

## CURRICULUM VITAE\*

Name: William Jeffrey Hughes  
Born: 26 May 1950 at Bangor, Wales

Present Position: Professor of Astronomy, Boston University

Nationality Status: British Subject, Permanent U.S. Resident  
Address: Department of Astronomy, Boston University,  
725 Commonwealth Avenue, Boston, MA 02215

Telephone: (617) 353-2471  
e-mail: hughes@bu.edu

### Education

DATES	INSTITUTION	DEGREES AWARDED AND DATE
1960-67	Rydal School	
1968-71	Imperial College University of London	B.Sc., A.R.C.S., in Theoretical Physics, 1971
1971-74	Imperial College University of London	Ph.D., D.I.C., in Space Physics, 1974 (Thesis Supervisor: Prof. J.W. Dungey)

### Professional Appointments

2010-17 Associate Dean, Graduate School of Arts and Sciences, Boston University.  
2002-13 Director, Center for Integrated Space Weather Modeling.  
1997-02 Chairman, Department of Astronomy, Boston University.  
1990- Professor, Department of Astronomy, Boston University.  
1987-97 Director, Center for Space Physics, Boston University.  
1984-90 Associate Professor, Department of Astronomy, Boston University.  
1984-85 Visiting Fellow, The Blackett Laboratory, Imperial College, London.  
1978-84 Assistant Professor, Department of Astronomy, Boston University  
1976-78 Research Assistant, The Blackett Laboratory, Imperial College, London.  
1975-76 Visiting Scholar and Assistant Research Geophysicist, Institute of  
Geophysics and Planetary Physics, UCLA.  
1974-75 Visiting Fellow, Cooperative Institute for Research in the Environmental  
Sciences, University of Colorado/NOAA.  
1968 (8 months) Student Apprentice, General Electric Company, Hurst Research  
Laboratories, Wembley, England.

---

\* August 2017

## **Professional Societies**

Member, American Geophysical Union  
Fellow, Royal Astronomical Society  
Member, Sigma Xi

## **Scholarships, Awards etc.**

Pantfyedwyn Trust Scholar, (1963-1967)  
Imperial College Exhibitioner, (1969-1971)  
Senior Fulbright-Hayes Exchange Scholar, (1974-1976)

## **Professional Community Service**

- Referee: Journal of Geophysical Research  
Geophysical Research Letters  
Journal of Geophysics  
Planetary and Space Science  
Journal of Atmospheric and Solar-Terrestrial Physics  
Annales Geophysicae  
Solar Physics
- Convenor: Symposia on “Hydromagnetic Wave Particle Interactions,” “The Physics of Pulsation Resonance Regions,” and “Characteristics and Structures of Pi2 Pulsations,” held at IAGA Scientific Assembly, Edinburgh, August, 1981.
- Chair: International Sun Earth Explorer (ISEE) Working Group on Waves and Pulsations, 1980-1984.
- Member: Program Committee: Chapman Conference on “Waves in Magnetospheric Plasmas,” Hawaii, February, 1983.
- Guest-Editor: Geophysical Research Letters special issue on “on “Waves in Magnetospheric Plasmas,” August, 1983.
- Reporter: on “Hydromagnetic Waves in the Magnetosphere” for the U.S. National Report to XVIII IUGG General Assembly, Hamburg, August, 1983.
- Associate Editor: Geophysical Research Letters, 1983-1986.
- Convenor: Symposium on “ULF and VLF Waves” held at XXI URSI General Assembly, Florence, August 1984.

Chair: IAGA Working Group III-1 on ULF Pulsations 1983-1987.

Convenor: Symposium on “Spatial Structure in ULF Wave Fields” held at IAGA Scientific Assembly, Exeter, England, August, 1989.

Member: Editorial Board of Planetary and Space Science. 1989-1992.

Secretary: Magnetospheric Physics (SM) Section, American Geophysical Union, 1990-1992.

Member: NSF Geospace Environment Modeling (GEM) Steering Committee. 1991-1998. Chairman: 1994-1997.

Member: American Geophysical Union, Meetings Committee. 1992-1996.

Member: Program Committee: Chapman Conference on “Solar Wind Sources of Magnetospheric ULF Waves”, Williamsburg, VA, September 1992.

Member: National Research Council Committee on Geophysical and Environmental Data. 1992-1995.

Member: AGU Space Physics and Aeronomy (SPA) Section Awards Committee. 1992-1996. Chair: 1992-1994.

Member: Program Committee: COSPAR Symposium “Result of the Inter-Agency Solar Terrestrial Program (IASTP)”, Birmingham, UK, July 1996.

Member: American Geophysical Union, Budget and Finance Committee. 1996-2000.

Member: Organizing Committee: The Sixth US-Finnish Auroral Dynamics Workshop: Magnetospheric-Ionospheric Dynamics, Melbourne, Florida, 2-5 February 1997.

Associate Editor: Journal of Geophysical Research, 1997-2001

Vice-Chairman: University Space Research Association, Council of Institutions. 1998-1999; 2004-2006.

Chair: University Space Research Association, Council of Institutions. 1999-2000, 2006-2008.

Coordinator: Geospace Environment Modeling Program (GEM), Magnetosphere-Ionosphere Coupling Campaign, 2000-2009

Member: American Institute of Physics, Physics Resources Policy Committee. 2002-2008

Member: University Space Research Association (USRA) Board of Trustees. 2004-2008

- Member: NCAR/High Altitude Observatory Vision Committee. 2007
- Moderator: American Institute of Physics Industrial Physics Forum, Boston, 2008
- Member: University Space Research Association (USRA) *ad hoc* Governance Committee, 2010-2011
- Chair: University Space Research Association (USRA) Nominating Committee. 2010-2013
- Member: Natural Science and Engineering Research Council of Canada, Physics Evaluation Panel, 2011-2014; Chair, Astronomy and Space Physics Section, 2012-14
- Member: NASA Advisory Council, Heliophysics Subcommittee, 2012-15
- Member: Geospace Environmental Modeling Program Steering Committee: ad hoc committee to draft a GEM White Paper, 2013.
- Lecturer: CISM Space Weather Graduate Summer School – Reality, Harsh Reality, and Virtual Reality, NCAR, Boulder CO, 2013-2017.
- Member: National Research Council Committee to Review the NSF AGS Draft Science Goals and Objectives, 2014.

### **Boston University Committee Appointments and Service**

- Director of Graduate Studies, Department of Astronomy, 1980-1984, 1985-1987.
- Member: University Research Advisory Committee, 1981-1984.
- Member: University Graduate Research Fellowship Committee, 1984-1989.
- Member: Faculty Council Research Activities Committee, 1986-1991.  
(Chairman, 1987-1989)
- Member: Faculty and University Councils, 1986-1990.
- Member: University Council Research Activities Committee, 1987-1991.  
(Chairman, 1987-1989)
- Member: College of Liberal Arts, Appointment, Promotion and Tenure Committee, 1987-1988; 1993-1994; 1996-1997.
- Director: Center for Space Physics, Graduate School of Arts and Sciences, 1987-97

Chair: University Reaccreditation Task Force on Research, 1988-1989.

Member: College of Liberal Arts Executive Committee, 1988-1991.

Chair: Faculty Council Nomination Committee, 1989-1990

Member: University Promotion and Tenure Committee, 1992-1993; 1995-1996.

Chair: Astronomy Graduate Admissions Committee, 1992-1995.

Member: University Fulbright Committee, 1993-1996.

Chair: Department of Astronomy, College of Arts and Sciences, 1997-2002.

Chair: College of Arts and Sciences Academic Conduct Committee, 2003-2004

Member: 7-year BA/MD Program Admissions Committee, 2007-2016.

Director of Undergraduate Studies, Department of Astronomy, 2008-2010

Associate Chair: Department of Astronomy, 2009-2010

Member: University Task Force on Funding of Research Doctoral Programs, 2010-2011

Co-Chair: Responsible Conduct of Research Education Advisory Committee, 2010-2017

Member: University Graduate Council, 2010-2017

Member: University Council Student Life Committee, 2011-

## List of Publications

- Hughes, W.J., The effect of two periodic conductivity anomalies on geomagnetic micropulsation measurements. *Geophys. J. R. Astr. Soc.* 31, 407, 1973.
- Hughes, W.J., The effect on micropulsations of a localized conductivity anomaly. *Geophys. J. R. Astr. Soc.*, 36, 641, 1974.
- Hughes, W.J., and Southwood, D.J., Effect of atmosphere and ionosphere on magnetospheric micropulsation signals. *Nature*, 248, 493, 1974.
- Hughes, W.J., On how the lithosphere, atmosphere and ionosphere affect magnetospheric micropulsations. Ph.D. Thesis, University of London, 1974.
- Hughes, W.J., The polarization of micropulsations and geoelectric structure. *Geophys. J. R. Astr. Soc.*, 38, 95, 1974.
- Hughes, W.J., The effect of the atmosphere and ionosphere on long period magnetospheric micropulsations. *Planet. Space Sci.*, 22, 1157, 1974.
- Hughes, W.J., and Wait, J.R., Effective wave tilt and surface impedance over a laterally inhomogeneous two-layer Earth. *Radio Science*, 10, 1001, 1975.
- Hughes, W.J., and Wait, J.R., Electromagnetic induction over a two-layer Earth with a sinusoidal over-burden. *Pure App. Geophys.*, 113, 591, 1975.
- Hughes, W.J., and Southwood, D.J., The screening of micropulsation signals by the atmosphere and ionosphere. *J. Geophys. Res.*, 81, 3234, 1976.
- Hughes, W.J., and Southwood, D.J., An illustration of modification of geomagnetic pulsation structure by the ionosphere. *J. Geophys. Res.*, 81, 3241, 1976.
- Hughes, W.J., McPherron, and Russell, C.T., Multiple satellite observations of pulsation resonance structure in the magnetosphere. *J. Geophys. Res.*, 82, 492, 1977.
- Arthur, C.W., McPherron, R.L., and Hughes, W.J., A statistical study of pc3 magnetic pulsations at synchronous orbit, ATS 6. *J. Geophys. Res.*, 82, 1149, 1977.
- Hughes, W.J., Comment on: "Hydromagnetic Waves in a Non-Uniform Plasma," by E. Kupfer. *J. Geophys.*, 43, 829, 1977.
- Hughes, W.J., McPherron, R.L., and Barfield, J.N., Geomagnetic pulsations observed simultaneously on three geostationary satellites. *J. Geophys. Res.*, 83, 1109, 1978.
- Newton, R.S., Southwood, D.J., and Hughes, W.J., Damping of geomagnetic pulsations by the ionosphere. *Planet. Space Sci.*, 26, 201, 1978.

- Hughes, W.J., Southwood, D.J., Mauk, B.H., McPherron, R. L., and Barfield, J.N., Alfvén waves generated by an inverted plasma energy distribution. *Nature*, 275, 43, 1978.
- Southwood, D.J., and Hughes, W.J., Source induced vertical components in geomagnetic pulsation signals. *Planet Space Sci.*, 26, 715, 1978.
- Hughes, W.J., McPherron, R. L., and Barfield, J.N., Mauk, B.H., A compressional pc4 pulsation observed by three satellites in geostationary orbit near local midnight. *Planet Space Sci.*, 27, 821, 1979.
- Hughes, W.J., Multiple satellite studies of ULF waves. In *Proceedings of the International Workshop on Selected Topics of the Magnetospheric Physics*; Japanese IMS Committee, Tokyo, 1979.
- Mier-Jedrezejowicz, W.A.C. and Hughes, W.J., Phase skipping in pulsation signals. *J. Geophys. Res.*, 85, 6888, 1980.
- Hughes, W.J. Multisatellite observations of geomagnetic pulsations. *J. Geomag. Geoelec.*, 32, Suppl. II, SII41, 1980.
- Singer, H.J., Hughes, W.J., and Russell, C.T., Standing Alfvén waves observed by ISEE 1 and 2: Radial extent and harmonic. *J. Geophys. Res.*, 87, 3519, 1982.
- Nopper, R.W., Hughes, W.J., MacLennan, C.G., and McPherron, R.L., Impulse excited pulsations during the July 27, 1977 event. *J. Geophys. Res.*, 87, 5911, 1982.
- Hughes, W.J., Pulsation research during the I.M.S. *Rev. Geophys. Space Phys.*, 20, 641, 1982.
- Cowley, S.W.H., and Hughes, W.J., Observations of an I.M.F. effect in the Y magnetic field component at geostationary orbit. *Planet. Space Sci.*, 31, 73, 1983.
- Southwood, D.J., and Hughes, W.J., Theory of hydromagnetic waves in the magnetosphere. *Space Sci. Rev.*, 35, 301, 1983.
- Hughes, W.J., Hydromagnetic waves in the magnetosphere. *Rev. Geophys. Space Phys.*, 21, 508, 1983.
- Hughes, W.J., Waves in magnetospheric plasmas: Editorial. *Geophys. Res. Lett.* 10, 601, 1983.
- Singer, H.J., Hughes, W.J., Fougere, P.F., and Knecht, D. J., The localization of pi2 pulsations: Ground satellite observations. *J. Geophys. Res.*, 88, 7029, 1983.
- Hughes, W.J., Hydromagnetic waves in the magnetosphere, in *Solar-Terrestrial Physics: Principles and Theoretical Foundations* (R.L. Carovillano and J.M. Forbes, Eds.). D. Reidel, Dordrecht, 1983.

- Lester, M., Hughes, W.J., and Singer, H.J., Polarization patterns of pi2 magnetic pulsations and the substorm current wedge. *J. Geophys. Res.*, 88, 7958, 1983.
- Hughes, W.J., and Grard, R.J.L., A second-harmonic geomagnetic field line resonance at the inner edge of the plasma sheet; GEOS 1 ISEE 1 and ISEE 2 observations. *J. Geophys. Res.*, 89, 2755, 1984.
- Sutcliffe, P.R., Walker, A.D.M., Smits, D.P., Hughes, W.J., and Goertz, C., Magnetic signatures during the magnetospheric substorm of 27 July 1979. *S. Afr. J. Phys.*, 7, 7, 1984.
- Lester, M., Hughes, W.J., and Singer, H.J., Longitudinal structure in pi2 pulsations and the substorm current wedge. *J. Geophys. Res.*, 89, 5489, 1984.
- Takahashi, K., McPherron, R.L., and Hughes, W.J., Multispacecraft observations of azimuthally polarized pc 3-4 magnetic pulsations, *J. Geophys. Res.*, 89, 6758, 1984.
- Singer, H.J., Hughes, W.J., Russell, C.T., and Grard, R.J.L., Magnetospheric pulsations observed by ISSE 1 and 2 satellites. *Proc. Conf. Achievements of the IMS*, p. 619, ESA SP-217, Paris 1984.
- Lester, M., Hughes, W.J., and Singer, H.J., Pi2 pulsations and the substorm current wedge: ground observations. *Proc. Conf. Achievements of the IMS*, p. 673, ESA SP-217, Paris 1984.
- Singer, H.J., Knecht, D.J., Hughes, W.J., Gelpi, C., and Lester, M., Ground satellite observations of substorm related pi2 pulsations and current systems. *Proc. Conf. Achievements of the IMS*, p. 679, ESA SP-217, Paris 1984.
- Southwood, D.J., and Hughes, W.J., Concerning the structure of pi2 pulsations. *J. Geophys. Res.*, 90, 386, 1985.
- Daly, R.A., and Hughes, W.J., The effect of hydromagnetic waves on the shape of the plasmapause boundary. *J. Geophys. Res.*, 90, 537, 1985.
- Hughes, W.J., and Singer, H.J., Midlatitude pi2 pulsations, geosynchronous substorm onset signatures and auroral zone currents on 22 March 1979: CDAW-6 *J Geophys. Res.*, 90, 1297, 1985.
- Gelpi, C., Hughes, W.J., Singer, H.J., and Lester, M., Midlatitudes pi2 polarization pattern and synchronous orbit magnetic activity. *J. Geophys. Res.*, 90, 6451, 1985.
- Hughes, W.J. Smits, D.P., Cattell, C.A., and Russell, C.T., Multisatellite investigations of substorm onsets. *Adv. Space Res.*, 5, 159, 1985.



- Singer, H.J., Hughes, W.J., Gelpi, C., and Ledley, B.G., Magnetic disturbances in the vicinity of synchronous orbit and the substorm current wedge: a case study. *J. Geophys. Res.*, *90*, 9583, 1985.
- Gelpi, C., Hughes, W.J., and Singer, H.J., Longitudinal phase and polarization characteristics in mid latitude  $\pi/2$  pulsations. *J. Geophys. Res.*, *90*, 9905, 1985.
- Smits, D.P., Hughes, W.J., Cattell, C.A., and Russell, C.T., Observations of field-aligned currents, waves and electric fields at substorm onset. *J. Geophys. Res.*, *91*, 121, 1986.
- Edwin, P.M., Roberts, B., and Hughes, W.J., Dispersive ducting of MHD waves in the plasma sheet: A source of  $\pi/2$  wave bursts. *Geophys. Res. Lett.*, *13*, 373, 1986.
- Cowley, S.W.H., and Hughes, W.J., A definitive test of the Primdahl-Spangselev hypotheses concerning the nature of the solar wind-magnetosphere interactions. *Planet. Space Sci.*, *34*, 745, 1986.
- Hughes, W.J., and Cowley, S.W.H., Observation of IMF associated magnetic field perturbations in the GSM X component at geostationary orbit, in *Solar Wind-Magnetosphere Coupling*, (Y. Kamide and J.A. Slavin, Eds.) p. 691, D. Reidel, Dordrecht, 1986.
- Murphy, N., Slavin, J.A., Baker, D.N., and Hughes, W.J., Enhancements of energetic ions associated with travelling compression regions in the deep geomagnetic tail. *J. Geophys. Res.*, *92*, 64, 1987.
- Gelpi, C., Singer, H.J., and Hughes, W.J., A comparison of magnetic signatures and DMSP auroral images at substorm onset: 3 case studies. *J. Geophys. Res.*, *92*, 2447, 1987.
- Gledhill, J.A., Dore, I.S., Goertz, C.K., Haggard, R., Hughes, W.J., Scourfield, M.W.J., Smits, D.P., Stoker, P.H., Sutcliffe, P.R., Wakerley, P.A., and Walker, A.D.M., A magnetospheric substorm observed at Sanae, Antarctica, *J. Geophys. Res.*, *92*, 2461, 1987.
- Hughes, W.J., and Sibeck, D.G., On the three-dimensional structure of plasmoids, *Geophys. Res. Lett.*, *14*, 636, 1987.
- Crowley, G., Hughes, W.J., and Jones, T.B., Observational evidence of cavity modes in the Earth's magnetosphere, *J. Geophys. Res.*, *92*, 12,233, 1987.
- Hughes, W.J., Multisatellite observations of field-aligned current systems, *Adv. Space Res.*, *V8*, (9) 321, 1988.
- Ludlow, G.R., Cornilleau-Wehrin, N., Hughes, W.J., and Singer, H.J., Simultaneous Observation of a Pc1 Pulsation by the AFGL Magnetometer Network and GEOS 1, *J. Geophys. Res.*, *94*, 6633, 1989.

- Slavin, J.A., Baker, D.N., Craven, J.D., Elphic, R.C., Fairfield, D.H., Frank, L.A., Galvin, A.B., Hughes, W.J., Manka, R.H., Mitchel, D.G., Richardson, I.G., Sanderson, T.R., Sibeck, D.J., Smith, E.J., and Zwickl, R.D., CDAW V8 observations of plasmoid signatures in the geomagnetic tail: An assessment, *J. Geophys. Res.*, *94*, 15153, 1989.
- Lester, M., Singer, H.J., Smits, D.P., and Hughes, W.J., Pi2 pulsations and the substorm current wedge -- low latitude polarization, *J. Geophys. Res.*, *94*, 17133, 1989.
- Kivelson, M.G., and Hughes, W.J., On the threshold for triggering substorms, *Planet. Sci.*, *38*, 211, 1990.
- Moldwin, M.B., and Hughes, W.J., A 2 ½ dimensional magnetic field model of plasmoids, in *The Physics of Magnetic Flux Ropes*, (C.T. Russell, E.R. Priest, and L.C. Lee, Eds.), AGU Mono. Ser., v 58, p. 663, American Geophysical Union, Washington, DC, 1990.
- Hughes, W.J., Waves on the magnetopause and their signature on the ground, in *Report of the GEM Workshop on Ionospheric Signatures of Cusp, Magnetopause and Boundary Layer Processes*, (T.J. Rosenberg, Ed.), p. 33, Univ. Maryland, College Park, 1990.
- Mendillo, M., Baumgardner, J., Flynn, B., and Hughes, W.J., The extended sodium nebula of Jupiter, *Nature*, *348*, 312, 1990.
- Ludlow, G.R., Hughes, J.W., Engebretson, M.J., Slavin, J.A., Sugirura, M., and Singer, H.J., Ion cyclotron waves near L=4.6: a ground-satellite correlation study, *J. Geophys. Res.*, *96*, 1451, 1991.
- Moldwin, M.B., and Hughes, W.J., Plasmoids as magnetic flux ropes, *J. Geophys. Res.*, *96*, 14051, 1991.
- Moldwin, M.B., and Hughes, W.J., Multisatellite observations of plasmoids: IMP 8 and ISEE 3, *Geophys. Res. Lett.*, *19*, 1081, 1992.
- Basinka, E.W., Burke, W.J., Maynard, N.C., Hughes, W.J., Winningham, J.D., and Hanson, W.B., Small scale electrodynamic of the cusp with northward interplanetary magnetic field, *J. Geophys. Res.*, *97*, 6369, 1992.
- Moldwin, M.B., and Hughes, W.J., Plasmoid observations in the distant plasma sheet boundary layer, *Geophys. Res. Lett.*, *19*, 1911, 1992.
- Paranicas, C., Hughes, W.J., Singer, H.J., and Anderson, R.R., Banded electrostatic emissions observed by the CRRES plasma wave experiment, *J. Geophys. Res.*, *97*, 13889, 1992.
- Moldwin, M.B., and Hughes, W.J., On the formation and evolution of plasmoids: a survey of ISEE 3 Geotail data, *J. Geophys. Res.*, *97*, 19259, 1992.

- Singer, H.J., Hughes, W.J., and Anderson, R.R., Advances in substorm physics from CRRES, *Adv. Space Res.*, 13, (4) 203, 1993.
- Moldwin, M.B., and Hughes, W.J., Geomagnetic substorm association of plasmoids, *J. Geophys. Res.*, 98, V81, 1993.
- Ludlow, G.R., and Hughes, W.J., The ion cyclotron group delay for source regions near the plasmopause, *J. Geophys. Res.*, 98, 7561, 1993.
- Hughes, W.J., (Editor), *Outstanding Questions in Geotail and Substorm Physics*, Report of the GEM Workshop on the Physics of the Tail and Substorms. Boston University, May 1993.
- Moldwin, M.B., and Hughes, W.J., Observations of earthward and tailward propagating flux rope plasmoids: Expanding the plasmoid model of geomagnetic substorms, *J. Geophys. Res.*, 99, 183, 1994.
- Shodhan, S., Crooker, N.U., Hughes, W.J., and Siscoe, G. L., Heliospheric Current Sheet Inclinations predicted from source surface maps, *J. Geophys. Res.*, 99, 2531, 1994.
- Greenspan, E.E., Burke, W.J., Rich, F.J., Hughes, W.J., and Heelis, R.A., DMSP F8 observations of the mid-latitude and low-latitude topside ionosphere near solar minimum, *J. Geophys. Res.*, 99, 3817, 1994.
- Fraser, B.J., Singer, H.J., Hughes, W.J., Anderson, R.R., and Wygant, J.R., Electromagnetic ion cyclotron harmonic waves near the plasmopause, *Adv. Space Res.*, 5, 255-258, 1994
- Hughes, W.J., Magnetospheric ULF Waves: A tutorial with a historical perspective, in *Solar Wind Sources of ULF Waves*, (M.J. Engbretson, K. Takahashi, and M. Scholer, Eds.), AGU Geophys. Mono. Ser., v81, p. 1, Am. Geophys. Un., 1994.
- Basinka, E.M., Burke, W.J., Maynard, N.C., Hughes, W.J., Knudsen, D.J., and Slavin, J.A., Electric and magnetic fluctuations at high latitudes in the dayside ionosphere during southward IMF, in *Solar Wind Sources of ULF Waves*, (M.J. Engbretson, K. Takahashi, and M. Scholer, Eds.), AGU Geophys. Mono. Ser., v81, p. 387, Am. Geophys. Un., 1994.
- Rasinkangas, Mursula, K., Kremser, G., Singer, H.J., Fraser, B.J., Korth, A., and Hughes, W.J., in *Solar Wind Sources of ULF Waves*, (M.J. Engbretson, K. Takahashi, and M. Scholer, Eds.), AGU Geophys. Mono. Ser., v81, p. 417, Am. Geophys. Un., 1994.
- Hughes, W.J., (Editor), *Strategies for the Tail and Substorm Campaign*, Report of the GEM Workshop on the Physics of the Tail and Substorms. Boston University, April 1994.
- Hughes, W.J., ULF Waves in the Cusp and Cleft: Signatures of Boundary Layer Processes, in *Physical Signatures of Magnetospheric Boundary Layer Processes*, (J.A. Holtet, and A. Egeland, Eds.) p. 349, Kluwer Acad. Pub., Dordrecht, 1994.

- Singer, H.J., and Hughes, W.J., Magnetic Field Observations of the Ring Current by CRRES, in *Proceedings of the International Conference on Magnetic Storms*, (Y. Kamide, Ed.) p. 33, Nagoya University Solar-Terrestrial Environment Laboratory, Nagoya, Japan, 1995.
- Hughes, W.J., The Magnetopause, Magnetotail, and Magnetic Reconnection, in *Introduction to Space Physics* (M.G. Kivelson and C.T. Russel, Eds.), pp. 227-287, Camb. Univ. Press., New York, 1995.
- Hughes, W.J., Engebretson, M.J., and Zesta, E., Ground Observations of Transient Cusp Phenomena: Initial Results from MACCS, in *Physics of the Magnetopause*, (P. Song, B.U.O. Sonnerup, and M.F. Thomsen, Eds.) AGU Geophys. Mono. Ser., v90, p. 427, Am. Geophys. Un., Washington DC. 1995.
- Engebretson, M.J., Hughes, W.J., Alford, J.L., Zesta, E., Cahill, L.J., Arnoldy, R.L., and Reeves, G.D., MACCS Observations of the Spatial Extent of Broadband ULF Magnetic Pulsations at Cusp/Cleft Latitudes, *J. Geophys. Res.*, *100*, 19371, 1995.
- Bristow, W.A., Sibeck, D.G., Jacquey, C., Greenwald, R.A., Sofko, G.J., Mukai, T., Yamamoto, T., Kokubun, S., Hughes, T.J., Hughes, W.J., Zesta, E., and Engebretson, M.J., Observations of Convection Vortices using the SuperDARN HF Radars, *J. Geophys. Res.*, *100*, 19743, 1995.
- Angelopoulos, V., Mitchell, D.G., Williams, D.J., McEntire, R.W., Lui, A.T.Y., Decker, R.B., Krimigis, S.M., Roelof, E.C., Christon, S.P., Kokubun, S., Yamamoto, T., Hughes, W.J., Samson, J.C., Friis-Christensen, E., and Hayashi, K., Growth and Evolution of a Plasmoid Associated with a Small, Isolated Substorm: IMP8 and GEOTAIL Measurements in the Magnetotail, *Geophys. Res. Lett.*, *22*, 3011, 1995.
- Maynard, N.C., Burke, W.J., Basinka, E.M., Erickson, G.M., Hughes, W.J., Singer, H.J., Yahnin, A., Hardy, D.A., and Mozer, F.S., Dynamics of the inner magnetosphere near times of substorm onsets, *J. Geophys. Res.*, *101*, 7705, 1996.
- Chi, P.J., Russell, C.T., Le, G., Hughes, W.J., and Singer, H.J., A synoptic Study of Pc 3, 4 Waves using the Air Force Geophysics Laboratory Magnetometer Array, *J. Geophys. Res.*, *101*, 13215, 1996.
- Angelopoulos, V., Lui, A.T.Y., McEntire, R.W., Williams, D.J., Christon, S.P., Nakamura, M., Kusaka, H., Mukai, T., Kokubun, S., Yamamoto, T., Reeves, G.D., Friis-Christensen, E., and Hughes, W.J., Anisotropy reversals in the distant magnetotail and their association with magnetospheric substorms, *J. Geomag. Geoelectr.*, *48*, 629, 1996.
- Fraser, B.J., Singer, H.J., Hughes, W.J., Wygant, J.R., Anderson, R.R., and Hu, Y.D., CRRES Pointing vector observations of electromagnetic ion cyclotron waves near the plasmopause, *J. Geophys. Res.*, *101*, 15331, 1996.

- Angelopoulos, V., Mitchell, D.G., McEntire, R.W., Williams, D.J., Lui, A.T.Y., Krimigis, S.M., Decker, R.B., Christon, S.P., Kokubun, S., Yamamoto, T., Saito, Y., Mukai, T., Mozer, F.S., Tsuruda, K., Lepping, R., Reeves, G., Hughes, W.J., Friis-Christensen, E., and Troshichev, O., Tailward progression of magnetotail acceleration centers: relationship to substorm current wedge, *J. Geophys. Res.*, *101*, 24599, 1996.
- Hughes, W.J., and Engebretson, M.J., MACCS: Magnetometer Array for Cusp and Cleft Studies, in *Satellite Ground Based Coordination Sourcebook*, (M. Lockwood, H.J. Opgenoorth, M.N. Wild, and R. Stamper, Eds.) p.119, ESA-SP-1198, European Space Agency, Noordwijk, The Netherlands, 1997.
- Spence, H.E., A.M. Jorgensen, W.J. Hughes, J.F. Fennell, and J.L. Roeder, Towards Inner Magnetosphere Particle and Field Models, *Adv. Space Res.*, *20*, (3) 427, 1997.
- Dyrud, L.P., M.J. Engebretson, J.L. Posch, W.J. Hughes, H. Fukunishi, R.L. Arnoldy, P.T. Newell, and R.B. Horne, Ground Observations and Possible Source Regions of Two Types of Pc 1-2 micropulsations at very high latitudes, *J. Geophys. Res.*, *102*, 27011, 1997.
- Hughes, W.J., Book Review: *Physics of Solar System Plasmas*, by T.E. Cravens, EOS, *Trans. Am. Geophys. Un.*, *79*, 251, 1998.
- Szuberla, C.A.L., J.V. Olson, M.J. Engebretson, B.J. Fraser, S. Ables, and W.J. Hughes, Interstation Pc3 coherence at cusp latitudes, *Geophys. Res. Lett.*, *25*, 2381, 1998.
- Engebretson, M.J., K.-H. Glassmeier, M. Stellmacher, W.J. Hughes, and H. Luhr, The dependence of high-latitude Pc5 wave power on solar wind velocity and on the phase of high-speed solar wind streams, *J. Geophys. Res.*, *103*, 26271, 1998.
- Posch, J.L., M.J. Engebretson, A.T. Weatherwax, D.L. Detrick, W.J. Hughes, and C.G. MacLennan, Characteristics of broadband ULF magnetic pulsations at conjugate cusp latitude stations, *J. Geophys. Res.*, *104*, 311, 1999.
- Huang, C.-S., G.J. Sofko, D. Murr, W.J. Hughes, and T. Moretto, High-latitude ionospheric convection during strong interplanetary magnetic field  $B_y$ , *Geophys. Res. Lett.*, *26*, 405, 1999.
- Ohtani, S., G. Rostoker, K. Takahashi, V. Angelopoulos, M. Nakamura, C. Waters, H.J. Singer, S. Kokubun, K. Tsuruda, W.J. Hughes, T.A. Potemra, L.J. Zanetti, J.B. Gary, A.T.Y. Lui, and D.J. Williams, Coordinated ISTP satellite and ground observations of morningside Pc5 waves, *J. Geophys. Res.*, *104*, 2381, 1999.
- Lyatsky, W.B. , G.J. Sofko, A.V. Kustov, D. Andre, W.J. Hughes, and D. L. Murr, Traveling convection vortices as seen by the SuperDARN HF radars, *J. Geophys. Res.*, *104*, 2591, 1999.

- Shiokawa, K., R.R. Anderson, I.A. Daglis, W.J. Hughes, and J.R. Wygant, Simultaneous DMSP and CRRES observations of broadband electrons during a storm-time substorm on March 25, 1991. *Phys. Chem. Earth (C)*, 24, 281, 1999.
- Pilipenko, V.A., S.L. Shalimov, E.N. Fedorov, M.J. Engebretson, and W.J. Hughes, Coupling between field-aligned current impulses and Pi1 noise bursts, *J. Geophys. Res.*, 104, 17419, 1999.
- Takahashi, K., W.J. Hughes, R.R. Anderson, and S.I. Solovyev, CRRES Satellite Observations associated with low latitude Pi2 pulsations, *J. Geophys. Res.*, 104, 17431, 1999.
- Engebretson, M.J., D.L. Murr, W.J. Hughes, H. Luhr, T. Moretto, J.L. Posch, A.T. Weatherwax, T.J. Rosenberg, C.G. MacLennan, L.J. Lanzerotti, F. Marcucci, S. Dennis, G. Burns, J. Bitterly, and M. Bitterly. A multipoint determination of the propagation velocity of a sudden commencement across the polar ionosphere. *Journal of Geophysical Research*, 104, A10, 22433, 1999.
- Pilipenko, V., E. Fedorov, N. Mazur, M.J. Engebretson, and W.J. Hughes. Magnetohydrodynamic waveguide/resonator for Pc3 ULF pulsations at cusp latitudes. *Earth Planets Space*, 51, 441, 1999.
- Solovyev, S.I., D.G. Baishev, E.S. Barkova, M.J. Engebretson, J.L. Posch, W.J. Hughes, K. Yumoto, and V.A. Pilipenko. Structure of disturbances in the dayside and nightside ionosphere during periods of negative interplanetary magnetic field  $B_z$ . *Journal of Geophysical Research*, 104, A12, 28019, 1999.
- Zesta, E., W.J. Hughes, M.J. Engebretson, T.J. Hughes, A.J. Lazarus., and K.I. Paularena. The November 9, 1993 traveling convection vortex event: A case study. *Journal of Geophysical Research*, 104, A12 28041, 1999.
- Slinker, S.P., J.A. Fedder, W.J. Hughes, J.G. Lyon. Response of the ionosphere to a density pulse in the solar wind: simulation of traveling convection vortices. *Geophysical Research Letters*, 26, 23, 3549, 1999.
- Huang, Chao-Song, D. Murr, G.J. Sofko, W.J. Hughes, T. Moretto. Ionospheric convection response to changes of interplanetary magnetic field  $B_z$  component during strong  $B_y$  component. *Journal of Geophysical Research*, 105, A3, 5231, 2000.
- Pi, Xiaoqing, M. Mendillo, W.J. Hughes, M.J. Bounsanto, D.P. Sipler, J. Kelly, Qihou Zhou, Gang Lu, and T.J. Hughes. Dynamical effects of geomagnetic storms and substorms in the middle-latitude ionosphere: An observational campaign. *Journal of Geophysical Research*, 105, A4, 7403, 2000.
- Szuberla, C.A.L., J.V. Olson, M.J. Engebretson, M.G. McHarg, and W.J. Hughes, Spatiotemporal characteristics of cusp latitude spectra. *Journal of Geophysical Research*, 105, A4, 7695, 2000.

- Huang, Chao-Song, G.J. Sofko, A.V. Kustov, J.W. MacDougall, D.A. Andre, W.J. Hughes, V.O. Papitashvili. Quasi-periodic ionospheric disturbances with a 40-min period during prolonged northward magnetic field *Geophysical Research Letters*, 27, 12, 1795, 2000.
- Murr, D.L., and W.J. Hughes, Reconfiguration Timescales of Ionospheric Convection, *Geophysical Research Letters*, 28, 2145, 2001.
- Ober, D.M., N.C. Maynard, W.J. Burke, W.K. Peterson, J.B. Sigwarth, L.A. Frank, J.D. Scudder, W.J. Hughes, and C.T. Russell, Electrodynamics of the poleward auroral border observed by Polar during a substorm on April 22, 1998, *Journal of Geophysical Research*, 106, 5927, 2001.
- Huang, C.-S., G.J. Sofko, A.V. Koustov, J.W. MacDougall, R.A. Greenwald, J.M. Ruohoniemi, J.P. Villain, M. Lester, J. Watermann, V.O. Papitashvili, and W.J. Hughes, Long-Period magnetospheric-ionospheric perturbations during northward interplanetary magnetic field, *Journal of Geophysical Research*, 106, 13,091, 2001.
- Takahashi, K., S. Ohtani, W.J. Hughes, and R.R. Anderson, CRRES observation of Pi2 pulsations: Wave-mode inside and outside the plasmasphere, *Journal of Geophysical Research*, 106, 15567, 2001. (Correction: v106, 29945, 2001)
- Lyatsky W., L.L. Cogger, B. Jackel, A.M. Hamza, W.J. Hughes, D. Murr, and O. Rasmussen, Substorm development as observed by Interball UV imager and 2-D magnetic array, *Journal of Atmospheric and Solar-Terrestrial Physics*, 63, 1609-1621, 2001
- Khan, H., S.W.H. Cowley, E. Kolesnikova, M. Lester, M.J. Brittner, T.J. Hughes, W.J. Hughes, W.S. Kurth, D.J. McComas, L. Newitt, C.J. Owen, G.D. Reeves, H.J. Singer, C.W. Smith, D.J. Southwood, and J.F. Watermann, Observations of two complete substorm cycles during the Cassini Earth swing-by: Cassini magnetometer data in a global context, *Journal of Geophysical Research*, 106, 30141-30175, 2001
- Denton R.E., M.R. Lessard, R. Anderson, E.G. Miftakhova, and W.J. Hughes, Determining the mass density along magnetic field lines from toroidal eigenfrequencies: Polynomial expansion applied to CRRES data, *Journal of Geophysical Research*, 106, 29915-29924, 2001
- Murr, D. L., W.J. Hughes, A.S. Rodger, E. Zesta, H.U. Frey, and A.T. Weatherwax, Conjugate Observations of Traveling Convection Vortices: The Field Aligned Current System, *Journal of Geophysical Research*, 107, doi:10.1029/2002JA009456, 2002.
- Zesta, E., W.J. Hughes, and M.J. Engebretson, A Statistical Study of Traveling Convection Vortices using MACCS, *Journal of Geophysical Research*, 107, 1317, doi:10.1029/1999JA000386, 2002.

- Posch, J.L., M.J. Engebretson, V.A. Pilipenko, W.J. Hughes, C.T. Russell, and L.J. Lanzerotti, Characterizing the Long-period ULF response to Magnetic Storms, *Journal of Geophysical Research*, 108(A1), 1029, doi:10.1029/2002JA009386, 2003.
- Murr, D.L., and W.J. Hughes, Solar Wind Drivers of Traveling Convection Vortices, *Geophysical Research Letters*, 30(7), 1354, doi:10.1029/2002GL015498, 2003.
- Takahashi, K., D.-H. Lee, M. Nose, R.R. Anderson, and W.J. Hughes, CRRES electric field study of the radial mode structure of Pi2 pulsations, *Journal of Geophysical Research*, 108(A5), 1210, doi:10.1029/2002JA009761, 2003.
- Engebretson, M.J., J.L. Posch, and W.J. Hughes, Nonconjugate ULF Wave Power Observed by Ground Magnetometers in the Northern and Southern Dayside Cusp/Cleft/LLBL Regions, in *Earth's Low Latitude Boundary Layer*, (P.T. Newell, and T. Onsager, Eds.) AGU Geophys. Mono. Ser., v133, p. 223, American Geophys. Union, Washington DC. 2003.
- Shields, D.W., E.A. Bering III, A. Alaniz, S.E.M. Mason, W. Guo, R.L. Arnoldy, M.J. Engebretson, W.J. Hughes, D.L. Murr, L.J. Lanzerotti, and C.G. MacLennan, Multistation Studies of the simultaneous occurrence rate of Pc3 micropulsations and magnetic impulse events, *Journal of Geophysical Research*, 108(A6), 1225, doi:10.1029/2002JA009397, 2003
- Takahashi, K., R.R. Anderson, and W.J. Hughes, Pi2 pulsations with second harmonic: CRRES observations in the plasmasphere, *Journal of Geophysical Research*, 108(A6), 1242, doi:10.1029/2003JA009847, 2003.
- Takahashi, K., R.E. Denton, R.R. Anderson, and W.J. Hughes, Frequencies of standing Alfvén wave harmonics and their implication for plasma mass distribution along geomagnetic field lines: Statistical analysis of CRRES data, *Journal of Geophysical Research*, 109(A8), A08202, doi:10.1029/2003JA010345, 2004.
- Hughes, W.J., and M.K. Hudson, Towards an integrated model of the space weather system, *J. Atmos. Solar.-Terr. Phys.*, 66, 1241-1517, 2004
- Guild, T., H. Spence, L. Kepko, M. Wiltberger, C. Goodrich, J. Lyon and W.J. Hughes, Plasma sheet climatology: Geotail observations and LFM model comparisons, *J. Atmos. Solar.-Terr. Phys.*, 66, 1351-1360, 2004
- Siscoe, G.L., D.N. Baker, R. Weigel, W.J. Hughes, and H.E. Spence, Roles of empirical modeling within CISM, *J. Atmos. Solar.-Terr. Phys.*, 66, 1481-1489, 2004
- Jorgensen, A.M., H.E. Spence, W.J. Hughes, and H.J. Singer, A statistical study of the global structure of the ring current, *Journal of Geophysical Research*, 109(12), A12204, doi:10.1029/2003JA010090, 2004.



- Takahashi, K., R.E. Denton, R.R. Anderson, and W.J. Hughes, Mass density inferred from toroidal wave frequencies and its comparison to electron density, *Journal of Geophysical Research*, 111(1), A01201, doi:10.1029/2005JA011286, 2006.
- Denton, R.E., K. Takahashi, I. A. Galkin, P. A. Nsumei, X. Huang, B. W. Reinisch, R. R. Anderson, M. K. Sleeper, and W. J. Hughes, Distribution of density along magnetospheric field lines, *Journal of Geophysical Research*, 111(4), A04213, doi:10.1029/2005JA011414, 2006.
- Simms L. E., M. J. Engebretson, J. L. Posch, W. J. Hughes, Effects of the equatorward auroral boundary location and solar wind parameters on Pc5 activity at auroral zone stations: A multiple regression analysis, *Journal of Geophysical Research*, 111, A10217, doi:10.1029/2005JA011587, 2006.
- Murr, D.L., and W.J. Hughes, The Coherence between the IMF and High-Latitude Ionospheric Flows: The Dayside Magnetosphere – Ionosphere Low-Pass Filter, *J. Atmos. Sol.-Terr. Phys.*, 69, 223, (doi:10.1016/j.jastp.2006.07.019), 2007.
- Owens, M. J., N. A. Schwadron, N. U. Crooker, W. J. Hughes, and H. E. Spence, Role of coronal mass ejections in the heliospheric Hale cycle, *Geophysical Research Letters*, 34, L06104, doi:10.1029/2006GL028795, 2007.
- Garcia, K.S., and W. J. Hughes, Finding the Lyon-Fedder-Mobarry Magnetopause: A statistical perspective, *Journal of Geophysical Research*, 112, A06229, doi:10.1029/2006JA012039, 2007.
- Merkin, V.G., M. J. Owens, H. E. Spence, W. J. Hughes, and J. M. Quinn, Predicting magnetospheric dynamics with a coupled Sun-to-Earth model: Challenges and first results, *Space Weather*, 5, S12001, doi:10.1029/2007SW000335, 2007
- Reeves, K. K., T.B. Guild, W.J. Hughes K.E. Korreck, J. Lin, J. Raymond, S. Savage, N.A. Schwadron, H.E. Spence, D.F. Webb, and M. Wiltberger, Posteruptive phenomena in coronal mass ejections and substorms: Indicators of a universal process? *Journal of Geophysical Research*, 113, A00B02, doi:10.1029/2008JA013049, 2008
- Owens, M. J., H. E. Spence, S. McGregor, W. J. Hughes, J. M. Quinn, C. N. Arge, P. Riley, J. Linker, and D. Odstrcil, Metrics for solar wind prediction models: Comparison of empirical, hybrid, and physics-based schemes with 8 years of L1 observations, *Space Weather*, 6, S08001, doi:10.1029/2007SW000380, 2008
- McGregor, S. L., W. J. Hughes, C. N. Arge, and M. J. Owens, Analysis of the magnetic field discontinuity at the potential field source surface and Schatten Current Sheet interface in the Wang–Sheeley–Arge model, *Journal of Geophysical Research*, 113, A08112, doi:10.1029/2007JA012330, 2008.
- Gross, N.A., R. Lopez, and W.J. Hughes, Theory into Practice: Applying lessons learned from retention studies to build a diverse graduate community, *Proc. Nat. Soc. Black Phys. AIP Conf. Proc. CP991*, 110-118, 2008.

- Takahashi, K., S. Ohtani, R. E. Denton, W. J. Hughes, and R. R. Anderson, Ion composition in the plasma trough and plasma plume derived from a Combined Release and Radiation Effects Satellite Magnetoseismic study. *Journal of Geophysical Research*, 114, A06101, doi:10.1029/2007JA012330, 2008.
- Gross, N.A., C.N. Arge, R. Bruntz, A.G. Burns, W.J. Hughes, D.J. Knipp, J. Lyon, S.L. McGregor, M.J. Owens, G.L. Siscoe, S.C. Solomon, and M.J. Wiltberger, Space Physics for Graduate Students: An Activities-Based Approach, *EOS, Trans. Am. Geophys. Un.*, 90, 13, 2009.
- Hughes, W.J., Book Review: Space Weather: Physics and Effects, by V. Bothmer and I. A. Daglis, Eds, Springer, 2007, *EOS, Trans. Am. Geophys. Un.*, 90, 75, 2009.
- Quinn, J., W.J. Hughes, D.N. Baker, J. Linker, J. Lyon, S.C. Solomon, and M. Wiltberger, Building and Using Coupled Models for the Space Weather System: Lessons Learned, *Space Weather*, 7, S05005, doi:10.1029/2009SW000462, 2009.
- Schmit D.J., S. Gibson, G. de Toma, M.J. Wiltberger, W.J. Hughes, H.E. Spence, P. Riley, J.A. Linker, and Z. Mikic, A novel metric for coronal MHD models, *Journal of Geophysical Research*, 114, A12203, doi:10.1029/2008JA013732, 2009.
- Huang, C.-L., H.E. Spence, H.J. Singer, and W.J. Hughes, Modeling Radiation Belt Radial Diffusion in ULF Wave Fields: 1. Quantifying ULF Wave Power at Geosynchronous Orbit in Observations and in Global MHD Model, *Journal of Geophysical Research*, 115, A06215, doi:10.1029/2009JA014917, 2010.
- Garcia, K. S., V. G. Merkin, and W. J. Hughes, Effects of nightside O<sup>+</sup> outflow on magnetospheric dynamics: Results of multifluid MHD modeling, *Journal of Geophysical Research*, 115, A00J09, doi:10.1029/2010JA015730, 2010
- Aarnio, A.N., K.G. Stassun, W.J. Hughes, and S.L. McGregor, Solar Flares and Coronal Mass Ejections: A Statistically Determined Flare Flux-CME Mass Correlation, *Solar Physics*, 268, 195-212, 2011.
- McGregor, S.L., W.J. Hughes, C.N. Arge, D. Odstrcil, and M.J. Owens, The distribution of solar wind speeds during solar minimum: Calibration for numerical solar wind modeling constraints on the source of the slow solar wind, *Journal of Geophysical Research*, 116, A03101, doi:10.1029/2010JA015881, 2011.
- McGregor, S.L., W.J. Hughes, C.N. Arge, D. Odstrcil, and N.A. Schwadron, The Radial Evolution of the Solar Wind Speeds, *Journal of Geophysical Research* 116, A03106, doi:10.1029/2010JA016006, 2011.
- Aarnio, A. N., K. G. Stassun, S. P. Matt, W. J. Hughes, and S. L. McGregor. Extreme Coronal Mass Ejections in Young Low-Mass Stars. In *Astronomical Society of the Pacific Conference Series*, vol. 448, p. 43. 2011.
- Hughes, W.J., and M.K. Hudson, Corotating interaction regions from sun to earth: Modeling their formation, evolution, and geoeffectiveness, *J. Atmos. Solar.-Terr. Phys.*, 83, v, 2012.

- Stevens, M.L., J.A. Linker, P. Riley, and W.J. Hughes, Underestimates of magnetic flux in Coupled MHD model solar wind solutions, *J. Atmos. Solar.-Terr. Phys.*, 83, 22, 2012.
- Pahud, D.M., V.G. Merkin, C.N. Arge, W.J. Hughes, and S.M. McGregor, an MHD simulation of the inner heliosphere during Carrington rotations 2060 and 2068: Comparison with Messenger and Ace spacecraft observations, *J. Atmos. Solar.-Terr. Phys.*, 83, 32, 2012.
- Lotko, W., W.J. Hughes, M.W. Liemohn, and K. Nykyri, The Geospace Environment Modeling Program: Need, Goals, Accomplishments, Implementation, White paper published by GEM Steering Committee, 2013.
- Avery, S., D.N. Baker, A. Clement, W.J. Hughes, J.L. Kinter, III, C.E. Kolb, J.A. Logan, J.W. Nielson-Gammon, Review of the National Science Foundation's Division on Atmospheric and Geospace Sciences Draft Goals and Objectives Document, The National Academies Press, Washington, D.C. 2014.
- McGregor, S. L., M. K. Hudson, and W. J. Hughes, Modeling magnetospheric response to synthetic Alfvénic fluctuations in the solar wind: ULF wave fields in the magnetosphere, *J. Geophys. Res. Space Physics*, 119, doi:10.1002/2014JA020000, 2014.
- Hughes, W.J., Jim Dungey's Contributions to Magnetospheric ULF Waves and Field Line Resonances, in *Magnetospheric Plasma Physics: The Impact of Jim Dungey's Research*, D. Southwood et al. (eds.), Astrophysics and Space Science Proceedings, 41, doi 10.1007/978-3-319-18359-6\_7, 2015
- Garcia-Sage, K., T. E. Moore, A. Pembroke, V. G. Merkin, and W. J. Hughes, Modeling the effects of ionospheric oxygen outflow on bursty magnetotail flows, *J. Geophys. Res. Space Physics*, 120, doi:10.1002/2015JA021228, 2015.
- Gross, N. A., and W. J. Hughes, A Decade of Questions About Magnetic Reconnection, *Space Weather*, 13, doi:10.1002/2015SW00120, 2015.