, Alexander A., Baize, Rosemary R., Thome, Kurtis J., Shea, Yolanda, Kopp, Greg A., Pilewskie, Peter, Revercomb, Henry E., and Best, Frederick A. (2016). Climate change observation accuracy: Requirements and economic value. Bellingham, WA, *SPIE-The International Society for Optical Engineering*, Abstract 9881-10
- Gero, J., Knuteson, R., Hackel, D., Best, F.A., Garcia, R., Phillips, C., Revercomb, H., and Smith, W. (2015). A new Marine Atmospheric Emitted Radiance Interferometer (M-AERI) for shipboard atmospheric and oceanic observations. Washington, DC, *US Department of Energy, Office of Energy Research, Office of Health and Environmental Research, Environmental Sciences Division*
- Revercomb, H., Tobin, D., Knuteson, B., Best, F.A., Moeller, C., Laporte, D., and Strow, L. (2015). Assessment and optimization of IR radiance measurements and products for climate, assimilation, and remote sensing applications: Continued NPP Science Team participation. Science Team Grant NNXAK21G final report for the period 17 June 2011-15 June 2015. *Madison, WI, University of Wisconsin-Madison, Space Science and Engineering Center*, Call Number: UW SSEC Publication No.15.06.R1
- Best, F.A., Adler, D.P., Pettersen, C., Revercomb, H.E., Gero, P.J., Taylor, J.K., Knuteson, R.O. (2014). Results from recent vacuum testing of an on-orbit absolute radiance standard (OARS) intended for the next generation of infrared remote sensing instruments. *Proc. SPIE-The International Society for Optical Engineering*. Multispectral, Hyperspectral, and Ultraspectral Remote Sensing Technology, Techniques and Applications V, 926314; doi:10.1117/12.2069338
- Gero, P. Jonathan; Knuteson, Robert O.; Shiomi, Kei; Kuze, Akihiko; Kataoka, Fumie; Revercomb, Henry E.; Tobin, David C.; Taylor, Joseph K. and Best, Fred A. (2014).



- GOSAT TANSO FTS TIR band calibration: A five-year review. Bellingham, WA, *SPIE-The International Society for Optical Engineering*, Paper 926316. Reprint # 8149
- Revercomb, Hank, Best, F.A., Knuteson, R.O., Tobin, D.C., Taylor, J.K., Gero, P.J., Adler, D., Pettersen, C., and Mulligan, M. (2014). Establishing a high-quality climate benchmark for the Earth: Utilizing a new on-orbit IR transfer standard to leverage next generational operational environmental satellite capabilities. Boston, MA, *American Meteorological Society*, Abstract 6.1
- Revercomb, Hank; Best, Fred; Knuteson, Bob; Tobin, Dave; Taylor, Joe; Gero, Jon, Adler, Doug; Pettersen, Claire; and Mulligan, Mark. (2014). The Absolute Radiance Interferometer (ARI) for the UW/LASP/GSFC CLARREO tech demo/Pathfinder on ISS. Hampton, VA, *National Aeronautics and Space Administration (NASA), Langley Research Center*
- Taylor, Joseph K., Revercomb, Henry E., Best, Fred A., Gero, P. Jonathan, Genest, Jerome E., Buijs, Henry L., Grandmont, Frederic J., Tobin, David C., and Knuteson, Robert O. (2014). The University of Wisconsin Space Science and Engineering Center Absolute Radiance Interferometer (ARI): Instrument characterization and demonstrated radiometric performance. Bellingham, WA, *SPIE-The International Society for Optical Engineering*, Paper 926313 Reprint # 8158
- Revercomb, H.E., Tobin, D., Knuteson, B., Best, F., Taylor, J., DeSlover, D., Borg, L., Martin, G, Quinn, G., and Garcia, R. (2013). Suomi NPP/JPSS Cross-track Infrared Sounder (CrIS): Radiometric and spectral performance. Boston, MA, *American Meteorological Society*, Paper 4.3. Reprint # 8079
- Revercomb, H. E. and Best, Fred A. (2013). NASA Instrument Incubator Program: A New Class of Advanced Accuracy Satellite Instrumentation (AASI) for the CLARREO Mission, Final Report. *University of Wisconsin, Space Science and Engineering Center*
- Revercomb, H. E., Best, Fred A. (2013). Vacuum Testing of the UW Absolute Radiance Interferometer (ARI) With End-to-End Verification Tests to Bring the Instrument to TRL 6, Final Report. *University of Wisconsin, Space Science and Engineering Center*
- Best, F.A., Adler, D.P., Pettersen, C., Revercomb, H.E., Gero, P.J., Taylor, J.K., Knuteson, R.O., and Perepezko, J.H. (2012). On-orbit absolute radiance standard for the next generation of IR remote sensing instruments. Bellingham, WA, *SPIE-International Society for Optical Engineering*, Paper 85270N Reprint # 7085
- Mekhontsev, S., Hanssen, L.M., Rice, J.P., Zeng, J., Khromchenko, V., Best, F.A., and Dykema, J.A. (2012). Comparative study of blackbody emissivity using reflectometry, modeling and radiance measurements. [Washington, DC], *Department of Commerce, National Institute of Standards and Technology*, Session G-2, Paper 3
- Pettersen, Claire, Best, Fred A., Adler, Douglas P., Aguilar, David M., and Perepezko, John H. (2012). Performance demonstration of miniature phase transition cells in microgravity as a validation for their use in the absolute calibration of temperature sensors on-orbit. Washington, DC, *American Geophysical Union*, Abstract A21E-0120

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- Revercomb, Henry E., Best, Fred A., Knuteson, Robert O., Tobin, David C., Taylor, Joe K., Gero, P. Jonathan, Adler, Douglas P., Pettersen, Claire, and Mulligan, Mark. (2012). Observing decadal trends in atmospheric feedbacks and climate change with Zeus and CLARREO. Washington, DC, *American Geophysical Union*, Abstract A21E-0116
- Best, F.A., Adler, Douglas P., Pettersen, Claire, Revercomb, Henry E., Gero, Jonathan, Taylor, Joseph K., Knuteson, Robert O., and Perepezko, John H. (2011). On-orbit absolute radiance standard for future IR remote sensing instruments. *NASA ESTO Technology Forum*, Jet Propulsion Laboratory
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- Best, F.A., Adler, D.P., Pettersen, C., et al. (2010). On-orbit absolute temperature calibration using multiple phase change materials: overview of recent technology advancements. *Proceedings of SPIE Vol. 7857, 78570J*
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- Revercomb, Henry E., Smith, William L., Best, Fred A., Knuteson, Robert O., Tobin, David C., Taylor, Joseph K., Feltz, Wayne, Turner, David, LaPorte, Daniel D., Ellington, Scott D., Dirkx, Timothy P., Dedecker, Ralph G., Garcia, Ray K., Ciganovich, Nick N., Dutcher, Stephen, Howell, H. Benjamin, Hackel, Denny, Adler Douglas P., and Pettersen, Claire. (2010). The path to accurately calibrated FTIR: Progress from the University of Wisconsin HIS aircraft instruments, to the ground based AERI, to spaceborne atmospheric sounding instruments (AIRS, IASI, CrIS), and onward to the NASA CLARREO climate benchmark mission. *ABB Bomem Workshop on Infrared Remote Sensing Applications (WIRSA)*
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