

William A. Bristow

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University of Alaska Fairbanks
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Associate Professor of Electrical Engineering.



Education:

9/88-5/92 University of Alaska Fairbanks

Geophysical Institute

Space Physics Program

Ph.D. Space Physics (Thesis Advisor: Brenton Watkins)

9/85-5/88 University of Alaska Fairbanks

Graduation in May 1988 with:

BS Electrical Engineering

BS Applied Physics

Chancellors List

Tau Beta Pi

Work Experience:

7/2003 - present Associate Professor of Electrical Engineering at the University of Alaska Fairbanks. Space Physics researcher at the Geophysical Institute. Principal Investigator for the Kodiak, Alaska, SuperDARN radar. Co-principal investigator for the King Salmon SuperDARN radar.

8/1998 – 6/2003 Assistant Professor of Electrical Engineering at the University of Alaska Fairbanks. Space Physics researcher at the Geophysical Institute. Principal Investigator for the Kodiak, Alaska, SuperDARN radar. Co-principal investigator for the King Salmon SuperDARN radar.

Research: As a principal investigator for the SuperDARN network, I have been responsible for the construction, maintenance, and operation of two radar systems in Alaska. Construction of the radars involved a number of activities including: writing of

the original proposals, evaluation of suitable sites, environmental assessment, public meetings, public outreach, contractor selection, electronics fabrication, procurement of electronic components and systems, and the physical labor of laying out cabling and assembling the electronics. While carrying out the radar construction, my other research activities have included studies of winds in the upper atmosphere, studies of the magnetosphere-ionosphere coupling, and space-weather effects on radio propagation, which directly impacts radio communications in high-latitude regions. My research grants during this period have averaged about \$300,000 per year, while the radar construction grants and contracts have totaled over \$600,000.

For the first two and a half years of my work at UAF, I acted as the principal investigator for the Space Weather portion of the University Partnering for Operational Support program (UPOS). This program is a joint venture with the Johns Hopkins University Applied Physics Laboratory under which the results of space science and atmospheric science research programs are adapted to meet the operational needs of the US Army and Air Force. The UPOS space weather program has an annual budget of over \$1M per year at UAF.

Teaching: I taught a graduate level course in radar systems (EE693) my first year at UAF and have taught an undergraduate course in electromagnetic waves and devices in the three succeeding years (EE312 lecture, EE332 laboratory). The radar systems class was a special topics class and as such there was not a pre-existing structure for the course. The course topics were developed to provide the theoretical basis for modern radar systems. I relied heavily on my research for examples of how the theory applied to real systems. In the undergraduate electromagnetics course, I try to provide a thorough understanding of the physical basis for electromagnetics rather than simply providing a phenomenological description. I developed a new series of laboratory experiments that use modern devices and modern test equipment. Approximately \$20,000 of new equipment was purchased for the lab and, equipment worth about \$2,000 was donated by manufacturers. In addition, I was the organizer for the 2002 and 2003 Polar Aeronomy and Radio Science summer schools. This summer school is now an annual event attended by approximately 30 graduate students from Alaska and outside institutions. The school provides an intensive two-week program of lectures and experiments in an aeronomy or radio science theme.

Service: Since coming to UAF, I have continued service in my professional community, and have taken service responsibilities on campus and in the Fairbanks community. In the community, I have served each year as a judge for the Fairbanks School District Science Fair, and have served the last four years as a judge for the Alaska Science Symposium. On campus, I served in the Faculty Senate, and on the Core Curriculum Review Committee. I am currently serving on the ad-hoc committee on classified research. I served as the out of department representative on a physics department faculty search committee that involved the review of over 120 applications. In addition, I have served as outside examiner for two Ph. D. thesis defenses. In my professional community, I have served as session chairman for several sessions at the annual meetings of the American Geophysical Union. I have served as a conference organizer for one NASA conference hosted by the Marshall Space Flight Center. I served on a NASA science and technology definition team for

the upcoming Global Electrodynamic Connections mission. I was the organizer and host for the 2002 SuperDARN annual project meeting, which was held in Valdez. I am currently a member of the American Geophysical Union's Student Affairs Committee.

4/94-8/98 Senior Professional Staff Physicist at Johns Hopkins Applied Physics Laboratory. Duties included research on high latitude ionospheric plasma processes using the SuperDARN HF Coherent Radar Network. Member of the Space Science Remote Sensing group.

8/92-4/94 Post-Doctoral Fellow at the Applied Physics Laboratory. Duties included research on high latitude ionospheric plasma processes using the Goose Bay HF Coherent Radar. Member of the Space Science Remote Sensing group.

6/89-7/92 Graduate studies were supported by research assistantship. Work mainly involved thesis research. Additional duties included: assistance with data analysis for advisor and other students, assistance with the design of the proposed Poker Flat Incoherent-Scatter Radar.

Refereed Publications:

1. Bristow, W.A., B.J.Watkins, Numerical simulation of the formation of thin ionization layers at high latitudes, *Geoph. Res. Lett.* 18, 3, 404-407, 1991.
2. Bristow, W.A., B. J. Watkins, Incoherent-Scatter observations of thin ionization layers at Sondrestrom, *J. Atmosph. Terr. Phys.*, 55, 6, 873-894, 1993.
3. Bristow, W.A., B. J. Watkins, Effects of the large-scale convection electric field structure on the formation of thin ionization layers at high latitudes, *J. Atmosph. Terr. Phys.*, 56, 3, 401-415, 1994.
4. Bristow, W.A., R. A. Greenwald, J. C. Samson, Identification of high latitude acoustic gravity wave sources using the Goose Bay HF Radar, *J. Geophys. Res.*, 99, A1, 319-331, 1994.
5. Sofko, G. J., R. A. Greenwald, W. A. Bristow, Direct determination of large-scale magnetospheric field-aligned currents with SuperDARN, *Geophys. Res. Lett.* 22, 2041-2044, 1995.
6. Bristow, W.A., R. A. Greenwald, Estimating gravity wave parameters from oblique HF backscatter: modeling and analysis, *J. Geophys. Res.*, 100, 3639-3648, 1995
7. Greenwald, R. A., W. A. Bristow, G. J. Sofko, C. Senior, J.-C. Cersier, A. Szabo, Super Dual Auroral Radar Network radar imaging of dayside high-latitude convection under northward interplanetary magnetic field: Toward resolving the distorted two-cell versus multicell controversy. *J. Geophys. Res.*, 100, 19,661-19,674, 1995.

8. Bristow, W. A., D. G. Sibeck, C. Jacquey, R. A. Greenwald, G. J. Sofko, T. Mukai, T. Yamamoto, S. Kokubun, T. J. Hughes, W. J. Hughes, M. J. Engebretson, Observations of convection vortices in the afternoon sector using the SuperDARN HF radars, *J Geophys. Res.*, 100, A10, 19,743-19,756, 1995.
9. Sibeck, D. G., R. A. Greenwald, W. A. Bristow, G. I. Korotova, Concerning the possible effects of ionospheric conductivity upon the occurrence patterns of impulsive events in high-latitude ground magnetograms. *J. Geophys. Res.*, 101, 13,407-13,412, 1996.
10. Bristow, W. A., R. A. Greenwald, J. P. Villain, On the seasonal dependence of medium-scale atmospheric gravity waves at high-latitudes, *J. Geophys. Res.*, 101, 15,685-15,699,1996.
11. Greenwald, R. A., J. M. Ruohoniemi, W. A. Bristow, G. J. Sofko, J.-P. Villain, A. Huuskonen, S. Kokubun, L. A. Frank, Mesoscale dayside convection vortices and their relation to substorm phase. *J. Geophys. Res.*, 101, 21,697-21,713, 1996.
12. Bristow, W. A., R. A. Greenwald, Multi-radar observations of medium-scale acoustic gravity waves using the SuperDARN HF radars, *J. Geophys. Res.*, 101, 24,499-24,511, 1996.
13. Bristow, W. A., R. A. Greenwald, On the spectrum of thermospheric gravity waves observed by the Super Dual Auroral Radar Network., *J. Geophys. Res.*, 102, 11,585-11,595, 1997.
14. Bristow, W. A, J. M. Ruohoniemi, R. A. Greenwald, Super Dual Auroral Radar Network observations of convection during a period of small magnitude northward IMF. *J. Geophys. Res.*, 103, 4051-4061, 1998.
15. Lui, A. T. Y., D. J. Williams, R. W. McEntire, S. Ohtani, L. J. Zanetti, W. A. Bristow, R. A. Greenwald, P. T. Newell, S. P. Christon, T. Mukai, K. Tsuruda, T. Yamamoto, S. Kokubun, H. Matsumoto, H. Kojima, T. Murata, D. H. Fairfield, R. P. Lepping, J. C. Samson, G. Rostoker, G. D. Reeves, A. L. Rodger, H. J. Singer, Multipoint study of a substorm on February 9, 1995. *J. Geophys. Res.*, 103, 17,333-17,343, 1998.
16. Wong, C.-S., G. J. Sofko, K. A. McWilliams, W. A. Bristow, R. A. Greenwald, M. C. Kelley, SuperDARN observations of quasi-stationary mesoscale convection vortices in the dayside high-latitude ionosphere, *J. Geophys. Res.*, 103, 29,239-29,252, 1998.
17. Bristow, W. A., J.-H. Yee, X. Zhu, R. A. Greenwald, Simultaneous observations of the July 1996 two-day wave event using the Super Dual Radar Network and the High-Resolution Doppler Imager. *J. Geophys. Res.*, 104, 12,715-12,721, 1999.
18. Greenwald, R.A., J. M. Ruohoniemi, K.B. Baker, W.A. Bristow, G.J. Sofko, J.-P. Villain, M. Lester, and J. Slavin, Convective response to a transient increase in dayside reconnection,*J. Geophys. Res.*, 104, 10007-10015, 1999

19. Bristow, W. A., D. Lummerzheim, Determination of field-aligned currents using the Super Dual Auroral Radar Network and the UVI ultraviolet imager. *J. Geophys. Res.* 106, 18,577-18,588, 2001.
20. Bristow, W. A., A. Otto, and D. Lummerzheim, Substorm convection patterns observed by the Super Dual Auroral Radar network. *J. Geophys. Res.* 106, 24,593-24,609, 2001
21. Hughes, J. M., W. A. Bristow, R. A. Greenwald, R. J. Barnes, Determining characteristics of HF communications links using SuperDARN. *Ann. Geophys.*, 20, 1023-1030, 2002.
22. Bristow, W. A., G. J. Sofko, H. C. Stenbaek-Nielsen, S. Wei, D. Lummerzheim, A. Otto, Detailed analysis of substorm observations using SuperDARN, UVI, ground-based magnetometers, and all-sky imagers. *J. Geophys. Res.* 108, A3, 1124, doi:10.1029/2002JA009242, 2003.
23. Hughes, J. M., W. A. Bristow, Ionospheric convection patterns observed during periods of steady magnetospheric convection. *J. Geophys. Res.*, 108(A3), 1124, doi:10.1029/2002JA009242,2003
24. Hughes, J. M., W. A. Bristow, R. T. Parris, E. Lundell, SuperDARN observations of ionospheric heater-induced upper hybrid waves, *Geophys. Res. Lett.*, 30, doi:10.129/2003GL018772, 2003.
25. Bristow, W. A., R. A. Greenwald, S. G. Shepherd, J. M. Hughes, On the observed variability of the cross-polar-cap potential. *J. Geophys. Res.* Vol. 109, No. A2, A02203 10.1029/2003JA010206, 2004.
26. Hughes, J. M.; Bristow, W. A.; Parris, R. T. SuperDARN observations of spectral enhancements excited during an ionospheric heating experiment. *Geophys. Res. Lett.*, Vol. 31, No. 8, L08808 10.1029/2004GL019613

Published Abstracts:

1. Bristow, W. A., B. J. Watkins, Numerical simulation of the formation of thin ionization layers at high-latitudes. *EOS Transactions*, 71, 43, 1503, 1990.
2. Bristow, W. A., J. C. Samson, Identification of high-latitude acoustic gravity wave sources using the Goose Bay HF Radar. *EOS Transactions*, 74, 16, 226, 1993
3. Greenwald, R. A., J. M. Ruohoniemi, K. B. Baker, W. A. Bristow, G. J. Sofko, J. C. Samson, High-resolution SuperDARN HF Radar observations of nighttime plasma convection. *EOS Transactions*, 74, 43, 537, 1993.
4. Sofko, G. J., J. A. Koehler, M. J. McKibben, R. Wilkinson, R. A. Greenwald, J. M. Ruohoniemi, K. B. Baker, W. A. Bristow, High-latitude E-region radar observations by SuperDARN and SAPHIRE North. *EOS Transactions*, 74, 43, 537, 1993.

5. Bristow, W. A., R. A. Greenwald, D. G. Sibeck, C. Jacquey, D. Williams, M. J. Engebretson, T. J. Hughes, Observations of convection vortices due to solar wind dynamic pressure variations. *EOS Transactions*, 75, 16, 315, 1994.
6. Bristow, W. A., R. A. Greenwald, Estimating gravity wave parameters from oblique HF backscatter: Modeling and analysis. *EOS Transactions*, 75, 44, 489, 1994.
7. R. A. Greenwald, W. A. Bristow, G. J. Sofko, C. Senior, A. Zabo, SuperDARN radar imaging of dayside high-latitude convection under northward IMF: Toward resolving the distorted two-cell versus multi-cell controversy. *EOS Transactions*, 75, 22, 549, 1994.
8. Bristow, W. A., R. A. Greenwald, SuperDARN multiple-radar observations of medium-scale thermospheric gravity waves at high latitudes. *EOS Transactions*, 76, 46, 449, 1995.
9. Zesta, E. W. J. Hughes, M. J. Engebretson, W. A. Bristow, R. A. Greenwald, Case studies of traveling convection vortices. *IGA95 Abstracts*, A113, 1995.
10. G. J. Sofko, R. A. Greenwald, W. A. Bristow, Direct determination by SuperDARN of large-scale magnetospheric field-aligned currents, *IGA95 Abstracts*, B100, 1995.
11. W. A. Bristow, SuperDARN observations of atmospheric gravity waves. INVITED, *IGA95 Abstracts*, B108, 1995.
12. R. A. Greenwald, W. A. Bristow, G. J. Sofko, C. Senior, J.-C. Cerisier, A. Szabo, SuperDARN imaging of dayside high-latitude convection under northward IMF. *IGA95 Abstracts*, B110, 1995.
13. J. M. Ruohoniemi, R. A. Greenwald, W. A. Bristow, Extended local-time mapping of high-latitude convection. *IGA95 Abstracts*, B126, 1995.
14. Lui, A. T. Y., D. J. Williams, R. W. McEntire, V. Angelopolis, S. P. Christon, S. Kokubun, T. Yamamoto, T. Mukai, K. Tsurda, D. H. Fairfield, R. P. Lepping, W. A. Bristow, R. A. Greenwald, P. T. Newell, S. Ohtani, L. J. Zanetti, G. Rostoker, J. C. Samson, G. D. Reeves, J. T. Steinberg, A. J. Lazarus, Magnetotail activities during an extended period of strong northward interplanetary magnetic field. *EOS Transactions*, 76, 46, 461, 1995.
15. Sofko, G. J., K. McWilliams, R. A. Greenwald, W. A. Bristow, T. Potemra, J. Gary, S. Ohtani, L. J. Zanetti, Field-aligned currents inferred from SuperDARN convection vorticity. *EOS Transactions*, 76, 46, 490, 1995.
16. Baker, K. B., R. A. Greenwald, J. M. Ruohoniemi, W. A. Bristow, C.-I. Meng, G. J. Sofko, J.-P. Villain, T. B. Jones, E. Sanchez, J. Kelley, G. K. Parks, D. Lummerzheim, SuperDARN observations of global convection patterns during the May 19-20, 1996 ISTP/GGS campaign. *EOS Transactions* 77, 46, 1996.

17. Bristow, W. A., J. H. Yee, X. Zhu, R. A. Greenwald, Simultaneous observations of the July 1996 two-day wave event using HRDI and SuperDARN. *EOS Transactions*, 78, 46, 508, 1997.
18. Bristow, W. A., R. A. Greenwald, SuperDARN observations of gravity waves and their source regions. *COSPAR Abstracts*, 121, 1998.
19. Bristow, W. A., R. A. Greenwald, SuperDARN observations of neutral winds at meteor altitudes. *COSPAR Abstracts*, 140, 1998.
20. Greenwald, R. A., K. B. Baker, J. M. Ruohoniemi, W. A. Bristow, G. J. Sofko, J.-P. Villain, M. Lester, High-temporal resolution studies of global electrodynamics, *COSPAR Abstracts*, 214, 1998.
21. Gallagher, H. A., R. A. Greenwald, W. A. Bristow, C.-I. Meng, SuperDARN and Polar UVI estimates of ionospheric currents associated with substorms. *EOS Transactions*, 79, 17, 1998.
22. Bristow, W. A., D. Lummerzheim, High-latitude electrical currents and Joule heating as determined by SuperDARN, Polar UVI, and in-situ observations. *EOS Transactions*, 80, 46, 1999.
23. Hughes, J. M., W. A. Bristow, Determining HF communications channel parameters using SuperDARN. *EOS Trans., AGU*, 82, 47, 2001.
24. Bristow, W. A., A. Otto, D. Lummerzheim, Substorm convection patterns observed by the Super Dual Auroral Radar Network. *EOS Trans., AGU*, 82, 47, 2001.
25. Sheerin, J. P., J. P. Mills, K. M. Groves, W. A. Bristow, J. Pau, A. Y. Wong, Stimulated emissions and radar scatter from pulsed RF-Ionosphere interactions at HAARP. *EOS Trans., AGU*, 82, 47, 2001.
26. Ishii, M., W. A. Bristow, M. Conde, R. W. Smith, M. Krynicki, Dragged neutral campaign observations with Fabry-Perot interferometers and HF radars in Alaska. *EOS Trans., AGU*, 82, 47, 2001.