

# CURRICULUM VITAE

SCOTT W. MCINTOSH

## EDUCATION

### Degrees

- 12/1998            Ph.D. (Astrophysics), University of Glasgow, Scotland
- 07/1995            B.Sc., First Class Honors (Mathematics and Physics), University of Glasgow, Scotland

### Title of Ph.D. Thesis

*Optimal Diagnosis of Hot Solar Plasmas*

## POST-DEGREE APPOINTMENTS

- 10/2014 - Present    Director, High Altitude Observatory, NCAR, Boulder, CO
- 07/2011 - 10/2014   Section Head, High Altitude Observatory, NCAR, Boulder, CO
- 07/2010 - 07/2011   Scientist III, High Altitude Observatory, NCAR, Boulder, CO
- 06/2009 - 06/2010   Scientist II, High Altitude Observatory, NCAR, Boulder, CO
- 11/2007 - 06/2009   Project Scientist II, High Altitude Observatory, NCAR, Boulder, CO
- 08/2004 - 11/2007   Senior Research Scientist, Southwest Research Inst., Boulder, CO
- 02/2003 - 07/2004   Research Scientist, Universities Space Research Association, Greenbelt, MD
- 02/2001 - 02/2003   External Fellow, European Space Agency at NASA/GSFC, Greenbelt, MD
- 01/1999 - 01/2001   Post-Doctoral Fellow, Advanced Study Program, NCAR, Boulder, CO

## SCIENTIFIC AND TECHNICAL ACCOMPLISHMENTS

### Scientific Accomplishments

- 1998 - Present        Ninety-one papers in refereed journals, thirty-seven as first author. Including eight high-profile papers (three articles in Nature and five in

Science). My current H-index is twenty-eight and I have approximately three thousand citations.

- 2006 - Present Over \$2,000,000 in funding as Principal Investigator and over \$500,000 as Co-Investigator.
- 07/2013 - Present Publishes aforementioned research on the impact of small scale magnetic signatures on the manifestation of the solar activity cycle after a lengthy “battle” in peer review. This “battle” brought to bear considerable skills in negotiation and framing of scientific questions. The ongoing research explores the impact that this research has on the range of solar physics at the heart of the Heliospheric system with particular focus on Space Weather and Sun-Climate studies pursued at NCAR.
- 08/2013 - Present Has identified the presence and release of twist in small-scale magnetic activity of the solar chromosphere and transition region as observed by the *IRIS* mission.
- 01/2013 - Present Has led the research effort to investigate short-term quasi-periodic forcing of the Sun’s radiative particulate, radiative and eruptive as it ties to the long term variability of our Star.
- 06/2012 - Present Has led the research effort to observe the complete 22-year solar activity cycle and phenomenological describe the process which modulates the 11-year (quasi-)variability in sunspots. The observed interference of activity bands belonging to the 22-year cycle appears to be strongly driven by the rotation of the deep solar interior.
- 05/2010 - Present Designed and implemented first observing plans for the *Solar Dynamics Observatory* in combination with *Hinode*. Those observations yielded two significant papers on the source of hot coronal plasma in the chromosphere rooted in Type II spicules and the unambiguous detection of sufficient Alfvénic energy to power the quiescent solar atmosphere.
- 09/2009 - Present Investigation of multi-component line profiles in the corona and transition region leads to the view that 100km/s longitudinal motions in the above are not the signature of propagating slow MHD waves, but the signature of rapid material flows into the corona associated with Type-II spicules.
- 06/2009 - Present Was a key contributor in the scientific proposal development of the IRIS NASA SMEX mission. Selected for launch in 2012.
- 09/2008 - Present Identified and studied the signature of quasi-periodic chromospheric plasma heating to several million Kelvin using *Hinode* observations. Identified that a dynamic class of spicule (“Type-II” spicule) is a significant mass source for the quiet solar corona and wind. This research forms the basis of a section of the 2009 NCAR Annual Report.

- 03/2009 - 05/2009 Assisted in writing the cover story article on Alfvén Waves observed by CoMP for the May 2009 edition of Physics Today and November 2009 edition of Parity magazine. Developed and produced the art used on the cover.
- 09/2008 Nominated Finalist for the 2009 AAS/SPD Karen Harvey Prize.
- 05/2008 - Present Observationally demonstrated connection of coronal dimmings and wind streams, posed possible impact on CME kinematics.
- 10/2006 - 06/2007 With collaborators identified the presence of several distinct varieties of spicule from early Hinode observations using the Solar Optical Telescope. Subsequently discovered chromospheric Alfvén waves by studying the motion of spicules using data from the Solar Optical Telescope on Hinode.
- 12/2006 - 06/2007 Instrumental in the discovery of Alfvén waves in solar corona using data from the Coronal Multi-channel Polarimeter (CoMP).
- 06/2005 - 01/2007 Isolated the spectral signature of magneto-convective driven reconnection in the solar transition region - established characteristic differences in these signatures between open and closed magnetic regions. Used relationship to infer and observe the relationship between coronal dimmings and fast solar wind streams behind coronal mass ejections.
- 06/2005 - 05/2006 Identified the signature of p-mode leakage around the supergranular network - posed potential impact on chromospheric heating.
- 02/2002 - Present Conducted TRACE survey of chromospheric oscillations, identified multi-frequency dependence of wave propagation characteristics on the magnetic topology of the chromospheric plasma.
- 06/1999 - 01/2001 Observationally demonstrated the role played by the magnetic topology of the chromosphere on the coupling and conversion of magneto-acoustic waves. Re-determined the term “chromospheric Canopy” as belonging to the plasma- $\beta=1$  surface.
- 01/1998 - 01/1999 Demonstrated the mathematical equivalence of the Differential Emission Measure and line ratio spectroscopic diagnostics.

**Technical Accomplishments**

- 06/2013 - Present Involved in the ongoing instrument welfare, data dissemination, education/outreach, and calibration studies for the Interface Region Imaging Spectrograph (IRIS) mission. These activities include the publication of the IRIS “User Guide” for the community to download, access, and analyze IRIS data.
- 08/2012 - 11/2012 Assisted in development, implementation and testing of the iOS Application for the “Eclipse Megamovie Project” - a citizen science

project to observe the 2017 “Great American Eclipse”. The App was field tested at a Total Solar Eclipse in Queensland Australia (November 2012).

- 09/2011 - 10/2012 Lead a team to build and implement a data pipeline and delivery system for observations from the Coronal Multi-channel Polarimeter (CoMP).
- 03/2009 - 10/2009 Was a lead team consultant in the UCAR FinTools Proposal and Award review and award process.
- 06/2008 - 07/2008 Led a community wide team comprised of scientists from twelve institutes to propose for the Coronal Data Science Center in support of the NASA Solar Dynamics Observatory Mission (\$2.7M).
- 04/2008 - Present Involved in original proposal and Phase-A study of the Interface Region Imaging Spectrometer (IRIS) NASA Small-Explorer Mission.
- 01/2005 - 08/2007 Involved in the design, construction and scientific drive for the NASA Sub-orbital Rapid Acquisition Imaging Spectrograph Experiment (RAISE)
- 04/2004 - 05/2005 Completed the first survey of SOHO EUV Brightpoints, some 200,000,000 in total.
- 11/2003 - 02/2003 Involved in instrument design and scientific concept of the original proposal and Phase A studies of the Normal-Incidence EXtreme Ultraviolet Spectrograph (NEXUS) NASA Small-Explorer Mission.
- 01/2002 - 07/2004 Lead scientific planner and operator for the Coronal Diagnostic Spectrometer (CDS), Extreme-ultraviolet Imaging Telescope (EIT) and Solar Ultraviolet Measurement of Emitted Radiation (SUMER) instruments on the SOHO spacecraft.

## **COMMUNITY SERVICE**

### **Professional Service**

- 05/2014 - Present Member of Extreme Space Weather Events Workshop Organizing Committee.
- 04/2014 Panel Member for the 2014 National Faculty Development in the Space Sciences (FDSS) Search
- 03/2014 - Present Solar Representative in National Science Foundation Geospace Earthcube Consortium.
- 09/2013 - Present Member of JAXA/ISAS Solar-C proposal writing team.
- 06/2013 - Present Author and conservator of the users/observer’s guide to the Interface Region Imaging Spectrograph (*IRIS*) mission.

- 06/2011 - Present Has led a broad community team to pursue the “Eclipse Megamovie Project” as a citizen science project to observe the 2017 “Great American Eclipse”. The pilot project took place in November 2012 during a Total Solar Eclipse in Queensland Australia.
- 09/2012 Contributor to Discovery Channel documentary “The Sun” (Aired Nov 2012).
- 09/2011 - 10/2012 Lead a team to build and implement a data pipeline and delivery system for observations from the Coronal Multi-channel Polarimeter (CoMP).
- 06/2011 Contributor to British Broadcasting Corporation “Horizon” documentary “Solar Storms: The Threat to Planet Earth” (Aired Feb. 2012).
- 02/2010 Contributor to National Geographic / Public Broadcasting Service (NOVA) documentary “The Sun” (Aired Nov. 2011).
- 06/2009 - Present Member of the Advanced Technology Solar Telescope (ATST), now the Daniel K. Inouye Solar Telescope (DKIST) Science Working Group.
- 06/2009 - 06/2011 Elected to Solar Physics Division Education and Public Outreach Committee.
- 04/2008 - 04/2010 Elected Committee Member, Solar Physics Division of the American Astronomical Society.
- 01/1999 - Present Peer Reviewer for many journals and magazines: Advances in Space Research, Astrophysical Journal, Astronomical Journal, Astronomy & Astrophysics, Geophysical Research Letters, Journal of Plasma Physics, Journal of Computational Plasma Physics, Nature, New Astronomy, Science, Solar Physics, Space Science Review.

**Management Activities**

- 05/2014 - Present Participating in the development of two “goals” of the 2014-2019 UCAR Strategic plan.
- 06/2013 - Present Voted Co-Chair of the NCAR Scientists Assembly.
- 06/2012 - Present Became HAO’s representative to the NCAR Scientists Assembly.
- 01/2012 - Present Principal Investigator of HAO’s ChroMag Instrument. My primary focus in this project is to bring in funding support for the project, raise scientific awareness, and prepare the parallel observation and understanding pathways needed for the success of the project and future efforts of HAO.
- 06/2011 - Present Principal investigator and lead scientist of the “Eclipse Megamovie Project” to observe the 2017 “Great American Eclipse”. The underlying goal it to further interest in The Sun and its day-to-day impact on our

planet. We see the project as an overt means to grow our community through broadening interest in an object that many take for granted, the Sun.

- 05/2011 - Present Leader of HAO's First Scientific Frontier.
- 09/2011 - 10/2012 Lead a team to build and implement a data pipeline and delivery system for observations from the Coronal Multi-channel Polarimeter (CoMP).
- 10/2010 - Present Appointed Section Head of the HAO "Lower Solar Atmosphere" research group. The section has since been named "Solar Transients and Space Weather" with a focus on understanding short-term solar evolution. At present this role involves supervision of five scientists: four senior scientists and one project scientist/
- 05/2010 Helped to conceive and write the HAO Strategic plan 2011-2015.
- 08/2008 - Present Managed post-docs, graduate students and HAO Support Staff on grant-related projects.
- 11/2007 - 1/2009 Managed the HAO CSAC Strategic Initiative until it was successfully incorporated into HAO base funds.

### **Educational Activities**

- 06/2011 - Present Has led a broad community team to pursue the "Eclipse Megamovie Project" as a citizen science project to observe the 2017 "Great American Eclipse" and communicate the Sun-Earth connection with the general public. The pilot project took place at the November 2012 Total Solar Eclipse in Queensland Australia. The education component of the work relates to educational materials about the Sun-Earth connection and the Human connection to the Sun.
- 05/2013 - 09/2013 Mentor for the University of Colorado / NCAR based component of the NSF REU Program.
- 05/2012 - 09/2012 Mentor for the University of Colorado / NCAR based component of the NSF REU Program.
- 09/2012 Contributor to Discovery Channel documentary "The Sun" (Aired Nov 2012).
- 05/2011 - 09/2011 Mentor for the University of Colorado / NCAR based component of the NSF REU Program.
- 06/2011 Contributor to British Broadcasting Corporation "Horizon" documentary "Solar Storms: The Threat to Planet Earth" (Aired Feb. 2012).

- 05/2010 - 09/2010 Mentor for the University of Colorado / NCAR based component of the NSF REU Program.
- 02/2010 Contributor to National Geographic / Public Broadcasting Service (NOVA) documentary “The Sun” (Aired Nov. 2011).
- 06/2009 - Present Representative on South Lanarkshire Council [Scotland, UK] Science Education Panel. Particular duties involve working with senior students to undertake final year projects in solar and astro-physics.
- 08/2004 - Present Member and contributor to “Project-Astro” activities in Colorado.
- 05/2008 - 09/2008 Mentor for the University of Colorado / NCAR based component of the NSF REU Program. Mentored two students who are both to begin their post-graduate studies.
- 04/2002 - 07/2004 GSFC host scientist for (three) undergraduate and high-school solar physics interns interested in data from the Solar and Heliospheric Observatory.
- 05/2000 - 09/2000 Science mentor for the UCAR SOARS Program.

### **Professional Affiliations**

Member, American Astronomical Society

Member, American Geophysical Union

Member, American Association for the Advancement of Science.

Member, National Science Teacher’s Association

Member, American Meteorological Society

Member, Royal Society of Edinburgh

Associate Editor of “Stellar and Solar Physics”, a specialty of Frontiers Online Journal.

### **HONORS**

- 2014 Honorary Reader in the Department of Applied Mathematics, University of St Andrews (Pending Confirmation)
- 2010 UCAR Award for Outstanding Publication, “Alfvén Waves in the Quiet Solar Corona”

- 2009 John W. Firor (HAO) Publication Award for Outstanding Publication, “Alfvén Waves in the Quiet Solar Corona”
- 1996 M.K. Hunter Memorial Award for Research in Physics, Dept. of Physics and Astronomy, University of Glasgow, Scotland
- 1994 Physics Class Prize, Dept. of Physics and Astronomy, University of Glasgow, Scotland
- 1992 Physics Class Prize, Dept. of Physics and Astronomy, University of Glasgow, Scotland
- 1991 Mathematics Class Prize, Dept. of Mathematics, University of Glasgow, Scotland

#### **RESEARCH GRANTS**

- 07/2014 - Present Co-Investigator, 5-year “Physics and Diagnostics of the Drivers of Solar Eruptions”, NASA Heliophysics Grand Challenge Award.
- 09/2012 - 09/2013 Principal Investigator, “Eclipse Megamovie Project [EMP] 2012: A Pilot Project for the 2017 Continental US Total Solar Eclipse Transit” (\$200K)
- 07/2009 - 06/2015 Co-Investigator, “IRIS: The Interface Region Imaging Spectrograph”, NASA, Small Explorer Program (\$105M)
- 05/2008 - 04/2011 Principal Investigator, “Coronal Morphology: The Interplay of Structure and Energetics”, NASA, Living With a Star Targeted Research and Technology (\$401,000)
- 05/2008 - 04/2011 Co-Investigator, “Observations and Modeling of Alfvén Waves in the Low Solar”, NASA, Living With a Star Targeted Research and Technology (\$148,000 subcontract)
- 01/2008 - 12/2010 Principal Investigator, “Extending and Mining the EUV Brightpoint Database”, NASA, Heliospheric Guest Investigator (\$402,000)
- 01/2008 - 12/2008 Principal Investigator, “A Reappraisal of SOHO Line Width Measurements”, NASA, Heliospheric Guest Investigator (\$120,000)
- 05/2007 - 04/2010 Co-Investigator, “Coupling Chromospheric Scales”, NASA, Supporting Research and Technology in Heliospheric Physics (\$120,000 subcontract)
- 01/2005 - 12/2009 Principal Investigator, “Sounding the Magnetic Chromosphere: The Boundary Between the Chromosphere and Corona”, NSF, Solar Terrestrial Physics (\$450,000)

02/2006 - 02/2009 Principal Investigator, “Mapping, Modeling and Understanding the Magnetic Chromospheric Plasma Topography”, NASA, Supporting Research and Technology in Heliospheric Physics (\$475,000)

## PUBLICATIONS

### 1. Thesis

Title: *Optimal Diagnosis of Hot Solar Plasmas*  
Date: 08/1998  
Institution: Dept. of Physics and Astronomy, University of Glasgow, Scotland  
Advisor: Prof. John C. Brown, Astronomer Royal for Scotland

### 2. Publications in Refereed Journals

- 2.1. McIntosh, S.W., and R.J. Leamon (2014) “On Magnetic Activity Band Overlap, Interaction, and the Formation of Complex Active Regions”, In Press, *Ap. J. Lett.*
- 2.2. McIntosh, S.W.; R.J. Leamon; L.D. Krista; A.M. Title; H.S. Hudson; P. Riley; J.W. Harder; G. Kopp; M. Snow; T.N. Woods; J.C. Kasper; M.L. Stevens; R.K. Ulrich, (2014), “On The Quasi-Periodic Driving of the Sun’s Eruptive, Radiative, and Particulate Output”, in press, *Nature Communications*.
- 2.3. Jiajia Liu, Scott W. McIntosh, Ineke De Moortel, James Threlfall, Christian Bethge, (2014), “Statistical Evidence for the Existence of Alfvénic Turbulence in Solar Coronal Loops”. In Press, *Ap. J.*
- 2.4. De Pontieu, B.; L. Rouppe van der Voort; S.W. McIntosh; T. Pereira; M. Carlsson; V. H. Hansteen; J. Lemen; A. M. Title; P. Boerner; N. Hurlburt; T. D. Tarbell; J.P. Wuelser; E.E. De Luca; L. Golub; S. McKillop; K. K. Reeves; S. Saar; H. Tian; P. Testa; C. Kankelborg; S. Jaeggli; L. Kleint; J. Martinez-Sykora, “The Solar Chromosphere and Transition Region are Replete with Small-Scale Twist”. In Press, *Science* (2014).
- 2.5. Tian, H.; B. De Pontieu; L. Rouppe van der Voort; S.W. McIntosh; T. Pereira; M. Carlsson; V. H. Hansteen; J. Lemen; A. M. Title; P. Boerner; N. Hurlburt; T.D. Tarbell; J.P. Wuelser; E.E. De Luca; L. Golub; S. McKillop; K. Reeves; S. Saar; P. Testa; C. Kankelborg; S. Jaeggli; L. Kleint; J. Martinez-Sykora, “Prevalence of Small-scale Jets from the Network Structures of the Solar Transition Region and Chromosphere”. In Press, *Science* (2014).
- 2.6. McIntosh, S.W.; X. Wang; R.J. Leamon; A.R. Davey; R. Howe; L.D. Krista; A.V. Malanushenko; R.S. Markel; J.W. Cirtain; J.B. Gurman; W.D. Pesnell; M.J. Thompson, “Deciphering The Solar Magnetic Activity I: On The Relationship Between Sunspot Cycle 23 And The Evolution Of Small-scale Magnetic Activity”, *Ap. J.*, 792, 12.

- 2.7. Fang, F.; Y. Fan; S. W. McIntosh, (2014) “Rotating Solar Jets in Simulations of Flux Emergence with Thermal Conduction”, *Ap. J. Lett.*, 789, 19.
- 2.8. Tian, H.; E. DeLuca; K. K. Reeves; S. McKillop; B. De Pontieu; J. Martínez-Sykora; M. Carlsson; V. H. Hansteen; L. Kleint; M. Cheung; L. Golub; S. Saar; P. Testa; M. Weber; J. Lemen; A. M. Title; P. Boerner; N. Hurlburt; T. D. Tarbell; J.-P. Wuelser; C. Kankelborg; S. Jaeggli; S. W. McIntosh, (2014) “High-resolution Observations of the Shock Wave Behavior for Sunspot Oscillations with the Interface Region Imaging Spectrograph”, *Ap. J.*, 786, 137.
- 2.9. McIntosh, S. W.; X. Wang; R.J. Leamon; P. H. Scherrer; (2014) “Identifying Potential Markers of the Sun's Giant Convective Scale”, *Ap. J. Lett.*, 784, 32.
- 2.10. De Pontieu, B.; et al., (2014) “The Interface Region Imaging Spectrograph (IRIS)”, *Solar Physics*, 289, 2733.
- 2.11. De Moortel, I., S.W. McIntosh, J. Threlfall, and C. Bethge, (2014), “Potential Evidence for the Onset of Alfvénic Turbulence in Trans-Equatorial Coronal Loops Observed with CoMP”, *Ap. J., Lett.*, 728, 34.
- 2.12. Wang, X., S.W. McIntosh, W. Curdt, H. Tian, H. Peter, and L.-D. Xia, (2013), “Temperature Dependence of UV Line Parameters in Network and Internetwork Regions of the Quiet Sun and Coronal Holes”, *Astron. & Astrophys.*, 557, 126.
- 2.13. Threlfall, J., I. De Moortel, S.W. McIntosh, and C. Bethge, (2013), “First comparison of wave observations from CoMP and AIA/SDO”, *Astron. & Astrophys.*, 556, 124.
- 2.14. Martínez-Sykora, J., B. De Pontieu, T.M.D. Pereira, J. Leenaarts, V.H. Hansteen, M. Carlsson, J. Stern, H. Tian, S.W. McIntosh, L. Rouppe van der Voort, “A Detailed Comparison between the Observed and Synthesized Properties of a Simulated Type II Spicule”, *Ap. J.*, 771, 66.
- 2.15. Tian, H., S. Tomczyk, S.W. McIntosh, C. Bethge, G. de Toma, and S.E. Gibson, (2013), “Observations of Coronal Mass Ejections with the Coronal Multichannel Polarimeter”, *Solar Physics in press.*
- 2.16. McIntosh, S.W., R.J. Leamon, J.B. Gurman, J.-P. Olive, J.W. Cirtain, D.H. Hathaway, J. Burkepile, M.S. Miesch, R.S. Markel, and L. Sitongia, (2013), “Hemispheric Asymmetries of Solar Photospheric Magnetism: Radiative, Particulate and Heliospheric Impacts”, *Ap. J.*, 765, 146.
- 2.17. McIntosh, S.W. and B. De Pontieu, (2012), “Estimating the ‘Dark’ Energy Content of the Solar Corona”, *Ap. J.*, 761, 138.
- 2.18. McIntosh, S.W., (2012), “Recent Observations of Plasma and Alfvénic Wave Energy Injection at the Base of the Fast Solar Wind”, *Sp. Sci. Rev.*, 172, 69.

- 2.19. Tian, H., S.W. McIntosh, T. Wang, L. Ofman, B. De Pontieu, D.E. Innes, and H. Peter, (2012), “Persistent Doppler Shift Oscillations Observed with Hinode/EIS in the Solar Corona: Spectroscopic Signatures of Alfvénic Waves and Recurring Upflows”, *Ap. J.*, 759, 144.
- 2.20. Kiddie, G., I. De Moortel, G. Del Zanna, S.W. McIntosh, I. Whittaker, (2012), “Propagating Disturbances in Coronal Loops: A Detailed Analysis of Propagation Speeds”, *Solar Physics*, 279, 427.
- 2.21. McIntosh, S.W., H. Tian, M. Sechler, and B. De Pontieu, Bart, (2012), “On the Doppler Velocity of Emission Line Profiles Formed in the "Coronal Contraflow" that Is the Chromosphere-Corona Mass Cycle”, *Ap. J.*, 749, 106.
- 2.22. Tian, H., S.W. McIntosh, L.-D. Xia, Jiansen, H. and X. Wang, (2012), “What can We Learn about Solar Coronal Mass Ejections, Coronal Dimmings, and Extreme-ultraviolet Jets through Spectroscopic Observations?”, *Ap. J.*, 748, 106.
- 2.23. Judge, P.G.; B. De Pontieu, S.W. McIntosh, K. Olluri, (2012), “The Connection of Type II Spicules to the Corona”, *Ap. J.*, 746, 158.
- 2.24. Gibson, S.E., G. de Toma, B. Emery, Barbara, P. Riley, L. Zhao, Y. Elsworth, R.J. Leamon, J. Lei, S.W. McIntosh, R.A. Mewaldt, B.J. Thompson, D. Webb, (2011) “The Whole Heliosphere Interval in the Context of a Long and Structured Solar Minimum: An Overview from Sun to Earth”, *Solar Physics*, 274, 5.
- 2.25. McIntosh, S.W., K.K. Kiefer, R.J. Leamon, J.C. Kasper, and M.L. Stevens, (2011), “Solar Cycle Variations in the Elemental Abundance of Helium and Fractionation of Iron in the Fast Solar Wind: Indicators of an Evolving Energetic Release of Mass from the Lower Solar Atmosphere”, *Ap. J.*, 740, 23.
- 2.26. Tian, H., S.W. McIntosh, B. De Pontieu, J. Martínez-Sykora, M. Sechler, and X. Wang, (2011), “Two Components of the Solar Coronal Emission Revealed by Extreme-ultraviolet Spectroscopic Observations”, *Ap. J.*, 738, 18.
- 2.27. Tian, H., S.W. McIntosh, S.R. Habbal, and H. Jiansen, (2011), “Observation of High-speed Outflow on Plume-like Structures of the Quiet Sun and Coronal Holes with Solar Dynamics Observatory/Atmospheric Imaging Assembly”, *Ap. J.*, 736, 130.
- 2.28. McIntosh, S.W., B. De Pontieu, M. Carlsson, V.H. Hansteen, P. Boerner, M. Goossens, (2011), “Alfvénic waves with sufficient energy to power the quiet solar corona and fast solar wind”, *Nature*, 475, 477.
- 2.29. Martínez-Sykora, J.; B. De Pontieu, V.H. Hansteen, and S.W. McIntosh, (2011), “What do Spectral Line Profile Asymmetries Tell us About the Solar Atmosphere?”, *Ap. J.*, 730, 3.

- 2.30. McIntosh, S.W., R.J. Leamon, R.A. Hock, M.P. Rast, R.K. Ulrich, (2011), “Observing Evolution in the Supergranular Network Length Scale During Periods of Low Solar Activity”, *Ap. J.*, 732, 84.
- 2.31. Hui, T., S.W. McIntosh, and De Pontieu, B., (2011), “The Spectroscopic Signature of Quasi-periodic Upflows in Active Region Timeseries”, *Ap. J.*, 727, 37.
- 2.32. De Pontieu, B., S.W. McIntosh, M. Carlsson, V.H. Hansteen, T.D. Tarbell, P. Boerner, J. Martinez-Sykora, C.J. Schrijver, and A.M. Title, (2011), “The Origins of Hot Plasma in the Solar Corona”, *Science*, 331, 55.
- 2.33. McIntosh, S.W., R.J. Leamon and B. De Pontieu, (2011), “The Spectroscopic Footprint of the Fast Solar Wind”, *Ap. J.*, 727, 7.
- 2.34. De Pontieu, B., and S.W. McIntosh, (2010), “Quasi-periodic Propagating Signals in the Solar Corona: The Signature of Magnetoacoustic Waves or High-velocity Upflows?”, *Ap. J.*, 722, 1013.
- 2.35. McIntosh, S.W., B. De Pontieu, and R.J. Leamon, (2010), “The Impact of New EUV Diagnostics on CME-Related Kinematics”, *Solar Physics*, 265, 5.
- 2.36. Innes, D.E., S.W. McIntosh, and A. Pietarila, (2010), “STEREO quadrature observations of coronal dimming at the onset of mini-CMEs”, *Astron. & Astrophys.*, 517, 7.
- 2.37. McIntosh, S.W., D.E., Innes, B. De Pontieu, and R.J. Leamon, (2010), “STEREO observations of quasi-periodically driven high velocity outflows in polar plumes”, *Astron. & Astrophys.*, 510, 2.
- 2.38. McIntosh, S.W. and B. De Pontieu, (2010), “High-Speed Transition Region and Coronal Upflows in the Quiet Sun”, *Ap. J.*, 707, 524.
- 2.39. McIntosh, S.W., and B. De Pontieu, (2009), “Observing Episodic Coronal Heating Events Rooted in Chromospheric Activity”, *Ap. J.*, 706, L80.
- 2.40. McIntosh, S.W., and B. De Pontieu, (2009), “High Speed Transition Region and Coronal Upflows in the Quiet Sun”, *Ap. J.*, 707, 524.
- 2.41. de Wijn, A.G., S.W. McIntosh, and B. De Pontieu, (2009), “On the propagation of p-modes into the solar chromosphere”, *Ap. J.*, 702, L168.
- 2.42. De Pontieu, B., V.H. Hansteen, S.W. McIntosh, and Patsourakos, S. (2009), “Estimating the Chromospheric Absorption of Transition Region Moss Emission”, *Ap. J.*, 702, 1016.
- 2.43. De Pontieu, B., S.W. McIntosh, V.H. Hansteen, and C.J. Schrijver (2009), “Observing the Roots of Coronal Heating - in the Chromosphere”, *Ap. J.*, 701, L1.
- 2.44. Tomczyk, S., and S.W. McIntosh (2009), “Time-Distance Seismology of the Solar Corona with CoMP”, *Ap. J.*, 697, 1384.

- 2.45. Leamon, R.J., and S.W. McIntosh (2009), “How the Solar Wind Ties to its Photospheric Origin”, *Ap. J.*, 697, 1306.
- 2.46. Socas-Navarro, H., S.W. McIntosh, R. Centeno, A. de Wijn, and B.W. Lites, (2009), “Direct Imaging of Fine Structure in the Chromosphere of a Sunspot Umbra”, *Ap. J.*, 696, L1683
- 2.47. McIntosh, S.W., (2009), “The Inconvenient Truth About Coronal Dimmings”, *Ap. J.*, 693, L1306
- 2.48. McIntosh, S.W., B. De Pontieu, and S. Tomczyk (2008), “A Coherence-based Approach for Tracking Waves in the Solar Corona”, *Sol. Phys.*, 252, 321.
- 2.49. Habbal, S.R., I.F. Scholl, and S.W., McIntosh, (2008), “Impact of Active Regions on Coronal Hole Outflows”, *Ap. J.*, 683, L75.
- 2.50. Straus, T., B. Fleck, S.M. Jefferies, G. Cauzzi, S.W. McIntosh, K. Reardon, G. Severino, M. Steffen (2008), “The Energy Flux of Internal Gravity Waves in the Lower Solar Atmosphere”, *Ap. J.*, 681, L125.
- 2.51. Leamon, R.J. and S.W. McIntosh (2008), “Could We Have Forecast ‘The Day the Solar Wind Died’?”, *Ap. J.*, 679, 14.
- 2.52. McIntosh, S.W., B. De Pontieu, B. and T.D. Tarbell (2008), “Reappraising Transition Region Line Widths in Light of Recent Alfvén Wave Discoveries”, *Ap. J.*, 673, L219.
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### 3. Other External Refereed Publications

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- 4.1. De Pontieu, B.; J. Martinez-Sykora; H. Peter, "Why Is Non-thermal Line Broadening of Lower Transition Region Lines Independent of Spatial Resolution?", *Ap. J.*, *submitted*.
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#### 5. Non-Refereed Publications

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- 5.5. McIntosh, S.W. and B. Fleck (2003), "Spatial Correlations of Phase Relationships in TRACE Ultraviolet Bandpasses". In Proceedings of IAU Symposium 219, Sydney.

#### 7. Selected Conference Papers

More than 50 papers at conferences and symposia, including the following invited first-author presentations:

1. "The Eclipse Megamovie Project", National Science Teacher's Association Regional Meeting, Denver CO, December 2013
2. "IRIS Observations of the Alfvénic Energy Input to the Outer Solar Atmosphere", Fall AGU, December 2013
3. "A Hemispheric Asymmetry of Solar Photospheric Magnetism: Radiative, Particulate and Heliospheric Impacts", Fall AGU, December 2012
4. "Understanding the Mass-cycle of the Outer Solar Atmosphere" Fall AGU, December 2012
5. "The Chromo-Coronal Mass-Cycle" SORCE, September 2012
6. "The Chromo-Coronal Mass-Cycle" Hinode 6, August 2012
7. "The Chromo-Coronal Mass-Cycle" SHINE, June 2012
8. "Alfvénic Exploration - Magnetism & Energetics" Colloquium on Coronal Magnetism, May 2012
9. "Relentless Energy and Mass Supply to the Outer Solar Atmosphere", ISSI Workshop on Coronal Heating, April 2012
10. "Wiggly stuff: What Can We Learn?", IRIS/Hinode/SDO, Feb 2012
11. "Evidence of Magnetic Waves in the Outer Solar Atmosphere", IRIS/Hinode/SDO, Feb 2012
12. "Ubiquitous Waves & Flows", Coronal Loops 2011, July 2011
13. "Observing Waves With SDO", Royal Society of London Meeting on Coronal Heating, June 2011
14. "Direct Measurement of Strong Alfvénic Motions Throughout the (HOT) Outer Solar Atmosphere", LWS/SDO, May 2011
15. "There's more to "it" than just counting sunspots.....", Fall AGU 2011.
16. "Type II Spicules: Connecting the Chromosphere with the Solar Corona and Wind?", SHINE July 2010
17. "Quasi-Periodic Propagating Disturbances in the Corona Flows or Waves?", BUKS June 2010.
18. "Exploring Coronal Magnetism and Energetics with HAO's Coronal Multi-Channel Polarimeter", (Invited) AAS/SPD, May 2010.
19. "The Quiet Solar Chromosphere" (Invited), S.W. McIntosh, Sacramento Peak Workshop

on Chromospheric Physics, September 2009.

20. “Observing the Roots of Solar Coronal Heating in the Chromosphere” (Invited), AAS Solar Physics Division Meeting, Boulder, CO, May 2009.
21. “Reconciling Chromospheric and Coronal Observations of Alfvénic Waves” (Invited), AAS Solar Physics Division Meeting, Boulder, CO, May 2009.
22. “Characterizing the Quiet Sun,” Spring AGU, Ft. Lauderdale, FL, May 2008.
23. “Observing the Influence of Alfvén Waves on the Energetics of the Quiet Solar Corona and Solar Wind”, Fall AGU, San Francisco, CA, December 2007.
24. “Alfvén Waves in the Solar Atmosphere”, , Living With A Star Science Meeting, Boulder, CO, September 2007.
25. “A Tale of Two Spicules”, (Invited), Spring AGU, Honolulu, HI, May 2007.
26. “Observing the Influence of the Magnetic Carpet”, SHINE Meeting, Zermatt Resort, August 2006.
27. “SOHO EIT Brightpoints”, AAS/SPD Meeting, Denver, CO 2004.