

Curriculum Vitae

CHRISTOPHER S. RUF

Professor of Atmospheric, Oceanic & Space Sciences
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EDUCATION

Ph.D. 1987 Electrical and Computer Engineering, Univ. of Massachusetts at Amherst
B.A. 1982 Physics, Reed College, Portland, OR

PROFESSIONAL EXPERIENCE

May 2006 - present *Director, Space Physics Research Laboratory*
University of Michigan, Ann Arbor, MI
Jul 2000 - present *Associate Professor/Professor, Departments of AOSS and EECS*
University of Michigan, Ann Arbor, MI
Sep 2000 – Dec 2000 *Guest Professor, Department of Electromagnetic Systems*
Technical University of Denmark, Lyngby, DK
Jan 1992 - Jun 2000 *Assistant/Associate Professor, Department of Electrical Engineering*
Pennsylvania State University, University Park, PA
Jul 1988 - Dec 1991 *Member of Technical Staff, Microwave Observational Systems*
Jet Propulsion Laboratory, Pasadena, CA
Jun 1987 - Jun 1988 *Visiting Professor and Research Engineer,*
Dept. Electrical and Comp. Eng., Univ. Massachusetts, Amherst, MA
Sep 1983 - May 1987 *Graduate Research Assistant, Microwave Remote Sensing Lab*
Dept. Electrical and Comp. Eng., Univ. Massachusetts, Amherst, MA

CURRENT RESEARCH ACTIVITIES

- Satellite Programs: Science and Cal/Val Team member for NASA Jason, US Navy WindSat, NASA Aquarius, NASA Global Precipitation Measurement. Instrument Team member for NASA Juno. Performance Team member for IPO NPOESS MIS. On orbit cal/val and performance assessment for US Navy GEOSAT Follow-On Water Vapor Radiometer.
- Science and applications of remote sensing: Active/Passive microwave precipitation studies. Development, characterization and application of stationary statistical properties of geophysical parameters and remotely sensed radiobrightness.
- Instrumentation and technology development: System engineering of synthetic thinned aperture radiometers. Integrated digital microwave radiometry. Radio frequency interference detection and mitigation. Calibration and image processing algorithms and system architecture.

TEACHING EXPERIENCE

Graduate level: Inversion of Integral Transforms in Remote Sensing
 Mathematical Methods in Electromagnetics
 Theory of Microwave Remote Sensing
 Methods and Applications of Remote Sensing
 Atmospheric Radiative Transfer

Undergraduate level: Electromagnetic Theory and Applications
 Introduction to Remote Sensing
 Radiowave Propagation and Communication
 Introduction to Earth Science Data Analysis and Matlab Applications
 Circuit Design & Linear Systems Theory and Applications

GRADUATE STUDENTS SUPERVISED

Bala Subramanya, M.S. 1993	Savyasachee Mathur, M.S. 1994
Justin Bobak, M.S. 1994, Ph.D. 1998	Shawn Beus, M.S. 1996
Sean Daisley, MS. 1997	Rajiv Dewan, M.S. 1998
Sandra Cruz-Pol, Ph.D. 1998	Jude Giampaolo, M.S. 1999
Hans Rosenberger, M.S. 1999	Haiping Zhang, M.S. 1999
Gozde Fidan, M.S. 2000	Jikang Li, M.S. 2002
Sandra Lindström, M.S. 2002	Chris Schwartz, M.S. 2004
Ying Hu, M.S. 2005	Shannon Brown, Ph.D. 2005
Hirofumi Kawakubo, M.S. 2007	Jinzheng Peng, Ph.D. 2008
Boon Lim, Ph.D. 2008	Sidharth Misra, <i>in progress</i>
David Fenigstein, <i>in progress</i>	Shannon Curry, <i>in progress</i>
Amanda Mims, <i>in progress</i>	Rachael Kroodsma, <i>in progress</i>

UNIVERSITY SERVICE

Program Director and Academic Adviser, AOSS Masters of Engineering in Space Engineering (2004-2006)

AOSS Departmental Representative, EECS/AOSS/CEE Doctoral Program in Geoscience and Remote Sensing (2000-present)

Program Director and Academic Adviser, AOSS Masters of Engineering in Applied Remote Sensing and GeoInformation Systems (2000-2004)

Member, Oversight Committee for Graduate Certificate Program in Spatial Analysis, School of Natural Resources and Environment (2001-present)

Faculty Advisor, U-M Amateur Radio Club (2003 –2006)

PROFESSIONAL SERVICE

Editor, IEEE Transactions on Geoscience and Remote Sensing (2008-present)

Associate Editor, AMS Journal of Atmospheric and Oceanic Technology (2006-2008)

Associate Editor, IEEE Transactions on Geoscience and Remote Sensing (2001-2008)

Guest Editor for WindSat Special Issue, IEEE Trans. Geosci. Remote Sens. (2005-2006)

Member, Committee on the Scientific Uses of the Radio Spectrum, National Research Council Board of Physics and Astronomy, 2007-present.

Member, Weather Panel for the National Research Council's Space Studies Board study "Earth Science and Applications from Space : A Community Assessment and Strategy for the Future", 2005-2006.

Microwave Sub-committee Co-chair, NASA Capabilities Roadmap Committee on Science Instruments and Sensors, 2004-2005.

Member, NASA Earth Science Technology Office Radar/Radiometry Working Group, 2003-2004.

Session Chairman, Member of Technical Program Committee for IEEE 2007 International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN

Session Chairman, Member of Technical Program Committee for IEEE 2006 International Geoscience and Remote Sensing Symposium, Denver, CO

Member of Technical Program Committee for IEEE 2005 International Geoscience and Remote Sensing Symposium, Seoul, Korea

Session Chairman, Member of Technical Program Committee for IEEE 2004 International Geoscience and Remote Sensing Symposium, Anchorage, Alaska

Member of Technical Program Committee for Microwave Remote Sensing Conference, SPIE International Asia-Pacific Environmental Remote Sensing Symposium, 8-12 November 2004, Honolulu, HI.

Chairman, IEEE GRS-S Technical Committee on Frequency Allocations in Remote Sensing, 2001-2003.

Session chairman, Technical Program Committee Member – 2003 International Geoscience and Remote Sensing Symposium, Toulouse, France

Session chairman (2), Technical Program Committee Member – 2002 International Geoscience and Remote Sensing Symposium, Toronto, Canada

Technical Program Committee Member for SPIE 3rd International Asia-Pacific Environmental Remote Sensing Symposium on Remote Sensing of the Atmosphere, Ocean, Environment and Space, Hangzhou, China, October 2002.

Technical Program Committee Member – 2002 Second Microwave Radiometer Calibration Workshop, Barcelona, SPAIN, October 2002

Session chairman, Technical Program Committee Member – 2001 International Geoscience and Remote Sensing Symposium, Sydney, Australia

Session chairman, Technical Program Committee Member – 2000 International Geoscience and Remote Sensing Symposium, Honolulu, Hawaii

Technical Program Committee Member – 1999 International Geoscience and Remote Sensing Symposium, Hamburg, Germany

Editor, *IEEE Geoscience and Remote Sensing Society Newsletter* (1997-2000)

Guest Editor for *Radio Science*, American Geophysical Union (1997-1998)

Scientific Steering Committee Member, 5th Specialist Meeting on Microwave Radiometry and remote Sensing of the Environment, Boston, MA, November 1996

Associate Editor, *Radio Science*, American Geophysical Union (1992-1997)

PROFESSIONAL MEMBERSHIP

Member, IEEE Instrumentation and Future Technologies Committee (1996-present)

Member, IEEE GRS-S Tech. Comm. on Frequency Allocation in Remote Sensing (2002-present)
 Member of the IEEE Judith A. Resnik Technical Field Award Committee (2000 – 2003)
 Member, National Research Council Committee on Radio Frequency (2000-2003)
 Fellow, Institute of Electrical and Electronics Engineers (IEEE)
 Member, American Geophysical Union (AGU)
 Member, American Meteorological Society (AMS)
 Member, International Union of Radio Science (URSI), Commission F

FELLOWSHIPS and AWARDS

- 1984-1987: Massachusetts State Regents Graduate Fellowships
 1990: NASA Certificate of Recognition for *Sparse Aperture Interferometric Radiometer – Refining Two Dimensional Antenna Configuration*
 1992: NASA Certificates of Recognition (2) for *Synthetic Aperture Interferometric Radiometer Image Reconstruction Error Analysis* and *Piezoelectric Reflecting Array for Reflector Surface Distortion Compensation*
 1993: NASA Group Achievement Awards (2) for *TOPEX Microwave Radiometer* and *TOPEX Precision Orbit Determination*
 1994: NASA Group Achievement Award for *TOPEX Joint Verification Team*
 1997: IEEE Transactions on Geoscience and Remote Sensing Prize Paper Award for “*Retrieval of tropospheric water vapor scale height from horizontal turbulence structure,*” by Ruf and Beus, IEEE TGARS, **35**(2), 203-211, 1997.
 1999: IEEE Judith A. Resnik Technical Field Award “*For contributions to the absolute calibration of spaceborne microwave radiometers*”
 2001: Fellow, IEEE “*For contributions in the development, calibration and remote sensing applications of microwave radiometers*”
 2004: NASA Group Achievement Award for *Lightweight Rainfall Radiometer*
 2007: IEEE Geoscience and Remote Sensing Society Symposium Prize Paper Award for “*Detection of RFI by its Amplitude Probability Distribution,*” by Ruf, Misra, Gross and De Roo

JOURNAL PUBLICATIONS

49. Misra, S., P. N. Mohammed, B. Guner, C. S. Ruf, J. R. Piepmeier and J. T. Johnson, “Microwave Radiometer Radio Frequency Interference Detection Algorithms: A Comparative Study,” IEEE Trans. Geosci. Remote Sens., **47**(11), 3742-3754, doi:10.1109/TGRS.2009.2031104, 2009.
 48. Lim, B. H., and C. S. Ruf, “A High Resolution Full Earth Disk Model for Evaluating Synthetic Aperture Passive Microwave Observations from GEO,” IEEE Trans. Geosci. Remote Sens., **47**(11), 3731-3741, doi:10.1109/TGRS.2009.2031172, 2009.
 47. Keihm, S., S. Brown, J. Teixeira, S. Desai, W. Lu, E. Fetzer, C. Ruf, X. Huang and Y. Yung, “Ocean Water Vapor and Cloud Liquid Water Trends from 1992-2005 TOPEX Microwave Radiometer Data,” J. Geophys. Res., **114**(D18101), doi:10.1029/2009JD012145, 2009.
 46. Ruf, C., N. O. Renno, J. F. Kok, E. Bandelier, M. J. Sander, S. Gross, L. Skjerve, and B. Cantor, “Emission of Non-thermal Microwave Radiation by a Martian Dust Storm,” Geophys. Res. Lett., **36**(13), L13202, doi:10.1029/2009GL038715, 2009.

45. Peng, J., and C. S. Ruf, "Covariance Statistics of Polarimetric Brightness Temperature Measurements," *IEEE Trans. Geosci. Remote Sens.*, **46**(10), 3238-3251, 2008.
44. Misra, S., and C. S. Ruf, "Detection of Radio Frequency Interference for the Aquarius Radiometer," *IEEE Trans. Geosci. Remote Sens.*, **46**(10), 3123-3128, 2008.
43. Peng, J., and C. S. Ruf, "Calibration Method for Fully Polarimetric Microwave Radiometers Using the Correlated Noise Calibration Standard," *IEEE Trans. Geosci. Remote Sens.*, **46**(10), 3087-3097, 2008.
42. Lagerloef, G., F. R. Colomb, D. Le Vine, F. Wentz, S. Yueh, C. Ruf, J. Lilly, J. Gunn, Y. Chao, A. deCharon, G. Feldman and C. Swift, "The Aquarius/SAC-D mission –Designed to Meet the Salinity Remote Sensing Challenge," *Oceanography – Special Issues on Salinity*, **21**(1), 68-81, Mar 2008.
41. Tanner, A.B., W.J. Wilson, B.H. Lambrigsten, S.J. Dinardo, S.T. Brown, P.P. Kangaslahti, T.C. Gaier, C.S. Ruf, S.M. Gross, B.H. Lim, S. Musko, S. Rogacki, J.R. Piepmeier, "Initial Results of the Geostationary Synthetic Thinned Array Radiometer (GeoSTAR) Demonstrator Instrument," *IEEE Trans. Geosci. Remote Sens.*, **45**(7), 1947-1957, 2007.
40. De Roo, R., S. Misra and C. Ruf, "Sensitivity of the Kurtosis Statistic as a Detector of Pulsed Sinusoidal RFI," *IEEE Trans. Geosci. Remote Sens.*, **45**(7), 1938-1946, 2007.
39. Brown, S.T., and C.S. Ruf, "Validation and Development of Melting Layer Models Using Constraints by Active/Passive Microwave Observations of Rain and the Wind Roughened Ocean Surface," *AMS J. Oceanic Atmos. Tech.*, **24**(4), 543-563, 2007.
38. Ruf, C.S., and A.M. Warnock, "GEOSAT Follow On Water Vapor Radiometer: Performance with a Shared Active/Passive Antenna," *IEEE Trans. Geosci. Remote Sens.*, **45**(4), 970-977, 2007.
37. Ruf, C.S., S. M. Gross and S. Misra, "RFI Detection and Mitigation for Microwave Radiometry with an Agile Digital Detector," *IEEE Trans. Geosci. Remote Sens.*, **44**(3), 694-706, 2006.
36. Brown, S.T., C.S. Ruf and D.R. Lyzenga, "An Emissivity Based Wind Vector Retrieval Algorithm for the WindSat Polarimetric Radiometer," *IEEE Trans. Geosci. Remote Sens.*, **44**(3), 611-621, 2006.
35. Ruf, C.S., Y. Hu and S.T. Brown, "Calibration of WindSat Polarimetric Channels with a Vicarious Cold Reference," *IEEE Trans. Geosci. Remote Sens.*, **44**(3), 470-475, 2006.
34. Brown, S.T., and C.S. Ruf, "Determination of a Hot Blackbody Reference Target over the Amazon Rainforest for the On-orbit Calibration of Microwave Radiometers," *AMS J. Oceanic Atmos. Tech.*, **22**(9), 1340-1352, 2005.
33. Brown, S., C. Ruf, S. Keihm and A. Kitiyakara, "Jason Microwave Radiometer performance and on-orbit calibration," *Marine Geodesy*, **27**(1-2), 199-220, 2004.
32. Ruf, C.S. and J. Li, "A Correlated Noise Calibration Standard for Interferometric, Polarimetric and Autocorrelation Microwave Radiometers," *IEEE Trans. Geosci. Remote Sens.*, **41**(10), 2187-2196, 2003.
31. Ruf, C.S., "Vicarious Calibration of an Ocean Salinity Radiometer from Low Earth Orbit," *AMS J. Atmos. Oceanic Tech.*, **20**(11), 1656-1670, 2003.
30. Fischman, M.A., A.W. England and C.S. Ruf, "How digital correlation affects the fringe washing function in L-Band aperture synthesis radiometry", *IEEE Trans. Geosci. Remote Sens.*, **40**(3), 671-679, 2002.
29. Ruf, C.S., "Characterization and Correction of a Drift in Calibration of the TOPEX Microwave Radiometer", *IEEE Trans. Geosci. Remote Sens.*, **40**(2), 509-511, 2002.
28. Tran, N., D. Vandemark, C. Ruf and B. Chapron, "The dependence of nadir ocean surface emissivity on wind vector as measured with TMR", *IEEE Trans. Geosci. Remote Sens.*, **40**(2), 515-523, 2002.

27. Giampaolo, J.C. and C.S. Ruf, "The Effect of Atmospheric Stability on Microwave Excess Emissivity due to Wind," *IEEE Trans. Geosci. Remote Sens.*, **39**(10), 2311-2314, 2001.
26. Ruf, C.S. and H. Zhang, "Performance Evaluation of Single and Multichannel Microwave Radiometers for Soil Moisture Retrieval," *Remote Sens. of Envir.*, **75**(1), 86-99, 2001.
25. Gerrard, A.J., T.J. Kane, J.P. Thayer, C.S. Ruf and R.L. Collins, "Consideration of non-Poisson distributions for lidar applications" *Appl. Optics*, **40**(9), 1488-1492, 2001.
24. Keihm, S.J., V. Zlotnicki and C.S. Ruf, "TOPEX Microwave Radiometer Performance Evaluation, 1992-1998," *IEEE Trans. Geosci. Remote Sens.*, **38**(3), 1379-1386, 2000.
23. Cruz-Pol, S.L. and C.S. Ruf, "A modified model for specular sea surface emissivity at microwave frequencies," *IEEE Trans. Geosci. Remote Sens.*, **38**(2), 858-869, 2000.
22. Ruf, C.S. "Detection of calibration drifts in spaceborne microwave radiometers using a vicarious cold reference," *IEEE Trans. Geosci. Remote Sens.*, **38**(1), 44-52, 2000.
21. Bobak, J.P. and C.S. Ruf, "Improvements and complications involved with adding an 85 GHz channel to cloud liquid water radiometers," *IEEE Trans. Geosci. Remote Sens.*, **38**(1), 214-225, 2000.
20. Bobak, J.P. and C.S. Ruf, "A new model for the structure function of integrated water vapor in turbulence," *Radio Science*, **34**(6), 1461-1474, 1999.
19. Ruf, C.S. "Constraints on the polarization purity of a Stokes microwave radiometer," *Radio Science*, **33**(6), 1617-1639, 1998.
18. Cruz-Pol, S.L., C.S. Ruf, and S.J. Keihm, "Improved 20-32 GHz Atmospheric Absorption Model," *Radio Science*, **33**(5), 1319-1334, 1998.
17. Bas, C.F., T.J. Kane, and C.S. Ruf, "Enhanced-resolution lidar," *J. Opt. Soc. Am. A*, **14**(5), 1044-1050, 1997.
16. Ruf, C.S. and S.E. Beus, "Retrieval of tropospheric water vapor scale height from horizontal turbulence structure," *IEEE Trans. Geosci. Remote Sens.*, **35**(2), 203-211, 1997.
15. Ruf, C.S., R.P. Dewan, and B. Subramanya, "Combined microwave radiometer and altimeter retrieval of wet path delay for the GEOSAT Follow On," *IEEE Trans. Geosci. Remote Sens.*, **34**(4), 991-999, 1996.
14. Ruf, C.S., K. Aydin, S. Mathur, and J.P. Bobak, "35 GHz dual polarization propagation link for rain rate estimation," *J. Atmos. and Oceanic Techn.*, **13**(2), 419-425, 1996.
13. Ruf, C.S., "Digital correlators for synthetic aperture interferometric radiometry," *IEEE Trans. Geosci. Remote Sens.*, **33**(5), 1222-1229, 1995.
12. Keihm, S.J. and C.S. Ruf, "The role of water vapor radiometers for in-flight calibration of the TOPEX Microwave Radiometer," *Marine Geodesy*, **18**, 139-156, 1995.
11. Ruf, C.S., M.A. Janssen, and S.J. Keihm, "TOPEX/POSEIDON Microwave Radiometer (TMR): I. Instrument description and antenna temperature calibration," *IEEE Trans. Geosci. Remote Sens.*, **33**(1), 125-137, 1995.
10. Janssen, M.A., C.S. Ruf, and S.J. Keihm, "TOPEX/POSEIDON Microwave Radiometer (TMR): II. Antenna Pattern Correction and Brightness Temperature Algorithm," *IEEE Trans. Geosci. Remote Sens.*, **33**(1), 138-146, 1995.
9. Keihm, S.J., M.A. Janssen, and C.S. Ruf, "TOPEX/POSEIDON Microwave Radiometer (TMR): III. Wet tropospheric range correction and pre-launch error budget," *IEEE Trans. Geosci. Remote Sens.*, **33**(1), 147-161, 1995.
8. Ruf, C.S., S.J. Keihm, B. Subramanya, and M.A. Janssen, "TOPEX/POSEIDON Microwave Radiometer Performance and In-flight Calibration," *J. of Geophys. Res.*, **99**(C12), 24915-24926, 1994.

7. Ruf, C.S., "Numerical annealing of low redundancy linear arrays," *IEEE Trans. Antennas and Propag.*, **41**(1), 85-90, 1993.
6. Ruf, C.S., "Error analysis of image reconstruction by a synthetic aperture interferometric radiometer," *Radio Science*, **26**(6), 1419-1434, 1991.
5. Swift, C.T., D.M. Le Vine, and C.S. Ruf, "Aperture synthesis concepts in microwave remote sensing of the earth," *IEEE Trans. on Microwave Theory and Techniques*, **39**(12), 1931-1935, 1991.
4. Alishouse, J.C., J.B. Snider, E.R. Westwater, C.T. Swift, C.S. Ruf, S.A. Snyder, J. Vongsathorn and R.R. Ferraro, "Determination of cloud liquid water content using the SSM/I," *IEEE Trans. Geosci. Remote Sens.*, **28**(5), 817-822, 1990.
3. Ruf, C.S., C.T. Swift, A.B. Tanner and D.M. Le Vine, "Interferometric synthetic aperture microwave radiometry for the remote sensing of the earth," *IEEE Trans. Geosci. Remote Sens.*, **26**(5), 597-611, 1988.
2. Ruf, C.S. and C.T. Swift, "Atmospheric profiling of water vapor density with a 20.5-23.5 GHz autocorrelation radiometer," *J. Atmos. and Oceanic Techn.*, **5**(4), 539-546, 1988.
1. Walters, J.M., C.S. Ruf and C.T. Swift, "A microwave radiometer weather-correcting sea ice algorithm," *J. of Geophys. Res.*, **92**(C6), 6521-6534, 1987.

PROCEEDINGS PUBLICATIONS

86. Misra, S., and C. Ruf, "Characterization of L-Band Radio Frequency Interference Across the Continental USA Using a Kurtosis Detector," *Proc. 2009 IEEE International Geoscience and Remote Sensing Symposium, Cape Town, S.A., 13-17 July 2009.*
85. Misra, S., and C. Ruf, "Inversion Algorithm for Estimating Radio Frequency Interference Characteristics Based on Kurtosis Measurements," *Proc. 2009 IEEE International Geoscience and Remote Sensing Symposium, Cape Town, S.A., 13-17 July 2009.*
84. Yueh, S., S. Dinardo, S. Chan, E. Njoku, T. Jackson, R. Bindlish, J. Johnson, J. Piepmeier and C. Ruf, "PALS-ADD and Airborne Campaigns to Support Soil Moisture and Sea Surface Salinity Missions," *Proc. 2009 IEEE International Geoscience and Remote Sensing Symposium, Cape Town, S.A., 13-17 July 2009.*
83. McKague, D., C. Ruf and J.J. Puckett, "Microwave Radiometer Inter-Calibration Using the Vicarious Calibration Method," *Proc. 2009 IEEE International Geoscience and Remote Sensing Symposium, Cape Town, S.A., 13-17 July 2009.*
82. Hood, R., R. Atlas, M. Bailey, P. Black, M.W. James, J. Johnson, L. Jones, T. Miller, C. Ruf, Uhlhorn, E., "Potential of Future Hurricane Imaging Radiometer (HIRAD) Ocean Surface Wind Observations for Determining Tropical Storm Vortex Intensity and Structure", *EOS Trans. AGU*, **89**(53), Fall Mtg. Suppl., Abstract A21F-0251, 2008.
81. Amarin, R., B. Lim, J. Johnson, W.L. Jones and C. Ruf, "Performance Simulations For A Synthetic Aperture Radiometer Measuring Peak Surface Wind Speed In Hurricanes," *Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July 2008.*
80. Lim, B., C. Ruf and A. Tanner, "A High Resolution Full Earth Disk Model for Microwave Observations From GEO," *Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July 2008.*
79. McKague, D., C. Ruf and J. Puckett, "Vicarious Calibration of Global Precipitation Measurement Microwave Radiometers," *Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July 2008.*

78. Misra, S., and C. Ruf, "Comparison of Pulsed Sinusoid Radio Frequency Interference Detection Algorithms Using Time and Frequency Sub-Sampling," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July 2008.
77. Misra, S., C. Ruf and R. Kroodsma, "Detectability of Radio Frequency Interference due to Spread Spectrum Communication Signals using The Kurtosis Algorithm," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July 2008.
76. Wilheit, T., K. Imaoka, M. Kachi, A. Shibata, C. Kummerow, W. Berg, E. Stoner, W.L. Jones, K. Gopalan, C. Ruf, D. McKague, J. Puckett, F. Weng, B. Yan, S. Yang, A. Hou and G. Skofronick-Jackson, "Cross Calibration of Microwave Radiometers in the GPM Constellation," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July 2008.
75. Amarin, R., C. S. Ruf, L. Jones and S. S. Chen, "Improved microwave radiometric imaging of surface wind speed dynamics in the hurricane eye-wall," Proc. 28th Conf. on Hurricanes and Tropical Meteo., Orlando, FL, 28 Apr-2 May 2008.
74. El-Nimri, S., S. Al-Sweiss, R. Amarin, W. L. Jones and C. S. Ruf, "Improved microwave remote sensing of hurricane wind speed and rain rates using the Hurricane Imaging Radiometer (HIRAD)," Proc. 28th Conf. on Hurricanes and Tropical Meteo., Orlando, FL, 28 Apr-2 May 2008.
73. Ruf, C. S., A. M. Mims and C. C. Hennon, "The dependence of the microwave emissivity of the ocean on hurricane force wind speed," Proc. 28th Conf. on Hurricanes and Tropical Meteo., Orlando, FL, 28 Apr-2 May 2008.
72. Amarin, R.A., S.F. El-Nimri, J.W. Johnson, W.L. Jones, B.H. Lim and C.S. Ruf, "Instrument design simulations for synthetic aperture microwave radiometric imaging of wind speed and rain rate in hurricanes," Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
71. Brown, S., S. Desai, S. Keihm, W. Lu and C. Ruf, "Ocean Water Vapor and Cloud Burden Trends Derived from the TOPEX Microwave Radiometer, Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
70. De Roo, R.D., C.S. Ruf and K. Sabet, "An L-band Radio Frequency Interference (RFI) Detection and Mitigation Testbed for Microwave Radiometry," Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
69. De Roo, R.D., S. Misra and C.S. Ruf, "Sensitivity of the Kurtosis Statistic as a Detector of Pulsed Sinusoidal Radio Frequency Interference in a Microwave Radiometer Receiver," Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
68. Lim, B.H., R. Amarin, S. El-Nimri, J. Johnson, L. Jones and C.S. Ruf, "Restrictions on the Field of View for an Undersampled 1-D Synthetic Thinned Aperture Radiometry," Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
67. Peng, J., C.S. Ruf, S. Brown and J. Piepmeier, "Characterization of the Aquarius and Juno Radiometers Using a Programmable Digital Noise Source," Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
66. Ruf, C.S., and S. Misra, "Detection of Radio Frequency Interference with the Aquarius Radiometer" Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.

65. Ruf, C., R. Amarin, M.C. Bailey, B. Lim, R. Hood, M. James, J. Johnson, L. Jones, V. Rohwedder and K. Stephens, "The Hurricane Imaging Radiometer – An Octave Bandwidth Synthetic Thinned Array Radiometer," Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
64. Tanner, A.B., S.T. Tanner, T.C. Gaier, B.H. Lambrigtsen, B.H. Lim and C.S. Ruf, "Field tests of the GeoSTAR demonstrator instrument," Proc. 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
63. Ridley, A.J., P. Drake, B. Gilchrist, T. Gombosi, M.W. Liemohn, N. Renno, C. Ruf and T.H. Zurbuchen, "The Space Weather Concentration at the University of Michigan," American Geophysical Union, San Francisco, CA, Abstract ED52B-02, Dec. 2006.
62. Lambrigtsen, B.H., S.T. Brown, S.J. Dinardo, T.C. Gaier, P.P. Kangaslahti, A.B. Tanner, J.R. Piepmeier, C.S. Ruf, S.M. Gross, S. Musko and S. Rogacki, "GeoSTAR: A Microwave Sounder for Geostationary Applications," Proc. SPIE, Vol. 6361, Oct. 2006.
61. Ruf, C., S. Misra, S. Gross and R. De Roo, "Detection of RFI by its Amplitude Probability Distribution," Proc. 2006 IEEE International Geoscience and Remote Sensing Symposium, Denver, CO, 31 Jul - 4 Aug 2006.
60. B.H. Lim and C.S. Ruf, "Calibration of a Fully Polarimetric Microwave Radiometer Using a Digital Polarimetric Noise Source," Proc. 2006 IEEE International Geoscience and Remote Sensing Symposium, Denver, CO, 31 Jul - 4 Aug 2006.
59. Tanner, A.B., W.J. Wilson, B.H. Lambrigtsen, S.J. Dinardo, S.T. Brown, P. Kangaslahti, T.C. Gaier, C.S. Ruf, S.M. Gross, B.H. Lim, S. Musko and S. Rogacki, "Initial Results of the Geosynchronous Thinned Array Radiometer (GeoSTAR)," Proc. 2006 IEEE International Geoscience and Remote Sensing Symposium, Denver, CO, 31 Jul - 4 Aug 2006.
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ORAL PRESENTATIONS

- Invited paper*, "Digital Microwave Radiometers: Digital Signal Processing Device Capabilities vs. Radiometer Sensor Performance," IEEE International Geoscience and Remote Sensing Symposium, Cape Town, S.A., 13-17 July 2009.
- Invited paper*, "The Hurricane Imaging Radiometer (Hirad): Instrument Status and Performance Predictions," IEEE International Geoscience and Remote Sensing Symposium, Cape Town, S.A., 13-17 July 2009.
- Guest Panelist*, "International Remote Sensing Publication Forum," 30th Canadian Symposium on Remote Sensing, Lethbridge, Alberta CANADA, 24 June 2009.
- Invited paper*, "Discussions/Perspectives on International Collaboration on Radiometer Calibration," 8th Global Precipitation Measurement Planning Workshop, Paris, FRANCE, 16-19 June 2009.
- Invited paper*, "Design and Performance Considerations for a Spaceborne Digital Radiometer," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July, 2008.
- Conference paper*, "Comparison of Pulsed Sinusoid Radio Frequency Interference Detection Algorithms Using Time and Frequency Sub-Sampling," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July, 2008.
- Conference paper*, "Cross Calibration of Microwave Radiometers in the GPM Constellation," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July, 2008.
- Conference paper*, "Vicarious Calibration of Global Precipitation Measurement Microwave Radiometers," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July, 2008.
- Invited paper*, "Design and Development of the Hurricane Imaging Radiometer (HIRAD)," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July, 2008.
- Conference paper*, "Detectability of Radio Frequency Interference due to Spread Spectrum Communication Signals using The Kurtosis Algorithm," Proc. 2008 IEEE International Geoscience and Remote Sensing Symposium, Boston, MA, 7-11 July, 2008.
- Conference paper*, "Characterization of the Aquarius and Juno Radiometers Using a Programmable Digital Noise Source," 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
- Conference paper*, "Detection of Radio Frequency Interference with the Aquarius Radiometer" 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
- Conference paper*, "The Hurricane Imaging Radiometer – An Octave Bandwidth Synthetic Thinned Array Radiometer," 2007 IEEE International Geoscience and Remote Sensing Symposium, Barcelona, SPAIN, 23-27 July, 2007.
- Conference paper*, "Detection of RFI by its Amplitude Probability Distribution," 2006 IEEE International Geoscience and Remote Sensing Symposium, Denver, CO, 31 Jul - 4 Aug 2006.

- Conference paper*, “Agile Digital Detector for RFI Mitigation,” 2006 Specialist Meeting on Microwave Radiometry, San Juan, PR, 28 Feb – 3 Mar 2006.
- Conference paper*, “Wind Vector Retrieval with WindSat – Impact on Performance of Missing Channels,” 2005 IEEE International Geoscience and Remote Sensing Symposium, Seoul, KOREA, 25-29 July 2005.
- Conference paper*, “Calibrating a Polarimetric Radiometer with the Correlated Noise Calibration Standard,” 2005 IEEE International Geoscience and Remote Sensing Symposium, Seoul, KOREA, 25-29 July 2005.
- Conference paper*, “Ensemble Scattering and RFI Speckle Caused by Collision Avoidance Radar,” Proc. URSI National Radio Science Meeting, Boulder, CO, F/J1-7, 215, 5-8 Jan 2005.
- Conference paper*, “WindSat Calibration and Geophysical Parameter Estimation,” IEEE International Geoscience and Remote Sensing Symposium, Anchorage, AK, 20-24 Sept. 2004.
- Conference paper*, “Simultaneous Retrieval of Surface Wind Speed and Rain Rate using Radar and Radiometer Measurements,” IEEE International Geoscience and Remote Sensing Symposium, Anchorage, AK, 20-24 Sept. 2004.
- Conference paper*, “X-Band Lightweight Rainfall Radiometer First Light,” 2003 IEEE International Geoscience and Remote Sensing Symposium, Toulouse, FRANCE, July 2003
- Conference paper*, “WindSat SDR and EDR On Orbit Calibration and Validation,” 2003 IEEE International Geoscience and Remote Sensing Symposium, Toulouse, FRANCE, July 2003.
- Conference paper*, “Jason Microwave Radiometer On Orbit Calibration, Validation and Performance,” AGU Fall Meeting, San Francisco, CA, December 2002.
- Conference paper*, “Jason Microwave Radiometer On Orbit Calibration, Validation and Performance,” Jason-1/TOPEX/Poseidon Science Working Team Meeting New Orleans, LA, 21-23 Oct 2002.
- Conference paper*, “Evaluation of Correlation Radiometers using Programmable Correlated Noise,” Second International Microwave Radiometer Calibration Workshop, Barcelona, Spain, Oct 2002.
- Conference paper*, “Early On Orbit Performance of the Jason-1 Microwave Radiometer,” 2002 Progress in Electromagnetics Research Symposium, Cambridge, MA, July 2002.
- Invited panel member*, NPOESS Cal/Val Panel Discussion, IGARSS2002, Toronto, Canada, June 2002
- Conference paper*, “Lightweight Rainfall Radiometer STAR Aircraft Sensor,” IEEE International Geoscience and Remote Sensing Symposium, Toronto, CA, June 2002.
- Keynote speaker*, “Cal/Val Activities and Issues for SMOS,” 3rd ESA Soil Moisture and Ocean Salinity Workshop, Oberpfaffenhofen, Germany, 11 Dec 2001.
- Conference paper*, “Environmental Testing of Correlation Radiometer Pairs with a Digital Noise Source,” 7th Specialist Meeting on Microwave Remote Sensing, Boulder, CO, November 2001.
- Invited speaker*, “Design Features of a Bore-sighted Radiometer,” NASA Workshop on GPM Core Satellite Radiometer Improvements, NASA Goddard Space Flight Center, Greenbelt, MD, 31 August 2001.
- Invited speaker*, “Enabling Technologies for the Global Precipitation Measurement Mission,” NASA Earth Science Technology Conference, University of MD, College Park, MD, 29 August 2001.
- Conference paper*, “MMIC Receiver Modules for Digital Correlation Radiometry,” 2001 International Geoscience and Remote Sensing Symposium, Sydney, Australia, July 2001.

- Conference paper*, “The GPM Constellation Microwave Radiometer Testbed,” 2001 International Geoscience and Remote Sensing Symposium, Sydney, Australia, July 2001.
- Invited speaker*, “Rainfall Measurement Technology - Passive Systems,” Global Precipitation Mission Workshop, NASA Goddard Space Flight Center, 20 February 2001.
- Invited speaker*, “Large, Lightweight Deployable Antenna Session – Large Radiometer Arrays in Space: Science and Technology Issues,” Technology Planning Workshop, NASA Earth Science Enterprise New Millennium Program, Arlington, VA, 23-24 January 2001
- Invited speaker*, “Outstanding Issues - Calibration,” 2nd ESA Soil Moisture and Ocean Salinity Science Workshop, Toulouse CESBIO, FRANCE, 28-30 November 2000
- Plenary speaker*, “Using Vicarious Calibration to Diagnose a Drift in the TOPEX Microwave Radiometer” First International Microwave Radiometer Calibration Workshop, Adelphi, MD, 30 Oct 2000.
- Invited seminar*, “Diagnosis of the Evidence for and Cause of a Drift in the TOPEX Microwave Radiometer,” CETP/IPSL/CNRS, Université St Quentin-Versailles, FRANCE, 16 October 2000
- Conference paper*, “Enabling Technologies to Map Precipitation with Near-Global Coverage and Hour-Scale Revisit Times,” 2000 International Geoscience and Remote Sensing Symposium, Honolulu, HI, July 2000.
- Conference paper*, “Statistical Analysis of a Lower Bound on Microwave Radiometer Brightness Temperature from Space,” 2000 International Geoscience and Remote Sensing Symposium, Honolulu, HI, July 2000.
- Conference paper*, “Implications of an improved atmospheric absorption model on water vapor retrievals,” 6th Specialist Meeting on Microwave Radiometry and Remote Sensing of the Environment, Florence, Italy, March 2000.
- Conference paper*, “A Temperature Dependent Correction to the Model for Microwave Excess Emissivity of the Ocean due to Surface Winds,” 1999 International Geoscience and Remote Sensing Symposium, Hamburg, GERMANY, July 1999.
- Conference paper*, “Calibration of the model for ocean surface emissivity at microwave frequencies,” 1999 International Geoscience and Remote Sensing Symposium, Hamburg, GERMANY, July 1999.
- Invited speaker*, “Polarization purity requirements for a polarimetric radiometer,” Workshop on Problems to be Addressed by Microwave Radiometers in the 21st Century, Rolighed, Denmark, September 1998
- Conference paper*, “Littoral antenna deconvolution for a microwave radiometer,” 1998 International Geoscience and Remote Sensing Symposium, Seattle, WA, July 1998.
- Conference paper*, “Polarimetric radiometry - Coherent vs. incoherent detection,” 1998 International Geoscience and Remote Sensing Symposium, Seattle, WA, July 1998..
- Conference paper*, “Prediction of water vapor scale height from integrated water vapor measurements,” 1996 International Geoscience and Remote Sensing Symposium, Lincoln, NE, July 1996.
- Conference paper*, “Estimation of the ocean/atmosphere boundary layer height of water vapor from space,” International Geoscience and Remote Sensing Symposium, Lincoln, NE, July 1996.
- Conference paper*, “An algorithm for improving the retrieval of cloud liquid water and water vapor using effective radiating temperature of clouds,” Second Topical Symposium on Combined Optical-Microwave Earth and Atmosphere Sensing, Atlanta, GA, April 1995.

- Conference paper*, "Rain rate estimation from attenuation measurements using a 35 GHz dual polarization propagation link," 1994 International Geoscience and Remote Sensing Symposium, Pasadena, CA, August 1994.
- Conference paper*, "Digital correlator performance analysis for a synthetic aperture imaging radiometer," 1994 International Geoscience and Remote Sensing Symposium, Pasadena, CA, August 1994.
- Conference paper*, "TOPEX Microwave Radiometer in-flight performance evaluation," 1993 International Geoscience and Remote Sensing Symposium, Tokyo, JAPAN, August 1993.
- Conference paper*, "Improved array configurations for synthetic aperture interferometric radiometers," 1993 International Geoscience and Remote Sensing Symposium, Tokyo, JAPAN, August 1993.
- Conference paper*, "The TOPEX Microwave Radiometer: Verification Phase Evaluation," AGU 1992 Fall Meeting, San Francisco, CA, Dec. 1992.
- Conference paper*, "The TOPEX microwave radiometer," Specialist Meeting on Microwave Radiometry and Remote Sensing, Boulder, Colorado, 1992.
- Conference paper*, "Error analysis of image reconstruction by a synthetic aperture interferometric radiometer," 1992 International Geoscience and Remote Sensing Symposium, , Houston, TX, May 1992.
- Conference paper*, "Antenna performance for a synthetic aperture microwave radiometer in geosynchronous earth orbit," 1990 International Geoscience and Remote Sensing Symposium, College Park, MD, May 1990.
- Conference paper*, "TOPEX/POSEIDON microwave radiometer - post-launch ground based calibration/validation," 1990 International Geoscience and Remote Sensing Symposium, College Park, MD, May 1990.
- Conference paper*, "Sparse aperture interferometric radiometry (SAIR) for the remote sensing of the earth," 1989 International Symposium on Antennas and Propagation, Tokyo, JAPAN, August 1989.
- Conference paper*, "TOPEX microwave radiometer system calibration; refining the SMMR heritage," 1989 International Geoscience and Remote Sensing Symposium, Vancouver, B.C., CANADA, July 1989.
- Conference paper*, "Atmospheric profiling of water vapour with a 20.5-23.5 GHz autocorrelation radiometer," 1988 International Geoscience and Remote Sensing Symposium, Edinburgh, UK, August 1988.
- Conference paper*, "The electronically steered thinned array radiometer (ESTAR)," 1986 International Geoscience and Remote Sensing Symposium, Zurich, SWITZ., October 1986.
- Conference paper*, "Electronically steered thinned array radiometer, system design, performance and calibration," 1985 International Geoscience and Remote Sensing Symposium, Amherst, MA, October 1985.