

## *Resume / Curriculum Vitea*

### **Andrew S. Jones**

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#### **Professional Objective and Career Summary**

I am a Colorado State University (CSU) Senior Research Scientist and CIRA Fellow, specializing in data assimilation, modeling, and remote sensing. I have focused my career toward cutting-edge hydrometeorological research applications and technology transitions, and have an extensive record of accomplishment working with many Govt. laboratories and agencies. I have an especially strong history of working operational weather and hydrologic needs with NOAA and the DoD. I have created more than 520 articles, publications, reports, and special presentations, including briefs to Congressional Staff, the Secretary of the Air Force, Directors and high level officials at DoD and other Govt. agencies.

**Program Management Abilities:** For more than 15 years, I have been highly successful at fund raising and involved in the management of more than \$25.9M in funded proposal activities at CSU. Of that amount, more than \$5.0M was for my own personal scientific research projects. Our teams of scientists typically include about 8-22 faculty, their students, and about an equal portion of research staff. As CG/AR Deputy Director, and with my lead role on other CIRA projects, I managed the many day-to-day interactions of about 20 individuals with our DoD laboratory sponsors and other operational agencies. This provided me numerous opportunities to learn how the Govt. functions and to obtain experience with their many interaction mechanisms to achieve meaningful outcomes. Science management is a very enjoyable part of my job. Most recently three of our new Innovation Center for Sustainable Agriculture (ICSA), Rural Wealth Creation and Terraforma groups were awarded sizeable special start-up awards from the CSU Vice President of Research Office through a CSU-wide faculty-team competition. These teams greatly facilitate the interdisciplinary nature of my research activities.

**My Research Interests:** My research objective is to implement new technologies using innovative remote sensing and data assimilation methodologies, focusing on application areas of high impact to our sponsors. This includes cross-sensor remote sensing techniques, specializing in the remote sensing of soil moisture, satellite/model data assimilation for analysis of hydrological processes, microwave emissivity analysis, land surface characterization, inversion theory, error propagation analysis, spatial filter analysis, and cross-sensor data fusion techniques. Aerosols, clouds, coupling of land/atmospheric processes, and atmospheric profile estimates are also an important part of my broader scientific interests. I have served on a wide-range of scientific review panels.

**Operational Research Transition Activities:** Our NOAA Blended Total Precipitable Water product is operational at NOAA/NESDIS. Our most recent OPS transition occurred within 18 hours of Day 1 data availability of NOAA-19 into a blended 8+-satellite configuration. That work has also won a “Best of Session – Collaborative Computing” award at the NOAATECH Conference. My advanced software data processing technology has also been adapted for use within the award-winning NASA CloudSat Data Processing Center at CIRA. I have served on the “NOAA/NESDIS/STAR ORA Infrastructure of the Future” and NASA review panels. The NESDIS study’s results are now the basis for the NESDIS/STAR Common Computing Environment, and played an important part in the development of the GOES-R Infrastructure WG standardization efforts. In the past, we started new US Army and USAF OPS interactions using the AFWA Land Information System and the DoD’s T-IWEDA tactical decision aid. Most recently, I generated 5 regional multi-satellite precipitation products in near real-time that are provisioned to the Bill and Melinda Gates Foundation global development activities, through the innovative cloud computing technologies of aWhere, Inc.

**Experience:** I have experience at multiple levels of the weather satellite acquisition process. I was a member of the Ball Aerospace National Polar Operational Environmental Satellite System (NPOESS) Conical Microwave Imager Sounder development team in the late 90s – early 00s, and I was a member of the NPOESS IPO Microwave Imager Sounder Performance Team. I am active in several scientific working groups connected to the DoD, NPOESS, NOAA, and NASA science programs. In particular, I am active within the US Soil Moisture operationalization efforts (e.g., DoD Soil Moisture Working Group (SMWG), and the NOAA SMWG). Our teams represent all DoD and NOAA aspects and includes interactions with ARL, NRL, AFWA, NOAA, and the USACE. I also have commercial DoD contractor experience in the DoD Smoke Community working on advanced radiative transfer and error propagation studies for a local remote sensing company.

**Scientific Achievements:** I have created several satellite microwave cloud water retrieval methods for use over land in the early 90s, which are now a standard requirement for our operational weather satellite systems. Similarly, my early cross-sensor microwave emissivity work demonstrated a path toward improved algorithm improvements over land. That work was the predecessor to much of the Joint Center for Satellite Data Assimilation (JCSDA) microwave emissivity work. We continued with the direct insertion of microwave emissivities within the advanced weather data assimilation systems to minimize the associated surface errors over land. The AFWA Coupled Assimilation and Prediction System (ACAPS) project was a focus of our collaboration with the NCAR WRF data assimilation group. The assimilation goal of the ACAPS project is the full use of satellite cloud data within NWP and land surface models for utilization by the USAF and the DoD OPS user community. Our activities also include satellite cloud verification studies in collaboration with the NCAR Model Evaluation Toolkit (MET) development group. I have organized and co-lead several joint CSU/NCAR data assimilation workshops. These workshops focused on data assimilation improvements for the USAF and US Army. I have also organized several additional specialized workshops. In collaboration

with Dr. Steven Fletcher, we have a vibrant non-Gaussian NSF research effort focused on non-Gaussian 1DVAR water vapor and WRF 3DVAR techniques using satellite data assimilation systems that I have developed. My current data assimilation activities and interests focus on snow and soil moisture data assimilation for DoD applications, as well as extensive interactions with the new Phytobiome Initiative activities, now serving as a Senior Editor for the *Phytobiome Journal*.

**Outreach Activities:** I have reached out to the broader community with invited talks at a variety of institutions including NOAA-CREST (NYC), the national AMS Data Assimilation Educational Forum, as well as coordinating several data assimilation workshops, and a satellite algorithm testbed workshop for NOAA. I have mentored many students while at Colorado State University, some of which are now have Govt. oversight responsibilities for CIRA, or lead other Govt. branches. Outreach is a rewarding part of my work.

## Education

### Colorado State University

Fort Collins, CO

- **Ph.D., Atmospheric Science**, Dissertation: "The Use of Satellite-Derived Heterogeneous Surface Soil Moisture for Numerical Weather Prediction".

### Colorado State University

Fort Collins, CO

- **M.S., Atmospheric Science**, Thesis: "Microwave Remote Sensing of Cloud Liquid Water and Surface Emittance over Land Regions".

### Eastern Illinois University

Charleston, IL

- **B.S., Physics, minor: Mathematics, University Honors, Summa cum laude**

## Experience

2009–present Colorado State University/CIRA

Fort Collins, CO

### CIRA Senior Research Scientist

- Assistant Director, Innovation Center for Sustainable Agriculture (ICSA) (2015-present).
- CIRA Fellow (2011-2020).
- Senior Editor of the APS *Phytobiome Journal* (2016-2020).
- Member of the Science Coordinating Committee (SCC) of the Phytobiome Initiative (2015-present).
- Member of the Science Advisory Group (SAG) for the Army Research Laboratory (ARL) Atmospheric Science Center (ASC) (2015-present).
- Member of the CSU ISTeC Data Management Committee (2014-present).
- Member of the CSU ISTeC Research Data Storage Subcommittee (2016-present).

- PI of several group projects (for project listings see the information below) focusing on satellite data assimilation, non-Gaussian data assimilation applications, microwave remote sensing of soil moisture, system of systems error analysis, data fusion methods, operational transitions, and microwave surface emissivity research.
- Co-I or collaborator on several projects focusing on blended cross-sensor technology OPS transitions.
- Editor of the AMS *Journal of Applied Meteorology and Climatology* (2014-2017).
- Technical Lead for the CG/AR Hydromet project theme area (2009-2015).
- CG/AR Deputy Director and Co-Investigator (2009-2011).
- Technical Lead for the CG/AR 1) Modeling and Data Assimilation, and 2) Technology Transitions project theme areas (2009-2011).
- Taught classes in AT737 and AT786, PhD-level graduate courses in Satellite Remote Sensing and Satellite Data Assimilation Methods.
- Co-Chair of various data assimilation workshops, member of several workshop organizing committees.
- Member of the Microwave Imager Sounder (MIS) sensor performance team.
- Invited session speaker at numerous Climate Smart Agriculture (CSA), and Big Data Analytics workshops, conferences, and symposia.
- Invited session speaker at the 2009 DTC Verification Workshop.
- Invited session review speaker of the 2009 AFWA Cloud Analysis Workshop, and chair of the Advanced and High Resolution Data Assimilation Techniques session.
- Member of the NPOESS soil moisture working group, CRTM Working Group, and other scientific technical groups.
- Created the CIRA Algorithm Testbed (CAT) in collaboration with Dr. Stan Kidder and Mr. John Forsythe to facilitate our satellite research to operation transitions.

**2010-2016                      CSU Ventures / Systems Solutions Group                      Fort Collins, CO**

**Consultant**

- Performed various collaborations with Govt. agencies to coordinate the impacts of CSU research to the DoD user community.

**2004–2009                      Colorado State University/CIRA                      Fort Collins, CO**

**CIRA Research Scientist III**

- CG/AR Deputy Director and Co-Investigator for the DoD Center for Geosciences/Atmospheric Research (CG/AR).

- PI of several group projects (for project listings see the project information below) focusing on advanced satellite data assimilation, microwave remote sensing of soil moisture, and microwave surface emissivity research.
- Co-I or collaborator on several other projects focusing on blended cross-sensor technology transitions.
- Technical Lead of two CG/AR project theme areas: 1) Hydrometeorology, and 2) N-Dimensional Data Assimilation Groups.
- Co-Organizer of the NOAA Satellite Algorithm Test Bed Workshop and active in leading related NOAA/NESDIS science collaboration activities designed to improve “system of systems” capabilities.
- Co-Chair of various data assimilation workshops, member of several workshop organizing committees.
- Invited keynote speaker at the 2008 AMS Data Assimilation Education Forum.
- Member of the NPOESS soil moisture working group, CRTM Working Group, and other scientific technical groups.

**2002–2004****Colorado State University/CIRA****Fort Collins, CO****CIRA Research Scientist II**

- PI on the JCSDA project “Global Microwave Surface Emissivity Error Analysis”.
- Technical Lead on the NESDIS project “Research for Validation of Microwave Land Emissivity Model”.
- Co-I on the NOAA/NESDIS Office of Satellite Development (OSD) PSDI project “The NESDIS Consolidated Microwave Hydrological Products System”.
- PI on the NOAA High Performance Computing and Communications (HPCC) project “Harnessing the Spare Computing Power of Desktop PCs for Improved Satellite Data Processing and Technology Transition”.

**1998–2002****Colorado State University/CIRA****Fort Collins, CO****CIRA Research Associate**

- Created a Microwave Land Surface Model (MWLSM) Observational Operator and its adjoint for use in variational soil moisture data assimilation.
- Created a new scalable cross-sensor satellite research development environment in a parallel Windows NT/2000 environment.
- Developed cross-sensor MW/IR land surface temperature algorithms and associated microwave surface emissivity fields to extend the satellite data assimilation methodology that makes use of satellite-derived surface heating rates coupled to a mesoscale atmospheric/land surface model (RAMS).

- Developed a system for near-real time delivery of AMSU satellite data and derived products for dissemination to NWS offices via the Internet in a semi-operational environment. Implemented new cross-sensor combined POES/GOES capabilities for testing in the operational forecast environment.
- Active in several Center for Geosciences / Atmospheric Research (CG/AR) technology transition efforts with DoD community users and developers.

**1990-2001****MetSat / Science Technology Corporation****Fort Collins, CO****Research Scientist**

- Performed algorithm analysis for the NPOESS CMIS instrument design for the Ball Aerospace CMIS Team. Science Lead on the Soil Moisture, Land Surface Temperature, and Classification EDRs.
- Gained experience managing and organizing project development for small working groups (3-4 people). Point of Contact for several small projects.
- Developed a quantified error analysis procedure for a ground-based radiometer transmittance measurement system for the Army Research Laboratory.
- Applied SSM/I cloud liquid water retrieval method to DoD winter icing pilot study to test OPS feasibility.

**1996-1998****Colorado State University/CIRA****Fort Collins, CO****CIRA / DOD Center for Geosciences Post-Doctoral Fellow**

- Principle Scientist and Task Leader on DOD Center for Geosciences Surface Hydrology Project: "Coupling of Satellite Remote Sensing of Land Surface Properties with a Hydrological Soil Model and Mesoscale Atmospheric Model". Published 3 journal papers regarding satellite remote sensing and data assimilation of surface hydrological features. Successfully directed the scientific research of 1 post-doc and 1 MS-level student under this project.
- Started development efforts on a 4DVAR system for use with satellite surface wetness observations.
- Extended a multi-sensor/platform satellite data fusion technique to a parallel processing environment.
- Developed a satellite data assimilation method to assimilate satellite surface wetness information for a distributed hydrological surface runoff and channel flow routing model (CASC2D).
- Developed and co-authored several papers on a new polarization difference method to measure cloud liquid water over land using passive microwave satellite data in a collaborative small group work setting which in addition to myself contained 2 PhD and 2 MS-level CIRA employees

**Colorado State University****Fort Collins, CO****Graduate Research Assistantship**

- Developed and published a new component-based satellite/model data assimilation method for improved mesoscale atmospheric model initialization of surface wetness using infrared and microwave satellite datasets with the CSU-RAMS model.

- Developed and published a new state-of-the-art multisensor/multi-spectral satellite data fusion method (PORTAL).
- Lecture and exam preparation experience while TA for several graduate level courses on Atmospheric Radiation (MS-level) and Satellite Meteorology (PhD-level).
- Extensive group experience with satellite data archival, and research use of data archives.

**Colorado State University****Fort Collins, CO****U.S. Army Geosciences Fellow**

- Developed a new method to remotely sense cloud liquid water over land surfaces using coincident DMSP SSM/I and GOES VISSR satellite data.
- Collaborated with research radar meteorologists to compare active and passive microwave signatures on convective precipitation events.
- Implemented a limb-correction method for GOES VAS data.
- Experience modifying and improving the GOES VISSR navigation software package.
- Organized and maintained an extensive centralized software library that provided experience with software management responsibilities and interaction with the software needs of scientific users.

**Eastern Illinois University****Charleston, IL****Student Hourly**

- Co-authored and published a classical mechanics solution manual, that was published in book form.
- Physics tutor

**Data Experience**

DMSP OLS, SSM/I, SSM/T-2, SSMIS; GOES imager and sounder; JAXA AMSR-2, METOP AMSU-A and MHS; NASA AIRS, AMSR-E, MODIS; NOAA AVHRR LAC and GAC data, AVHRR NDVI products, NOAA AMSU-A and B; Suomi-NPP ATMS; JAXA AMSR-2, NASA TRMM TMI and VIRS; CORIOLIS WindSat; AFWA-AGRMET and AFWA/NASA-LIS model output; NOAA GDAS / GFS model output; CSU-RAMS model output; WRF model output

**Software Experience**

Creator of the NOAA operational package: Data Processing and Error Analysis System (DPEAS) – functional on Windows, Linux, and NOAA AIX OPS environment. **OSes:** Windows, Windows Hyper-V, Linux, Unix (HP-UX and AIX), and VMS. **Languages:** FORTRAN 90/95/03/08, C, C++. **Scripts:** bash, DOS, GIT, ksh, Perl, Python, and sh. **Models and Libraries:** CASC-2D, CRTM, FASCODE, GSI, IMSL, LIS, LOWTRAN, MET, MODTRAN, MPI, MPM, MWLSM, NCAR Graphics, RAMS, RAMDAS, PORTAL, and WRF. **Data Formats:** HDF4, HDF5, HDF-EOS, GRIB, netCDF, and XML. **4G Processing**



**Environments and TDAs:** IDL, Mathematica, MATLAB, myWIDA, Python, R, T-IWEDA, aWhere WeatherTerrain™. **Miscellaneous:** McIDAS and GIS training, and other numerous misc. software packages, including parallel processing experience. Member of the 2005 NESDIS/ORA Infrastructure of the Future Review Panel.

## Funded Proposals

**Total Funding: All: \$26.049M, PI Funding: \$5.162M**

- 1/1/18 – 12/31/19: CSU VPR CIP: “Rural Wealth Creation: Exploring Food Systems-led Development Strategies,” Co-PI: \$199.8K
- 1/1/18 – 12/31/19: CSU VPR CIP: “Terraforma: Simulating Reality in Artificial Ecosystems,” Co-I: \$199.6K
- 11/1/17 – 10/31/18: Army SBIR: “SBIR Subsequent Phase II: Terrain Ponding Integration with PAWTL,” Co-PI: \$10K
- 9/1/17 – 8/31/18: JPSS: “JPSS-1 Readiness for Blended Hydrometeorological Products”, PI: \$128.1K
- 7/1/17 – 6/30/19: NOAA: “Comparison of Model versus Observationally-driven Water Vapor Profiles for Forecasting Heavy Precipitation Events,” Co-I, \$154.0K
- 7/1/17 – 6/30/20: NSF: Establishing links between atmospheric dynamics and non-Gaussian distributions and quantifying their effects on numerical weather prediction, Co-PI, \$674.9K
- 7/1/17 – 6/30/20: GOESR: “Using the New Capabilities of GOES-R to Improve Blended, Multisensor Water Vapor Products for Forecasters”, Co-I, \$456.4K
- 7/1/17 – 6/30/18: JPSS: “Blended-Hydromet Products Validation”, Co-I, \$75K
- 9/29/16 – 9/28/18: Army SBIR: “Subsequent Phase II SBIR for topic A13-019: Determination of Terrain Ponding for Logistics Emplacement and Planning,” CSU Co-PI: \$400K, Total Funds: \$999.1K.
- 7/1/16 – 6/30/17: JPSS: “Blended-Hydromet Products Validation”, Co-I, \$60K
- 7/1/16 – 6/30/17: JPSS: “ATMS Precipitable Water Algorithms and Products (MiRS)”, Co-I, \$59K
- 7/1/16 – 6/30/17: PSDI: “POES-GOES Blended Hydrometeorological Products”, PI: \$31K
- 4/1/16 – 1/31/17: CSU VPR PRECIP: “Rural Wealth Creation: exploring food systems-led development strategies”, Co-PI: \$5K.
- 3/15/16 – 3/14/20: USDA-AFRI, “Sustaining Agriculture through Adaptive Management to Preserve the Ogallala Aquifer under a Changing Climate”, CSU co-I: \$4.3M, Total Funds: \$7.895M.
- 12/1/15 – 6/30/16: aWhere, Inc.: “Near Real-time Improvements to the CSU Regional Multi-Satellite Precipitation Product”, PI.
- 6/1/15– 6/30/2016: PSDI: “POES-GOES Blended Hydrometeorological Products”, Co-PI: \$162K.
- 1/1/15 – 12/31/17: CSU VPR CIP: “Innovation Center for Sustainable Agriculture,” Co-I: \$199.5K.
- 12/1/14 – 4/31/15: US Army: “Integrated Multisensor Improvements to Retrieval Algorithms and Data Assimilation Systems for DoD Soil Moisture and Snow Water Equivalent Applications,” CSU PI: \$110K, Total Funds: \$450K.



- 7/1/14 – 5/15/15: Bill and Melinda Gates Foundation: “Agricultural RE-Analysis of Precipitation Data (AREA-PD),” CSU PI: \$125.2K. Total Funds: \$320K.
- 7/1/14 – 6/30/16: Army SBIR: “SBIR Phase II: Determination of Terrain Ponding for Logistics Emplacement and Planning,” CSU Co-PI: \$400K, Total Funds: \$1M.
- 6/1/14– 6/30/2015: PSDI: “POES-GOES Blended Hydrometeorological Products”, Co-I: \$30K.
- 10/1/13 – 1/30/14: Army SBIR: “SBIR Phase I: Determination of Terrain Ponding for Logistics Emplacement and Planning,” CSU Co-PI: \$44K, Total Funds: \$100K.
- 6/1/13 – 6/30/2014: PSDI: “POES-GOES Blended Hydrometeorological Products”, Co-I: \$162K.
- 5/1/13 – 6/30/14: OSD: “Improvement of Retrieval Algorithms and Data Assimilation Systems for DoD Soil Moisture and Snow Water Equivalent Applications,” CSU PI: \$100K.
- 5/20/13 – 9/20/13: Bill and Melinda Gates Foundation: “Real-time Mexico-Central American & African Multisatellite Precipitation Products and Distribution for Agricultural Use and Disease Mitigation Activities,” PI: \$51.3K.
- 2/1/13 – 8/30/13: ERDC: “SBIR Phase I: Downscaling Techniques for Ground State Information,” CSU Co-PI: \$33.3K, Total Funds: \$100K.
- 10/1/12 – 9/30/15: NSF: “Understanding Analyzing the impacts of non-Gaussian errors in Gaussian Data Assimilation Systems,” Co-PI: \$598.3K.
- 10/1/12 – 9/30/13: AFWA: “Creation of an AFWA Probability of Cloud Free Line of Sight (PCFLOS) WRF Post-processing System,” PI: \$252K.
- 10/1/12 – 9/30/13: AFWA: “System Improvements to the AFWA Cloud Advection Process,” PI: \$270.7K.
- 10/1/12 – 2/31/13: NCAR: AFWA Coupled Assimilation and Prediction System (ACAPS) Development at CIRA, PI: \$85.5K.
- 4/1/12 – 3/31/2013: PSDI: “POES-GOES Blended Hydrometeorological Products”, Co-I: \$63K.
- 7/5/11 – 7/4/13: NASA: “A Multisensor 4D Blended Water Vapor Product for Weather Forecasting,” Co-I: \$336K.
- 2/1/11 – 1/31/12: NCAR: AFWA Coupled Assimilation and Prediction System (ACAPS) Development at CIRA, PI: \$85.5K.
- 3/1/11 – 2/28/2012: PSDI: “POES-GOES Blended Hydrometeorological Products”, Co-I: \$57K.
- 5/1/10 – 4/30/2011: DoD Center for Geosciences/Atmospheric Research, Co-I: \$3M.
- 3/1/10 – 2/28/2011: PSDI: “POES-GOES Blended Hydrometeorological Products”, Co-I: \$135K.
- 2/1/10 – 1/31/11: NCAR: “AFWA Coupled Assimilation and Prediction System (ACAPS) Development at CIRA,” PI: \$49.6K.
- 11/1/09 – 10/30/10: NPOESS: “Retrieving Deep Soil Moisture: Research to OPS, Part 2”, PI: \$102K.
- 10/1/09 – 9/30/10: NASA: “Application of “A-Train” Satellite Observations to Enhance NWP Products for Next Generation Air Transportation System”, Co-I: \$300K.
- 5/1/09 – 4/30/2010: DoD Center for Geosciences/Atmospheric Research, Co-I: \$1.423M.

- 3/1/09 – 2/28/2010: PSDI: “POES-GOES Blended Hydrometeorological Products”, Co-I: \$180K.
- 2/1/09 – 12/31/09: NCAR: AFWA Coupled Assimilation and Prediction System (ACAPS) Development at CIRA, PI: \$85K.
- 11/1/08 – 10/30/09: NPOESS: “Retrieving Deep Soil Moisture: Research to Operations”, PI: \$102K.
- 5/1/08 – 4/30/2009: DoD Center for Geosciences/Atmospheric Research, Co-I: \$1.6M.
- 3/1/08 – 2/28/2009: PSDI: “POES-GOES Blended Hydrometeorological Products”, Co-I: \$70K.
- 1/1/08 – 4/28/2008: CG/AR, Environmental Modeling and Assimilation Science Team Leader: \$97K.
- 4/12/07 – 9/30/08: JSDI: “Cloud and Microwave Emissivity Verification Tools for use within the CRTM”, PI: \$100K.
- 4/1/07 – 1/31/2008: NCAR: “CIRA-NCAR/MMM WRF-Var Collaboration Work Plan”, PI: \$163K.
- 5/1/06 – 12/31/07: CG/AR, Acting CG/AR N-Dimensional Data Assimilation Science Team Leader: \$400K.
- 5/1/06 – 4/30/07: CG/AR, Hydrometeorology Science Team Leader: \$60K.
- 1/1/06 – 12/31/06: NPOESS IPO: “Application of WindSat for Soil Moisture Satellite Data Assimilation and DoD Impact Studies, Part 3”, PI: \$170K.
- 12/1/05 – 4/30/06: CG/AR, Acting CG/AR N-Dimensional Data Assimilation Science Team Leader: \$251.4K.
- 7/15/05 – 12/31/05: NPOESS IPO: “Application of WindSat for Soil Moisture Satellite Data Assimilation and DoD Impact Studies, Part 2a”, PI: \$120K.
- 5/1/05 – 4/30/06: CG/AR, CG/AR Hydrometeorology Science Team Leader: \$210K (\$29.9K for satellite hydromet subtask).
- 4/1/05 – 8/31/05: NESDIS/ORA: “ORA IT Infrastructure for the Future, Proposal for CIRA participation in the Study Group”, PI: \$13K.
- 12/1/04 – 11/30/05: NOAA High Performance Computing and Communications (HPCC), “Maximizing the Usefulness of Grid Technology on NOAA Office PC’s”, PI: \$25K.
- 7/15/04 – 4/30/05: NPOESS IPO: “Application of WindSat for Soil Moisture Satellite Data Assimilation and DoD Impact Studies, Part 1”, PI: \$200K.
- 5/1/04 – 4/30/05: CG/AR, CG/AR Hydrometeorology Science Team Leader: \$222K (\$64K for satellite hydromet subtask).
- 4/1/04 – 3/31/05: NOAA/NESDIS Office of Satellite Development (OSD) PSDI: “CIRA’s Cross-Sensor Products for Improved Weather Analysis and Forecasting”, Co-I: \$105K.
- 7/1/03 – 6/30/05: Joint Center for Satellite Data Assimilation (JCSDA), “Global Microwave Surface Emissivity Error Analysis”, PI: \$150K.
- 4/1/03 – 3/31/04: NOAA/NESDIS Office of Satellite Development (OSD), PSDI: “The NESDIS Consolidated Microwave Hydrological Products System”, Co-I: \$125K.
- 9/06/02 – 6/30/03: NOAA/NESDIS, “Research for Validation of Microwave Land Emissivity Model”, Team Leader: \$60K.

- 5/8/02 – 5/7/04: CG/AR, CG/AR Hydrometeorology Science Team Leader: \$276K (\$115K for satellite hydromet subtask).
- 4/01/02 – 3/31/03: NOAA High Performance Computing and Communications (HPCC), “Harnessing the Spare Computing Power of Desktop PCs for Satellite Data Processing”, PI: \$29.7K.
- 9/28/01 – 9/27/02: CG/AR Phase IVa, CG/AR Hydrometeorology Science Team Leader: \$190K.
- 8/5/98 – 8/4/01: CG/AR Phase III, CG/AR Hydrometeorology Science Team Leader: \$579K.

## Awards, Honors, and Positions

- CIRA Fellow (2011-2020)
- Senior Editor of the APS *Phytobiome Journal* (2016-2020)
- Editor of the AMS *Journal of Applied Meteorology and Climatology* (2014-2017)
- Assistant Director of the CSU Innovation Center for Sustainable Agriculture (ICSA) (2015-present)
- Member of the CSU Catalyst for Innovative Partnerships (CIP) Terraforma Team (2017-present)
- Member of the CSU CIP Rural Wealth Creation Team (2017-present)
- Member of the Phytobiome Coordination Committee of the Phytobiome Initiative (2015-present)
- Member of the CSU University Advisory Committee for the CSU Office of Defense Engagement (ODE) (2016-present)
- Member of the NATO Science & Technology Organization – Next Generation NATO Reference Mobility Model (NRMM) Development Applied Vehicle Technology-248 (AVT-248) Technical Team (2016-present)
- Member of the Science Advisory Group (SAG) for the Army Research Laboratory (ARL) Atmospheric Science Center (ASC) (2015-present)
- Member of the CSU Information Science & Technology Center (ISTeC) Data Management Committee (2014-present)

### Former Awards, Honors, and Positions:

- DoD Center for Geosciences / Atmospheric Research (CG/AR) – Deputy Director (2009-2011)
- PI of CIRA's AFWA Coupled Assimilation and Prediction System (ACAPS) Project
- PI of numerous additional CSU projects, CG/AR Theme Area Leader – a) Hydrometeorology, b) Environmental Modeling and Data Assimilation, and c) Technical Transitions
- Member of the CSU CIP Center for Sustainable Agriculture (ICSA) Team
- Member of the NPOESS Microwave Imager Sounder Performance Team
- AMS Data Assimilation Education Forum – national keynote speaker
- Founding member, NPOESS IPO Soil Moisture Working Group (SMWG)
- NOAA TECH 2004 presentation (Guch et al.) - Best of Session – Collaborative Computing
- DoD Center for Geosciences / Atmospheric Research Theme Leader – Hydrometeorology
- CIRA Research Initiative Award – (first recipient)

- CIRA Post-doctoral Fellowship
- DoD Geosciences Fellowship
- AMS Scholarship / Global Change Studies
- U.S. Army Geosciences Fellowship
- Colorado Fellowship
- The G. B. Dudley Award
- SPS Honor Society
- Illinois General Assembly Scholarship
- The President's Award
- Spark's Scholarship Award
- Illinois State Scholar
- Class Valedictorian

### **Professional Service / Affiliations**

Member of several weather panels and councils (Army, NASA, other organizations), Member of the Phytobiome Science Coordinating Committee, Founding Member of the Rocky Mountain Consortium for Global Development (RMCGD), Founding Member of the DoD Soil Moisture Applications Consortium (SMAC), Member of the JCSDA Common Radiative Transfer Model (CRTM) Working Group (CWG) (2008 – present), Member of the NOAA Soil Moisture Working Group (SMWG), (2008 – present), Founding member of the DoD SMWG, (2004 - present), Member of the NASA Langley DAAC User Working Group, (1998 - 2008), Member of American Geophysical Union (1991 – present), Member of American Institute of Physics (1991 – present), Member of American Meteorological Society (1988 – present), Member of the NESDIS Satellite Algorithm Testbed (SATB) Workshop Organizing Committee (2007 – 2008), Member of the JCSDA Radiative Transfer and Clouds and Precipitation Working Group, (2004 - 2008), Member of the JCSDA Advisory Group for the Workshop on "Applications of Remote Sensing to Data Assimilation" (2006 – 2007), Ph.D. Student Representative, 1990–1991, Graduate Student Council Representative, 1990–1991.

### **Publications and Presentations**

More than 520 publications, reports, and special presentations in the areas of coupled satellite/model data assimilation, multisensor satellite data fusion techniques, measurement of microwave surface emissivity for determining surface wetness, microwave detection of cloud liquid water and surface properties, satellite limb radiance, and radar and satellite intercomparison studies, including several invited conference presentations, and 38 peer-reviewed articles and books in the *Advances in Water Resources*, *Bulletin of the American Meteorology Society*, *Geophysical Research Letters*, *IEEE Trans. on Geoscience and Remote Sensing*, *J. Applied Meteorology and Climatology*, *J. Atmospheric and Oceanic Technology*, *J. Geophysical Research*, *J. Hydrometeorology*, *J. Operational Meteorology*, and *Monthly Weather Review*.

Reviewer for *Bulletin of the American Meteorology Society*, *Environmental Modeling and Software*, *Geophysical Research Letters*, *IEEE Trans. on Geoscience and Remote Sensing*, *J. Applied Meteorology*, *J. Atmos. and Oceanic Technology*, *J. Geophysical Research*, *J. Hydrology*, *J. Hydrometeorology*, *J. Pure and Applied Geophysics*, *Monthly Weather Review*, *National Weather Digest*, *Remote Sensing*, and *Weather and Forecasting*.

## Educational Training and Mentoring

- Invited panelist for the “2016 International Colloquium: Global Food Security & Sustainability” session on “Sustainable Food Production: How Innovation Points to Creative Possibilities”
- Invited panelist for the “Visions of Future Earth, Linking Society, Economics, and the Environment” session on “Climate Smart Agriculture”
- Lead speaker in the AMS Data Assimilation Education Forum
- Guest Satellite Data Assimilation Lecturer for ATS 737 – Satellite Observations of the Atmosphere and Earth
- Teaching Assistant for ATS 620 – Atmospheric Radiation
- Teaching Assistant for a variety of undergraduate physics courses
- I have mentored several graduate and post-graduate students: John Forsythe (MS), Ingrid Guch (MS), Ken Knapp (PhD), Ben Ruston (PhD), Phil Stephens (Postdoc), Dustin Rapp (MS), Tardendra Lakhankar (Postdoc), Curtis Seaman (PhD), Amin Haghnegahar (PhD), Gavin Roy (MS). In the past, I have been supervisor and technical lead for numerous CIRA staff scientists.

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Available upon request.

## Publications

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1. Combs, C., D. Reinke, and A. S. Jones, 2017: Applications of regional satellite cloud climatologies to local forecaster needs, *J. Operational Meteor.*, in preparation.
2. Jones, A. S., S. Fletcher, T. Lakhankar, M. Sengupta, G. McWilliams, 2017: Temporal adjoint soil moisture sensitivities using the variational method for a 21-day event – implications for deep soil moisture retrievals using remote sensing, in preparation.
3. Gitro, C. M., M. K. Jurewicz, S. J. Kusselson, J. M. Forsythe, S. Q. Kidder, E. Szoke, D. Bikos, A. S. Jones, C. M. Gravelle, and C. Grassotti, 2017: Using the Multisensor Advected Layered Precipitable Water Product in the Operational Forecast Environment, *J. Operational Meteor.*, in preparation.
4. Deshon, J. P., J. D. Niemann, T. R. Green, and A. S. Jones, 2017: Probabilistic downscaling of soil moisture with stochastic soil-moisture variability, *AGU Fall Meeting*, 11-15 December, New Orleans, LA.
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6. Jones, A. S., A. A. Andales, C. McGovern, G. E. B. Smith, O. David, and S. J. Fletcher, 2017: Integrated decision tools for sustainable watershed/ground water and crop health using predictive weather, remote sensing, and irrigation decision tools, *AGU Fall Meeting*, 11-15 December, New Orleans, LA.
7. Kleiwer, A., S. J. Fletcher, A. S. Jones, and J. M. Forsythe, 2017: Detecting non-Gaussian and lognormal characteristics of temperature and water vapor mixing ratio, *AGU Fall Meeting*, 11-15 December, New Orleans, LA.
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11. Fletcher, S. J., A. J. Kliewer, and A. S. Jones, 2017: Quantification of optimal choices of parameters in lognormal variational data assimilation and their chaotic behavior, *Mathematical Geosciences*, submitted.
12. Gitro, C. M., M. K. Jurewicz, J. M. Forsythe, S. Q. Kidder, E. Szoke, D. Bikos, A. Jones, C. M. Gravelle, S. J. Kusselson, and C. Grassotti, 2017: Anticipating High-Impact Rainfall Episodes with the New Multisensor Advected Layered Precipitable Water Product, *National Wea. Assoc. 42<sup>nd</sup> Annual Meeting*, 16-21 September, Garden Grove, CA, (poster).

13. Forsythe, J. M., S. Q. Kidder, A. S. Jones, D. Bikos, and E. Szoke, 2017: Blended satellite products for forecasting heavy precipitation, *National Wea. Assoc. 42<sup>nd</sup> Annual Meeting*, 16-21 September, Garden Grove, CA.
14. Hoehn, D. C., J. D. Niemann, T. R. Green, A. S. Jones, and P. J. Grazaitis, 2017: Downscaling soil moisture over regions that include multiple coarse-resolution grid cells, *Remote Sensing of Environ.*, **199**, 187-200, doi:10.1016/j.rse.2017.07.021.
15. Deshon, J. P., J. D. Niemann, and A. S. Jones, 2017: Probabilistic downscaling of remotely sensed soil moisture to fine-resolutions, Grand Global Challenges Summit, 18-20 July, Washington, DC.
16. Grieco, N. R., J. D. Niemann, T. R. Green, and A. S. Jones, 2017: An evaluation of downscaling soil moisture without local calibration, *37<sup>th</sup> Annual AGU Hydrology Days*, 20-22 March, Fort Collins, CO.
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40. Kliewer, A. J., S. J. Fletcher, A. S. Jones, and J. M. Forsythe, 2016: Identifying non-normal and lognormal characteristics of temperature, mixing ratio, surface pressure, and wind for data assimilation systems, *Nonlinear Processes in Geophysics Discussion*, **2**, 1363-1405, doi:10.5194/npgd-2-1363-2015.
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## Workshops Organized/Chaired

1. Session 3: Applying a Systems-level Approach to the Phytobiome: Can We Create a Better Future?, *8<sup>th</sup> Conference on Health and the Environment, AMS Annual Meeting*, Seattle, WA, January 26, 2017 (Session Chair).
2. Phytobiome Discussion Panel: Can We Create a Better Future?, *8<sup>th</sup> Conference on Health and the Environment, AMS Annual Meeting*, Seattle, WA, January 26, 2017 (Session Moderator and Panelist).
3. *NG23B. Advances in Data Assimilation, Predictability, and Uncertainty Quantification: Phytobiome I, 2016 Fall AGU Meeting*, San Francisco, CA, December 12-16, 2016 (Session Co-Chair).
4. *NG33B. Nonlinear Systems-Level Analysis of the Phytobiome, Including Plants, Insects, Microbiomes, Soils, Hydrology, Aerosols, and Other Atmospheric Properties Posters, 2016 Fall AGU Meeting*, San Francisco, CA, December 12-16, 2016 (Session Chair).
5. *Phytobiome Engineering, 2016 Keystone Symposia on Phytobiomes*, Santa Fe, NM, November 8-12, 2016 (Session Chair).
6. *USDA FFAR Phytobiome Convening Event: Identification of Fundable Technology for Phytobiomes*, Tampa, FL, July 28, 2016 (Session Co-Moderator).
7. *DoD Soil Moisture Working Group*, Fort Collins, CO, April 7-8, 2014 (Site Host).
8. *Battlefield Atmospheric and Cloud Impacts on Military Operations (BACIMO) Conference*, April 13-15, 2010 (Session Co-Chair: Data Assimilation and Numerical Weather Prediction).
9. *DoD Training Workshop for CG/AR, CG/AR*, Fort Collins, CO, October 27-28, 2009 (Chair).
10. *First International Cloud Analysis Workshop*, NCAR, Boulder, CO, September 1-3, 2009 (Co-Chair and Session Chair).
11. *4<sup>th</sup> Joint NCAR/MMM CSU/CIRA Data Assimilation Workshop*, CIRA, Fort Collins, CO, March 13, 2008 (Co-Chair).
12. *Satellite Algorithm Testbed Workshop*, Suitland, MD, February 26-27, 2008 (Session Chair and Workshop Organizing Committee Member).
13. *3<sup>rd</sup> Joint NCAR/MMM CSU/CIRA Data Assimilation Workshop*, NCAR, Boulder, CO, February 5, 2007 (Co-Chair).
14. *2<sup>nd</sup> Joint NCAR/MMM CSU/CIRA Data Assimilation Workshop*, NCAR, Boulder, CO, June 12, 2006 (Co-Chair).
15. *Joint NCAR/MMM CSU/CIRA Data Assimilation Workshop*, NCAR, Boulder, CO, September 19, 2005 (Session Chair).

## Invited Technical Presentations / Panels

1. "Using Remote Sensing for Water Condition Framework (WCF) Objectives – New Opportunities... Thoughts Regarding Very Useful Linkages," *Integrated Data and Tools for Watershed Condition Assessments – Interagency Workshop, USDA/USFS/NCAR*, Fort Collins, CO, September 6-7, 2017.
2. "Soil Moisture Data and Conversion of Raw Data", AVT 37<sup>th</sup> Panel Business Meeting, Next Generation NATO Reference Mobility Model (NRMM) Development, NATO/OTAN, Science &

- Technology Organization (STO), Vilnius, Lithuania, May 16, 2016, (Andrew Jones presenting in collaboration with Mark Cammarere, Keith Gemeinhart, Jeffrey Niemann, and Joseph Scalia).
3. Jones, A. S., 2017: CSU research applied toward systems-level integration of climate and weather data to crop and economic models, Phytobiome Alliance Member Presentation, Fort Collins, CO (via telecon), May 1, 2017.
  4. "Determination of Terrain Ponding for Logistics Emplacement and Planning (TARDEC Tasking)," TARDEC, Warren, MI, April 17, 2017, (Mark Cammarere and Jeff Niemann presenting, in collaboration with Keith Gemeinhart, Andrew Jones, and Joseph Scalia).
  5. "Technology Concepts for Food Security and Humanitarian Relief," TARDEC, Warren, MI, March 31, 2017, (Peter Grazaitis, Mark Cammarere in collaboration with Jeff Niemann and Andrew Jones).
  6. "CSU SBIR Progress Related to the Next Generation – NATO Reference Mobility Model (NG\_NRMM)", TARDEC (via telecon), Fort Collins, CO, Feb. 16, 2017.
  7. "Sustainable Food Production: How Innovation Points to Creative Possibilities," 2016 International Colloquium: Global Food Security & Sustainability, Invited Panel on: Sustainable Food Production: How Innovation Points to Creative Possibilities, Fort Collins, CO, November 29, 2016.
  8. "Determination of Terrain Ponding for Logistics Emplacement and Planning," TARDEC, Warren, MI, October 13, 2016, (Mark Cammarere and Jeff Niemann presenting, in collaboration with Keith Gemeinhart, and Andrew Jones).
  9. "Linking Weather and Climate to the Phytobiome," Foundation for Food and Agriculture Research (FFAR) Convening Meeting on the Phytobiome, Tampa, FL, July 29, 2016.
  10. "Terra Forma Engineering", Army Research Office Visit, Fort Collins, CO, July 19, 2016.
  11. "Linking Weather/Climate/Soil Moisture to Plants/Disease/Food/People and Decisions," ARL/HRED (via telecon), Fort Collins, CO, July 13, 2016.
  12. "CSU Atmospheric Science (ATS) Dept. and Cooperative Institute for Research in the Atmosphere (CIRA) – Weather Research Activities," MRIGlobal Visit, Fort Collins, CO, May 19, 2016.
  13. "Equilibrium Moisture from Topography, Vegetation, and Soil (EMT+VS) Downscaling Product," AVT 37<sup>th</sup> Panel Business Meeting, Next Generation NATO Reference Mobility Model (NRMM) Development, NATO/OTAN, Science & Technology Organization (STO), Tallinn, Estonia, April 26, 2016, (Andrew Jones presenting in collaboration with Mark Cammarere, Keith Gemeinhart, and Jeffrey Niemann).
  14. "Equilibrium Moisture from Topography, Vegetation, and Soil (EMT+VS) Downscaling Product," TARDEC, Warren, MI, January 11, 2016, (Mark Cammarere and Jeff Niemann presenting, in collaboration with Keith Gemeinhart, and Andrew Jones).
  15. "Presentation and Status Update to the Bill and Melinda Gates Foundation," Bill and Melinda Gates Foundation (BMGF), Seattle, WA, October 29, 2015.
  16. "Tools for Thinking Big: Big Data", Food Systems Workshop, Fort Collins, CO, September 28, 2015.
  17. "CSU Atmospheric Science (ATS) Department and Cooperative Institute for Research in the Atmosphere (CIRA) – Army-Relevant Weather Research Activities," Fort Collins, CO, September 25, 2015.

18. "CSU Atmospheric Science (ATS) Department and Cooperative Institute for Research in the Atmosphere (CIRA) – Weather Research Activities," Mars Incorporated Visit, Fort Collins, CO, August 14, 2015.
19. "CSU Atmospheric Science (ATS) Department and Cooperative Institute for Research in the Atmosphere (CIRA) – Weather Research Activities," Merage Foundation Meeting, Fort Collins, CO, July 23, 2015.
20. "Exploitation of SMAP Data for Army and Marine Corps Mobility Assessment," NASA Early Adopter Greenbelt, MD (via telecon), June 25, 2015, (Gary McWilliams presenting, in collaboration with Li Li, Andrew Jones, and Maria Stevens).
21. "CSU Links to DoD Transdisciplinary Topics," Army Research Office Visit, CSU, Fort Collins, CO, June 17, 2015.
22. "Operational Readiness Review: Blended-Hydro Products with S-NPP Capability," College Park, MD, (via telecon), July 1, 2015, (Limin Zhao presenting, in collaboration with Stan Kidder, John Forsythe, Andrew Jones, Ralph Ferraro, Vicky Lin, Clay Davenport, and Steve Quinn).
23. "Recent Developments in Non-Gaussian Based Data Assimilation Systems," NRL, Monterey, CA, June 23, 2015, (Steven Fletcher presenting, in collaboration with Anton Kliewer, Andrew Jones, and John Forsythe).
24. "The CSU post-processor applied to LIS and WindSat as compared to in situ data," Soil Moisture Working Group Meeting, Army Research Laboratory, Adelphi MD (via telecon), June 5, 2015.
25. "LIS post-processor algorithm to mitigate spatial errors and absolute biases," Soil Moisture Working Group Meeting, Army Research Laboratory, Adelphi, MD (via telecon), May 12, 2015.
26. "Climate Smart Agriculture – A new data era leads to new opportunities," *Colorado Agriculture Innovation Summit – Climate Smart Agriculture: Master Classroom*, Fort Collins, CO, March 18, 2015.
27. "Global Development Analytics, Rocky Mountain Consortium for Global Development (poster)," Global Forum for Innovations in Agriculture, ADNEC, Abu Dhabi, March 9-10, 2015.
28. "Blended Hydrometeorological Products in the JPSS/GOES-R Era," NOAA Satellite Science Week, February 2015, (John Forsythe presenting, in collaboration with Stan Kidder, Andrew Jones).
29. "New Large-scale Foundation Research & Development Activities at CSU," College of Engineering Meeting, Fort Collins, CO, February 17, 2015.
30. "CSU Rocky Mountain Consortium for Global Development (RMCGD) Interactions and Potential for ICSA and wider CSU R&D Community Engagement," Innovation Center for Sustainable Agriculture (ICSA) Meeting, Fort Collins, CO, February 5, 2015.
31. "CSU Soil Moisture Applications Consortium (SMAC) Project Overview and Technical Updates," DoD Soil Moisture Working Group Meeting, White Sands Missile Range, NM, February 12, 2015.
32. "An Update on CSU Environmental R&D Activities," Army TIM Meeting, White Sands Missile Range, NM, February 11, 2015.
33. "Determination of Terrain Ponding for Logistics Emplacement and Planning (Phase II Kick Off Brief)," (Mark Cammarere, Jeffrey Niemann, Andrew Jones), Aberdeen Proving Ground (via telecon), MD, February 4, 2015.

34. "Rocky Mountain Consortium for Global Development (RMCGD) CSU Activities," RMCGD Meeting, Broomfield, CO, January 28, 2015.
35. "Data Assimilation Overview – Future Directions," (Steve Fletcher, Andrew Jones), RMCGD Meeting, Broomfield, CO, January 27, 2015.
36. "Introduction to an On-line Location-specific Data Platform for Large-scale CSU Transdisciplinary Agriculture/Environmental/Public Health/Climate Change Global Studies", in collaboration with Dave Lundberg and Lori Wiles, CSU 2015 Professional Development Institute (PDI), Fort Collins, January 14, 2015.
37. "Critical Design Review (CDR): Blended RR and TPW Products including AMSR2 Data (Jones subcomponent)", Camp Springs, MD (via telecon), 10 December, 2014.
38. "ADVCLD Project: Outbrief", USAF/AFWA, Bellevue, NE, November 19, 2014.
39. "Equilibrium Moisture from Topograph, Vegetation, and Soil (EMT+VS) Downscaling Product Meeting," Fort Collins, CO, October 29, 2014.
40. "CSU, Big Data and Cloud Computing," Amity University Meeting, Fort Collins, CO, October 17, 2014.
41. Invited Panelist for: "Visions of Future Earth, Linking Society, Economics, and the Environment – Climate Smart Agriculture", School of Global Environmental Sustainability (SoGES), Fort Collins, CO, October 7, 2014.
42. "Hydrometeorological Data Assimilation and Blended Product Generation at CIRA," VT Group Meeting, Fort Collins, CO, August 12, 2014.
43. "CSU Global Development Transdisciplinary Research", Rocky Mountain Consortium for Global Development (RMCGD): Global Development Session with an Emphasis on India, University Consortium for Atmospheric Research (UCAR), Boulder, CO, May 19, 2014.
44. "Atmospheric Sciences Data Management – Opportunities for Transdisciplinary Collaboration", Information Science and Technology Center (ISTeC) Data Management Forum, CSU, Fort Collins, CO, May 2, 2014.
45. "Atmospheric Sciences – Data Analytics", Bill and Melinda Gates Foundation Visit, Infectious Disease Super Cluster (IDSC), Fort Collins, CO, April 25, 2014.
46. "Soil Moisture Error Budget Analysis", DoD Soil Moisture Working Group (SMWG), Fort Collins, CO, April 7, 2014.
47. "Atmospheric Sciences – Data Analytics", Lawrence Livermore National Laboratory (LLNL) Visit, Infectious Disease Super Cluster (IDSC), Fort Collins, CO, March 27, 2014.
48. "Satellite Soil Moisture Error Budget Analysis", DoD Soil Moisture Working Group (SMWG) Meeting (via telecon), Fort Collins, CO, March 26, 2014.
49. "Determination of Terrain Ponding for Logistics Emplacement and Planning", Army SBIR Phase I Final Brief (Mark Cammarere, Keith Gemeinhart, Jeffrey Niemann, Andrew Jones, via telecon), Fort Collins, March 18, 2014.
50. "System of Systems Error Budget Analysis: Proposed Error Definitions (Part 2)", DoD Soil Moisture Working Group (SMWG) Meeting (via telecon), Fort Collins, CO, February 26, 2014.

51. "Overview of the Gates Foundation Project on Precipitation / Soil Moisture", Weather Analytics Visit, Fort Collins, CO, February 25, 2014.
52. "System of Systems Error Budget Analysis: Proposed Error Definitions (Part 1)", DoD Soil Moisture Working Group (SMWG) Meeting (via telecon), Fort Collins, CO, February 19, 2014.
53. "Colorado State University, Atmospheric Modeling and Applications Capabilities," Sierra Nevada Corporation Visit, Fort Collins, CO, December 13, 2013.
54. "CSU SMWG Project Task Updates and Near-term Needs," DoD Soil Moisture Working Group (SMWG) Meeting, ERDC, Vicksburg, MS, December 9, 2013.
55. "Quality Control Assessment of the Data Assimilation Input Variables," DoD Soil Moisture Working Group (SMWG) Meeting, ARL/BED, Adelphi, MD, September 25, 2013.
56. "Rocky Mountain Consortium for Global Development (RMCGD) Overview," CIAT Visit, Fort Collins, CO, September 13, 2013.
57. "Colorado State University, Atmospheric Modeling and Applications Capabilities," Rocky Mountain Consortium for Global Development, NCAR, Boulder, CO, August 20, 2013.
58. "Colorado State University, Atmospheric Modeling and Applications Capabilities," GDA/aWhere Visit, Fort Collins, CO, June 13, 2013.
59. "Colorado State University, Geoscience Analysis, Modeling, and Applications", Army Weather Coordinating Council (AWCC) Meeting (via telecon), Adelphi, MD, April 25, 2013.
60. "Colorado State University's (CSU) Environmental Modeling and Remote Sensing Activities for DoD Applications," CEMML, Fort Collins, CO, February 26, 2013.
61. "Colorado State University's (CSU) Environmental Modeling and Remote Sensing Activities for DoD Applications," CERL, Champaign, IL, October 17, 2012.
62. "Mobility Modeling using SMAP Data," CERL, Champaign, IL, October 17, 2012.
63. "New Satellite Cal/Val and Data Distribution Capabilities for Remote Global Locations (e.g., Africa), DAMI and ARL, September 2012 (prepared for presentation).
64. "DoD Soil Moisture Applications Consortium (SMAC) Update," NASA, September 13, 2012, prepared for presentation by Mr. Gary McWilliams (ARL/BED).
65. "An update on the research activities of the CSU DoD Center for Geosciences / Atmospheric Research (CG/AR) program and the CIRA Blended Products Team", NRL-FNMOC, Monterey, CA, September 12, 2012.
66. "CSU ADVCLD and PCFLOS Projects," AFWA, Omaha, NE, June 4, 2012.
67. "Atmospheric/Geosciences Modeling, Downscaling, and Satellite Data Assimilation", Numerica Corporation Visit, Fort Collins, CO, April 23, 2012.
68. "Hydrometeorology Theme Overview", CG/AR Annual Review, Fort Collins, CO, March 7, 2012.
69. "DoD Soil Moisture and Applications", CG/AR Annual Review, Fort Collins, CO, March 7, 2012.
70. ARO Environmental Sciences Coordination Group (ESCOG) Briefing", ARL/ARO, Adelphi, MD (via telecon), 15 February, 2012.



71. "CIRA and ATS Overview to *aWhere* for exploration of Bill and Melinda Gates Foundation Sponsored Collaboration Opportunities at CSU", Fort Collins, CO, 25 January, 2012.
72. "POES-GOES Blended Hydrometeorological Products Project, Meeting #20, Implementation issues for the enhanced TPW, Preparation for NPP, GOES-15 readiness, GCOM-W readiness (Jones subcomponents)", Camp Springs, MD (via telecon), 5 October, 2011.
73. "AFWA Collaboration Opportunities at CSU", Fort Collins, CO, 28 September, 2011.
74. "MET Project: CIRA Updates (Jones)", MET Project Collaboration Workshop, 23 September, 2011.
75. "Critical Design Review (CDR): Blended RR Products and High Resolution Blended TPW Products (Jones subcomponent)", Camp Springs, MD (via telecon), 27 July, 2011.
76. "ACAPS Activities at CSU", ACAPS Kick-off Meeting, Boulder, CO (via telecon), 19 May, 2011.
77. "CSU CG/AR MyWIDA-Log Java "Ponding" Implementation", MyWIDA Workshop, Army Research Laboratory, White Sands Missile Range, NM (via telecon), 18 May, 2011.
78. "CSU/CG/AR DoD Center for Geosciences / Atmospheric Research", Army Weather Coordinating Council (AWCC) Meeting, Adelphi, MD, March 22-24, 2011.
79. "CG/AR Technology Transitions and Related Discussions", CG/AR Annual Review, Fort Collins, CO, March 9, 2011.
80. "Hydrometeorology Theme Overview", CG/AR Annual Review, Fort Collins, CO, March 8, 2011.
81. "Deep Soil Moisture Retrieval Implementation", CG/AR Annual Review, Fort Collins, CO, March 8, 2011.
82. "CG/AR Environmental Modeling and Assimilation Theme Overview", CG/AR Annual Review, Fort Collins, CO, March 8, 2011.
83. "ATS/CIRA Research Overview – Andrew Jones", CSU Atmospheric Sciences Department, Fort Collins, CO, February 24, 2011.
84. "A Brief History of Satellite Data Assimilation and a Look at its Future", AT786 Class, CSU, Fort Collins, CO, February 7, 2011.
85. "An Introduction to Satellite Data Assimilation", AT786 Class, CSU, Fort Collins, CO, January 31, 2011.
86. "A History of Data Assimilation", AT737 Class, CSU, Fort Collins, CO, December 1, 2010.
87. "What is Data Assimilation?", AT737 Class, CSU, Fort Collins, CO, November 29, 2010.
88. "CSU ACAPS Regional Satellite Cloud Climatologies", NCAR, Boulder, CO (via telecon), November 8, 2010.
89. "Status and Test Results from the Deep Environmental Estimator and Predictor", NPOESS IPO MIS Performance Team Meeting, Silver Springs, MD, September 15-16, 2010.
90. "Planned ACAPS activities at CSU", ACAPS Mid-year Review Meeting, Boulder, CO, July 21, 2010.
91. "Deep Soil Moisture from MIS", NPOESS IPO MIS Performance Team Meeting, Silver Springs, MD, July 7, 2010.

92. "CSU/CIRA DoD Center for Geosciences / Atmospheric Research", Army Weather Coordinating Council (AWCC) Meeting, Adelphi, MD, June 8-9, 2010.
93. "Hydromet Theme Overview", CG/AR Annual Review, Fort Collins, CO, March 30, 2010.
94. "Deep Soil Moisture Assimilation using Passive Microwave Data", CG/AR Annual Review, Fort Collins, CO, March 30, 2010.
95. "CG/AR Environmental Modeling and Assimilation Theme Overview", CG/AR Annual Review, Fort Collins, CO, March 30, 2010.
96. "CG/AR Technology Transitions and Related Discussions", CG/AR Annual Review, Fort Collins, CO, March 31, 2010.
97. "Agency Presentation: ARL/CSU", Co-authors: Gary McWilliams, Prof. Jeff Niemann, 3<sup>rd</sup> Interagency Land Surface Dynamics Coordination Meeting, CRREL, Hanover, NH, February 11-12, 2010.
98. "Boundary Layer: Group Summary Report", *Weather in Mountainous Terrain Workshop*, Tempe, AZ, February 1-2, 2010.
99. "Deep Soil Moisture Retrievals", ARO-AFWA Workshop on Dust Forecasting and Land Surface Dynamics, Omaha, NE, November 16-17, 2009.
100. "MPT Status: Land EDRs: test bed development and performance analysis, the deep soil moisture algorithm", NPOESS IPO MIS Performance Team Meeting, Silver Springs, MD, November 13, 2009.
101. "DoD Seminar Series, Student/Staff Session Welcome", Fort Collins, CO, October 28, 2009.
102. "DoD Seminar Series, Faculty Session Welcome", Fort Collins, CO, October 27, 2009.
103. "DoD Seminar Series, Student/Staff Session Welcome", Fort Collins, CO, October 27, 2009.
104. "CG/AR Overview", NOAA/NESDIS/STAR Meeting, Fort Collins, CO, October 21, 2009.
105. "Current and Future Observing Systems and Choice of Cloud Observables", Co-author: Dr. Steven Fletcher, AFWA Cloud Analysis Workshop, Boulder, CO, September 2, 2009.
106. "Lessons Learned from the CSU Cloudy Data Assimilation Research", DTC Verification Workshop, Boulder, CO, August 28, 2009.
107. "CSU/CIRA DoD Center for Geosciences / Atmospheric Research", CG/AR Congressional Brief, Fort Collins, CO, August 19, 2009.
108. "MIS Performance Team Meeting Deep Soil Moisture Status Update", MIS Performance Team Meeting, Silver Springs, MD, (telecon), July 15, 2009.
109. "CG/AR Hydrometeorology Theme Overview", CG/AR Annual Review, Fort Collins, CO, March 11, 2009.
110. "Deep Soil Moisture Detection using Passive Microwave Data", CG/AR Annual Review, Fort Collins, CO, March 11, 2009.
111. "CG/AR Environmental Modeling and Data Assimilation Theme Overview", CG/AR Annual Review, Fort Collins, CO, March 11, 2009.
112. "Modeling and Data Assimilation for Army-Scale and Regional Applications", CG/AR Annual Review, Fort Collins, CO, March 11, 2009 (joint talk with Dr. Fletcher).

113. "Deep Soil Moisture EDR Algorithm (Land: Part 2 of 2)", NPOESS IPO, Microwave Imager Sounder (MIS) Performance Team Meeting #4, Silver Spring, MD, February 4, 2009.
114. "Critical Design Review, The Blended TPW Products", Ms. Limin Zhao, Dr. Stan Kidder, Mr. Peter Keehn (primary speakers), Fort Collins, CO, December 16, 2008.
115. "What is Data Assimilation?", AT737 Class, CSU, Fort Collins, CO, November 19, 2008.
116. "CIRA Soil Moisture and Data Assimilation Research", CIRA/CREST/NOAA Technical Interchange Meeting, Camp Springs, MD, November 13, 2008.
117. "Soil Moisture EDR Algorithm and Whitepaper Discussion", NPOESS IPO, Microwave Imager Sounder (MIS) Performance Team Meeting #3, Silver Spring, MD, November 12, 2008.
118. "ARL/CIRA Deep Soil Moisture Activities", ARL/NOAA Technical Interchange Meeting (TIM), Adelphi, MD, September 30, 2008.
119. "Integrated Surface and Deep Soil Moisture Algorithm Performance Plan", NPOESS IPO, Microwave Imager Sounder (MIS) Performance Team Meeting #2, Silver Spring, MD (telecon), September 17, 2008.
120. "A Tutorial – What is Data Assimilation?", NOAA-CREST, New York, New York, September 9, 2008.
121. "CG/AR Overview", NCAR/RAL – ARL WRF Meeting, Boulder, CO, August 4-5, 2008.
122. "Retrieving Deep Soil Moisture – Research to Operations", NPOESS IPO, Microwave Imager Sounder (MIS) Performance Team Meeting #1, Silver Spring, MD (telecon), July 30, 2008.
123. "CG/AR Overview", CG/AR Research Progress Meeting, Fort Collins, June 12, 2008.
124. "Environmental Modeling and Data Assimilation", CG/AR Research Progress Meeting, Fort Collins, June 12, 2008.
125. "Weather Impacts Decision Aids (WIDA) Workshop Summary", CG/AR Research Progress Meeting, Fort Collins, June 12, 2008.
126. "Remote Sensing of Battlespace Parameters", CG/AR Research Progress Meeting, Fort Collins, June 12, 2008.
127. "CG/AR", Briefing to the Secretary of the Air Force Wynne, Fort Collins, CO, May 29, 2008.
128. "CG/AR Overview", Aerospace/CIRA Cloud Forecasting Meeting, Fort Collins, CO, May 19, 2008.
129. "Cloudy Data Assimilation Techniques", Aerospace/CIRA Cloud Forecasting Meeting, Fort Collins, CO, May 19, 2008.
130. "WRF-Var Data Assimilation Development and Other Research Transition Activities", Weather Impacts Decision Aids Workshop, Adelphi, MD, March 25-27, 2008.
131. "CSU WRF-Var Update", NCAR/MMM CSU/CIRA Data Assimilation Workshop, Fort Collins, CO, March 13, 2008.
132. "CSU WRF-Var Contract Status: including emissivity, APC, preconditioner discussions...", NCAR/MMM CSU/CIRA Data Assimilation Workshop, Fort Collins, CO, March 13, 2008.
133. "WRF-Var Future Work Plans", NCAR/MMM CSU/CIRA Data Assimilation Workshop, Fort Collins, CO, March 13, 2008.

134. "Satellite Algorithm Testbed (SATB) Desirables: CIRA", SATB Workshop, Suitland, MD, February 26-27, 2008.
135. "CG/AR Roundtable Discussions with ARL and Other DoD Labs: Technical Summary", Fort Collins, CO, February 21, 2008.
136. "Microwave Surface Products", COMET Lecture, Fort Collins, CO, May 8, 2007.
137. "Satellite Data Assimilation", AT737 Class, CSU, Fort Collins, CO, April 20, 2007.
138. "Modeling and Data Assimilation for Army-Scale and Regional Applications", CG/AR Annual Review, Fort Collins, CO, April 17-19, 2007.
139. "Soil Moisture Detection using WindSat Data", CG/AR Annual Review, Fort Collins, CO, April 17-19, 2007.
140. "CIRA Data Assimilation Status Update", 3<sup>rd</sup> Joint NCAR/MMM CSU/CIRA Data Assimilation Workshop, NCAR, Boulder, CO, February 5, 2007.
141. "Application of WindSat for Soil Moisture Satellite Data Assimilation and DoD Impact Studies", DoD/OSD NPOESS Technical Review, February 21, 2006 (electronic presentation).
142. "Application of WindSat for Soil Moisture Satellite Data Assimilation and DoD Impact Studies", NPOESS/IPO IGS Review, December 20, 2005.
143. "4D Data Assimilation using WindSat Data to Retrieve Soil Moisture", CG/AR Annual Review, Adelphi, MD, November 15-17, 2005.
144. "Soil Moisture Data Assimilation with Microwave Radiance", Joint NCAR/MMM CSU/CIRA Data Assimilation Workshop, NCAR, Boulder, CO, September 19, 2005.
145. "DPEAS Usage and Programming", NOAA/NESDIS HPCC Training Seminar, Camp Springs, MD, September 16, 2005.
146. "Soil Moisture Modeling using WindSat Data", NPOESS Soil Moisture Working Group, Silver Spring, MD, September 13, 2005.
147. "Applications of WindSat for Soil Moisture Satellite Data Assimilation and DoD Impact Studies", CSU/CIRA, Fort Collins, CO, August 29, 2005.
148. "Overview of the Data Processing and Error Analysis System", NESDIS/ORA, Camp Springs, MD, May 16, 2005.
149. "NPOESS Study using WindSat Data", NPOESS Soil Moisture Working Group, Phoenix, AZ, May 4, 2005.
150. "DPEAS Training Session", NESDIS/OSDPD, Suitland, MD, April 19, 2005.
151. "Global Microwave Surface Emissivity Error Analysis", 3<sup>rd</sup> JCSDA Workshop on Satellite Data Assimilation, Camp Springs, MD, April 20-21, 2005.
152. "NPOESS Soil Moisture Studies using WindSat Data", WindSat Meeting, Solomons, MD, November 17-18, 2004.
153. "CG/AR Hydrometeorology Theme", CG/AR Annual Review, White Sands Missile Range, NM, November 16-19, 2004.

154. "NPOESS Study using WindSat Data", NPOESS Soil Moisture Working Group, Silver Spring, MD, November 9, 2004.
155. "Cross-sensor Processing Environment", Multisensor Workshop, Laguna Beach, CA, May 26-27, 2004.
156. "Global Microwave Surface Emissivity Error Analysis", 2nd JCSDA Workshop on Satellite Data Assimilation, Camp Springs, MD, April 15-16, 2004.
157. "CG/AR Hydrometeorology Theme", CG/AR Annual Review, Fort Collins, CO, January 21-22, 2004.
158. "Applications of WindSat for Soil Moisture Satellite Data Assimilation and DoD Impact Studies", NPOESS IPO, Silver Springs, MD, November 19, 2003.
159. "Low Frequency Passive Microwave Satellite Data Assimilation Research for Retrieving Deep (10-100 cm) Soil Moisture Information", NOAA/ETL, Boulder, CO, August 20, 2003
160. "All Weather Data Assimilation", NOAA/FSL, Boulder, CO, August 4, 2003
161. "Alternative Dissemination Methods and Tools", JCSDA Workshop, Camp Springs, MD, June 3, 2003
162. "Global Microwave Surface Emissivity Error Analysis", JCSDA Workshop, Camp Springs, MD, June 2, 2003
163. "Soil Moisture / Cloud Data Assimilation Experiments", NPOESS IPO, Silver Springs, MD, January 9, 2003.
164. "CG/AR Theme: Hydrometeorology", CG/AR Annual Review, Adelphi, MD, January 7-9, 2003.
165. "Cross-sensor Challenges", NESDIS/OSDPD, Suitland, MD, December 8, 2002.
166. "The Cross-sensor Processing Environment (CPE) Primer", NESDIS/OSDPD, Suitland, MD, December 8, 2002.
167. "Variational data assimilation of soil moisture using a satellite observational operator and its adjoint", NRL, Monterey, CA, July 16, 2002.
168. "Soil Moisture EDR", CMIS PDR, Ball Aerospace, Louisville, CO, February 27 – March 1, 2001.
169. "Land Surface Temperature EDR", CMIS PDR, Ball Aerospace, Louisville, CO, February 27 – March 1, 2001.
170. "Vegetation / Surface Type Classification EDR", CMIS PDR, Ball Aerospace, Louisville, CO, February 27 – March 1, 2001.
171. "Soil Moisture EDR", CMIS Systems Integration Team (SIT) Working Group Meeting #15, NPOESS IPO, Tamasag, Bellvue, CO, December 12, 2000.
172. "Land Surface Temperature EDR", CMIS Systems Integration Team (SIT) Working Group Meeting #15, NPOESS IPO, Tamasag, Bellvue, CO, December 12, 2000.
173. "Vegetation / Surface Type Classification EDR", CMIS Systems Integration Team (SIT) Working Group Meeting #15, NPOESS IPO, Tamasag, Bellvue, CO, December 12, 2000.
174. "Incorporation of Multisensor Satellite Data within Numerical Weather Prediction Models", NOAA NESDIS-NCEP Seminar, Camp Springs, MD, September 12, 2000.

175. "Soil Moisture EDR Update", CMIS Systems Integration Team (SIT) Working Group Meeting #12, NPOESS IPO, CIRA, Fort Collins, CO, May 24, 2000.
176. "Land Surface Temperature EDR", CMIS Systems Integration Team (SIT) Working Group Meeting #12, NPOESS IPO, CIRA, Fort Collins, CO, May 24, 2000.
177. "Algorithm Theoretical Basis Document Structure", CMIS Systems Integration Team (SIT) Working Group Meeting #12, NPOESS IPO, CIRA, Fort Collins, CO, May 23, 2000.
178. "Soil Moisture EDR", CMIS Systems Integration Team (SIT) Working Group Meeting #10, NPOESS IPO, NRL, Monterey, CA, December 14, 1999.
179. "How to get better space-based soil moisture estimates that are 'good enough'", CG/AR Annual Review, Tamasag, Bellvue, CO, October 28, 1999.
180. "Low-level cloud detection over land using TRMM passive microwave radiometry", CG/AR Annual Review, Tamasag, Bellvue, CO, October 28, 1999.
181. "Lessons learned using HDF-EOS for multisensor data fusion", CEOS WGISS – Data Subgroup, Global Mapping Task Team Meeting, Boulder, CO, September 22, 1998.
182. "Microwave Surface Emissivity over Land", CMIS Systems Integration Team (SIT) Working Group Meeting #5, NPOESS IPO, Ball Aerospace, Boulder, CO, May 12, 1998.
183. "Remote Sensing using Coupled Satellite/Model Systems", CIRA 5-year Science Review, Tamasag, Bellvue, CO, April 21, 1998.
184. "Phase II Summary Briefing of Tasks 6 and 7", Briefing Phase II Center for Geosciences, Naval Research Laboratory (NRL), Monterey, CA, November 25, 1997.
185. "Phase II Summary Briefing of Tasks 4, 6, 7, and 8", Briefing Phase II Center for Geosciences, Office of Naval Research (ONR), Washington, DC, October 11, 1997.
186. "Satellite Hydrometeorology", DOD Center for Geosciences Workshop on 2D Surface Runoff Modeling, Fort Collins, CO, January 19, 1995.
187. "Cloud Liquid Water Retrieval over Land Using SSM/I and GOES Satellite Data: Data Fusion Aspects", Cold Regions Research Engineering Laboratory (CRREL), Hanover, NH, February 21, 1991.