

Bradley W. Hindman

Associate Research Professor

JILA & Department of Astrophysical and Planetary Sciences

University of Colorado Boulder

Boulder, CO 80309-0440 USA

Curriculum Vitae

EDUCATION

Ph.D. Astrophysical, Planetary and Atmospheric Sciences (1995)

University of Colorado, Boulder, Boulder CO

Adviser: Ellen G. Zweibel

Thesis: "The Seismology of Active Regions and the Solar Atmosphere"

B.A. summa cum laude in Physics (1990)

University of Puget Sound, Tacoma WA

APPOINTMENTS

8/17–present **Associate Research Professor**, Department of Astrophysical and Planetary Sciences, University of Colorado Boulder

7/01–present **Senior Research Associate**, JILA, University of Colorado Boulder

1/08–12/12 **Assistant Research Professor**, Department of Astrophysical and Planetary Sciences, University of Colorado Boulder

7/04–12/07 **Lecturer**, Department of Astrophysical and Planetary Sciences, University of Colorado Boulder

12/97–7/01 **Research Associate**, JILA, University of Colorado Boulder

12/95–12/97 **Advanced Studies Program Postdoctoral Fellow**, High Altitude Observatory, National Center for Atmospheric Research

RESEARCH EXPERIENCE

2001–present **Senior Research Associate**, JILA, University of Colorado Boulder
Research Topics: Physics of stellar convection zones and MHD waves in stellar coronae

1997–2001 **Research Associate**, JILA, University of Colorado Boulder
Research Topic: Helioseismology of the Sun's upper convection zone

1995–1997 **Advanced Studies Program Postdoctoral Fellow**, High Altitude Observatory, National Center for Atmospheric Research
Research Topic: Sunspot and active-region seismology

1/91–12/95 **Research Assistant** with Professor Ellen Zweibel, Department of Astrophysical, Planetary and Atmospheric Sciences, University of Colorado Boulder
Research Topic: Solar magnetohydrodynamics

7/90–12/90 **Graduate Research Assistant** with Dr. Robert Winglee, Department of Astrophysical, Planetary and Atmospheric Sciences, University of Colorado Boulder
Research Topic: Magnetotail instabilities

7/90–12/90 **Graduate Research Assistant** with Professor John McKim Malville, Department of Astrophysical, Planetary and Atmospheric Sciences, University of Colorado Boulder
Research Topic: The solar cycle

6/89–9/89 **Undergraduate Research Assistant** with Professor Alan Thorndike, Department of Physics, University of Puget Sound
Research Topic: River plume mixing in Commencement Bay

TEACHING EXPERIENCE

Primary Instructor:

Department of Astrophysical and Planetary Sciences, University of Colorado Boulder

- 2019 ASTR 5400: Introduction to Fluid Dynamics
- 2016 ASTR 1200: Stars & Galaxies, introductory astronomy for non-majors
- 2014 ASTR 5400: Introduction to Fluid Dynamics
- 2012 ASTR 5410: Fluid Instabilities, Waves, and Turbulence
- 2011 ASTR 5410: Fluid Instabilities, Waves, and Turbulence

Co-Instructor:

Department of Astrophysical and Planetary Sciences, University of Colorado Boulder

- 2009 ASTR 5410: Fluid Instabilities, Waves, and Turbulence, with Juri Toomre
- 2018 ASTR 7500: Helio- and Asteroseismology, with Mark Rast

Guest Instructor:

Department of Astrophysical and Planetary Sciences, University of Colorado Boulder

- 2016 ASTR 5540: Mathematical Methods, two lectures, course organized by Juri Toomre
- 2016 ASTR 5400: Introduction to Fluid Dynamics, four lectures, course organized by Juri Toomre
- 2013 ASTR 7500: Solar and Stellar Magnetism, six lectures, course organized by Juri Toomre
- 2012 ASTR 5540: Mathematical Methods, eight lectures, course organized by Juri Toomre
- 2009 ASTR 5540: Mathematical Methods, eight lectures, course organized by Juri Toomre

High Altitude Observatory, National Center for Atmospheric Research

- 2005 *Local Helioseismology, Summer School for the Solar Physics Division of the AAS*

MENTORING AND SUPERVISION

- 2015–2018 **Ph.D. Thesis Co-Advisor**, Loren Matilsky (Graduate Researcher), JILA, University of Colorado Boulder
- 2011–2015 **Ph.D. Thesis Advisor**, Benjamin Greer, Department of Astrophysical and Planetary Sciences, University of Colorado Boulder, Ph.D. received Dec 2015
- 2010–2011 **Supervisor**, Swati Routh (Postdoctoral Researcher), JILA, University of Colorado Boulder
- 2005–2011 **Ph.D. Thesis Co-Advisor**, Nicholas Featherstone, Department of Astrophysical and Planetary Sciences, University of Colorado Boulder, Ph.D. received Jan 2011
- 2004 **Supervisor**, Zachary Ziegler (Undergraduate Student), Undergraduate Research Opportunities Program (UROP), University of Colorado Boulder
- 2003 **Supervisor**, Zachary Ziegler (Undergraduate Student), Undergraduate Student Assistant, University of Colorado Boulder

GRANTS OBTAINED

Principal Investigator:

- 2018–2021 “Exploiting torque balance applied to the torsional oscillations to helioseismically detect and assess submerged magnetic field,” NASA Proposal Number 18-HGIO18_2-0070, \$352,109; Co-Investigator: Juri Toomre
- 2018–2021 “Seismology of the Corona’s Magnetic Field,” NASA grant 80NSSC18K1125, \$600,000; Co-Investigator: Rekha Jain
- 2014–2019 “Theoretical Advancements in the Seismology of Coronal Loops,” NASA grant NNX14AG05G, \$450,953, 3/25/14–3/24/17
Co-Investigator: Rekha Jain
- 2014–2018 “Subsurface Flow Evolution over the Solar Cycle Revealed by Modern Ring-Analysis Techniques,” NASA grant NNX14AC05G, \$460,141; 1/1/14–12/31/16
Co-Investigators: Nicholas Featherstone & Juri Toomre
- 2008–2011 “Helioseismic Tools that Incorporate Corrections Arising from Magnetic Active Regions,” NASA grant NNX08AQ28G, \$460,000; 5/19/08–5/18/11
Co-Investigators: Deborah Haber & Juri Toomre
- 2008–2011 “Helioseismic Probing of Flows Coupled with Evolving and Flaring Active Regions,” NASA grant NNX08AJ08G, \$437,902; 2/27/08–2/26/11
Co-Investigators: Deborah Haber & Juri Toomre
- 2005–2010 “Tools Enabling Rapid Mapping of Solar Subsurface Weather with Time-Distance Tomography,” NASA grant NNG05GM83G, \$661,929; 7/15/05–7/14/10
Co-Investigators: Deborah Haber & Juri Toomre
- 2002–2007 “Helioseismic Probing with GONG+ of Subsurface Flows and their Coupling to Magnetic Activity,” NSF grant ATM-0219581, \$498,007; 11/13/02–10/31/07
Co-Investigators: Deborah Haber & Juri Toomre
- 2002–2007 “Developing Rapid Helioseismic Mapping of Evolving Solar Subsurface Weather and Magnetic Structures for SDO,” NASA grant NAG5-12491, \$517,954, 8/15/02–8/14/07; Co-Investigators: Douglas Gough, Deborah Haber, Michael Thompson & Juri Toomre
- 2001–2005 “Origins of Spatial Variations in Helioseismic Frequency Shifts Associated with Solar Activity,” NASA grant NAG5-1F0917, \$263,249; 6/01/01–5/31/05
Co-Investigators: Douglas Gough, Deborah Haber, Michael Thompson & Juri Toomre

Principal Investigator (Supercomputing Resources):

- 2018–2019 “Seismology of the Corona’s Magnetic Field,” HEX grant HEC-SMD-17-1579, 100K SBUs (2.8 million core -hours)
- 2017–2018 “Modeling Support for Deep Helioseismic Flow Measurement,” NASA HEC augmentation award SMD-16-7469, 9.0 million processor hours, 11/1/17–12/31/18
- 2016–2017 “Modeling Support for Deep Helioseismic Flow Measurement,” NASA HEC grant SMD-16-7469, 9.8 million core-hours, 11/1/16–09/30/17
- 2016 “Modeling Support for Deep Helioseismic Flow Measurement,” NASA HEC grant SMD-16-6913, 1.6 million core-hours, 04/30/16–10/31/16
- 2015–2016 “Modeling Support for Deep Helioseismic Flow Measurement,” NASA HEC grant SMD-15-6478, 4.2 million core-hours, 11/01/15–04/30/16
- 2015–2016 “Modeling Support for Deep Helioseismic Flow Measurement,” NASA HEC grant SMD-15-5894, 3.6 million core-hours, 05/01/15–06/30/16

2014–2015 “Modeling Support for Deep Helioseismic Flow Measurement,” NASA HEC grant SMD-14-4892, 4.9 million core-hours, 5/1/14–6/30/15

Co-Investigator:

2018–2021 “Seeking the Deep Origins of Sunspots,” NASA grant 80NSSC18K1127, \$600,000
Principal Investigator: Juri Toomre

2017–2019 “The Solar Dynamo Revealed,” NASA Grant NNX17AM01G, \$1,389,068
Principal Investigator: Nicholas Featherstone

2011–2014 “Dynamic Origins of Cyclic Solar Activity,” NASA grant NNX11AJ36G, \$1,352,100;
Principal Investigator: Juri Toomre

2009–2013 “Developing Physics-Based Procedures for Helioseismic Probing of Sunspots and
Magnetic Active Regions,” NASA grant NNX09AB04G, \$2,800,000; Institutional
Principal Investigator: Juri Toomre (JILA), Principal Investigator: Douglas Braun
(NWRA/ CoRA)

2008–2012 “Solar Dynamo Probed with Simulations of Turbulent Convection, Magnetism and
Shear,” NASA grant, NNX08AI57G, \$1,217,909; Principal Investigator: Juri Toomre

2007–2012 “Helioseismic Mapping of Subsurface Flows Near Solar Filaments,” NASA grant,
NNX07AH82G, \$443,039; Principal Investigator: Deborah Haber

2007–2009 “Validation of Local Helioseismic Inversion Methods Using Realistic, Supergranulation-
Scale Simulations,” NASA grant, \$185,233; Principal Investigator: Robert Stein (MSU)

2006–2007 “Helioseismic Probing of Subsurface Flows with High-Resolution Ring Analyses,”
NASA grant NNG06GD97G, \$56,000; Principal Investigator: Deborah Haber

2005–2010 “Elements of the Solar Dynamo: MHD Simulations of Convection, Rotation, Shear and
Magnetism,” NASA grant NNG05G124G, \$1,278,621; Principal Investigator: Juri
Toomre

2005–2012 “Local Helioseismic Probing on Subsurface Dynamics with HMI,” NASA grant NAS5-
02139, \$481,066; Principal Investigator: Juri Toomre

2003–2009 “Assessing Interactions between Solar Subsurface Weather (SSW) and Magnetism,”
NASA grant NAG5-13520, \$825,204; Principal Investigator: Juri Toomre

2003–2008 “Framework to Interpret Solar Subsurface Weather: Global Simulations of Turbulent
Dynamics of the Upper Reaches of the Solar Convection Zone,” NASA grant NAG5-
12815, \$315,000; Principal Investigator: Juri Toomre

2006–2006 “Exploring Dynamical Implications of Solar Subsurface Weather,” NASA grant NAG5-
11920, \$56,000; Principal Investigator: Deborah Haber

2002–2006 “Exploring Dynamical Implications of Solar Subsurface Weather,” NASA grant
NNG06GD97G, \$487,932; Principal Investigator: Deborah Haber

1999–2003 “Global and Local Helioseismic Studies of Solar Convection Zone Dynamics Using SOI-
MDI on SOHO,” NASA grant NRA NAG5-7996, \$685,000; Principal Investigator: Juri
Toomre

1998–2000 “Sources of Original and Scattered p -Mode Energy,” NASA grant NRA 97-OSS-08,
\$100,022; Principal Investigator: Timothy Brown

SERVICE WORK

Service to the University of Colorado Boulder:

Department of Astrophysical and Planetary Sciences

- 2010–2018 Member of the Research Comprehensive Examination Committee for nine graduate students in APS (Karan Molaverdikhani, Benjamin Greer, Christopher Chronopoulos, Daniel Gole, Marcus Piquette, Ryan Ovredahl, Daniel Everding, Loren Matilsky, & Connor Bice)
- 2010–2018 Collaborated on the writing of the written graduate-level Comprehensive Exams for the last nine years (fluid dynamics and mathematical methods questions)
- 2013 Member of the Ph.D. Thesis Examination Committee for Kyle Augustson
- 2010 Member of the Ph.D. Thesis Examination Committee for Nicholas Featherstone

Department of Physics

- 2016 Member of the Masters Comprehensive Examination (II) Committee for Andrew Hess

Laboratory for Atmospheric and Space Physics

- 2018 Internal Science Review Panel for a proposal to NASA by PI T. Woods

Service to the Profession:

- 2004–present Reviewed 27 papers for scientific journals and proceedings: two for Astronomy & Astrophysics, ten for the Astrophysical Journal, nine for the Astrophysical Journal Letters, four for Solar Physics, one for Monthly Notices of the Royal Astronomical Society, and one for a conference proceeding
- 2004–present Reviewed 36 grant proposals for NASA: nine for the Solar and Heliospheric Physics (SHP) program, six for the Living with a Star (LWS) program, seven for the Heliophysics Guest Investigator (H-GI) program, and fourteen for the Heliophysics Supporting Research program (H-SR).
- 2010–present Member of the Science Team for the Helioseismic and Magnetic Imager (HMI) aboard the Solar Dynamics Observatory (SDO)
- 2012 Served as the external Ph.D. Thesis Examiner for Marie Elizabeth Newington, Monash University, Melbourne, Australia
- 2009 Member of a NASA grant review panel: Strategic Resource and Technology (SRT) program

COMMUNITY OUTREACH

- 2015 **Grade School Presentation**, “Grand Tour of the Planets,” 2nd-grade science class, BASIS Oro Valley, Oro Valley, Arizona; Teacher: Jennifer Mattes

PROFESSIONAL SOCIETIES

American Geophysical Union

Bradley W. Hindman

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INVITED PRESENTATIONS (ABBREVIATION OF 35)

- “Solar Convection under the Influence of Rotation,” Solar Focus Series, National Solar Observatory, Boulder, Colorado, December 2017
- “Solar Convection in the Rotationally Constrained Regime,” School of Mathematics and Statistics, University of Sheffield, Sheffield, UK, January 2017
- “Helioseismic Imaging of Supergranulation within the Upper 30 Mm of the Convection Zone,” National Solar Observatory, Boulder, Colorado, October 2016.
- “What’s Happening inside the Sun,” LWS / SDO Workshop, Squaw Valley, California, May 2011.
- “3D Helioseismic Inversions of Ring-Analysis Flow Measurements,” GONG 2010, Aix-en-Provence, France, June 2010.
- “Measuring Meridional Circulation Deep within the Sun,” IAU Symposium 271, Nice, France, June 2010.
- “New 3-D inversion modules for ring-diagram data,” HMI Science Team Meeting, Stanford, California, September 2009.
- “Subsurface Circulations Established by Active Regions,” SHINE 2009, Wolfville, Nova Scotia, Canada, August 2009.
- “Subsurface Circulations within Active Regions,” HAO Seminar, High Altitude Observatory, Boulder, Colorado, April 2009.
- “Solar Subsurface Flows,” GONG 2008 / SOHO XXI, Boulder, Colorado, October 2008.
- “The Generation of Coronal-Loop Waves below the Photosphere by p -Mode Forcing,” Departmental Seminar, Applied Mathematics, University of Sheffield, UK, January 2008.
- “Helioseismic Flow Comparisons,” SDO Team Meeting, Napa, California, March 2008
- “Subsurface Flows Underlying a Filament,” Boulder Solar Day, High Altitude Observatory, Boulder, Colorado, May 2006.
- “Subsurface Flows and the Evolution of Solar Filaments,” SOHO Workshop, Giardini Naxos, Sicily, Italy, May 2006.
- “Ring Analysis,” Solar Physics Division Summer School on Helioseismology, Boulder, Colorado, 2005.
- “Solar Subsurface Weather: Recent Measurements of Flows Using Ring-Diagram Analysis,” AAS meeting, Albuquerque, New Mexico, 2002.
- “Comparing Local Frequency Shifts Measured through Ring–Diagram Analyses with Global Frequency Shifts,” 10th SOHO Workshop, Santa Cruz de Tenerife, Spain, October 2 2000.
- “Local p -Mode Frequency Shifts Used as Tracers of Solar Activity,” 9th SOHO Workshop, Stanford, California, July 1999.
- “Flows within the Solar Convection Zone Obtained from MDI Dense-Pack Data,” GONG '99 Workshop, Tucson, Arizona, 1999.
- “Doppler Velocity and Intensity Measurements of p -Mode Surface Amplitudes,” University of California, Northridge, California, 1998.
- “Acoustic Power Maps of Solar Active Regions,” Joint SOHO/GONG Meeting, Stanford, California, December 1997.

PUBLICATIONS

Refereed Journal Articles:

- Matilsky, L.I., Hindman, B.W., & Toomre, J. 2019, "The role of downflows in establishing solar near-surface shear," *Astrophys. J.*, in press
- Hindman, B.W. & Jain, R. 2018, "A novel approach to resonant absorption of the fast MHD eigenmodes of a coronal arcade," *Astrophys. J.*, 858, 6
- Orvedahl, R.J., Calkins, M.A., Featherstone, N.A. & Hindman, B.W. 2018, "Prandtl-number effects in high-Rayleigh-number spherical convection," *Astrophys. J.*, 856, 13
- Featherstone, N.A. & Hindman, B.W. 2016b, "The emergence of supergranulation as a natural consequence of rotationally-constrained interior convection," *Astrophys. J. Letters*, 830, L15
- Greer, B.J., Hindman, B.W., & Toomre, J. 2016b, "Helioseismic imaging of supergranulation throughout the Sun's near-surface shear layer," *Astrophys. J.*, 824, 128
- Greer, B.J., Hindman, B.W., & Toomre, J. 2016a, "Helioseismic measurement of the Rossby number in the Sun's near-surface shear layer," *Astrophys. J.*, 824, 4
- Featherstone, N.A. & Hindman, B.W. 2016a, "The spectral amplitude of stellar convection and its scaling in the high-Rayleigh-number regime," *Astrophysical J.*, 818, 32
- Hindman, B.W. & Jain, R. 2015, "Eigenmodes of 3-D magnetic arcades in the Sun's corona," *Astrophys. J.*, 814, 105
- Jain, R., Maurya, R.A., & Hindman, B.W. 2015, "Fundamental-mode oscillations of two coronal loops within a solar magnetic arcade," *Astrophys. J. Letters*, 804, L19
- Greer, B.J., Hindman, B.W., Featherstone, N.A., & Toomre, J. 2015, "Helioseismic imaging of fast convective flows throughout the near-surface shear layer," *Astrophys. J. Letters*, 803, L17
- Jain, R., Gascoyne, A., Hindman, B.W., & Greer, B. 2014, "Five-minute oscillation power within magnetic elements in the solar atmosphere," *Astrophys. J.*, 796, 72
- Gascoyne, A., Jain, R., & Hindman, B.W. 2014, "Energy loss of solar p modes due to the excitation of magnetic sausage tube waves: Importance of coupling the upper atmosphere," *Astrophys. J.*, 789, 109
- Greer, B., Hindman, B.W., & Toomre, J. 2014, "Multi-ridge fitting for ring-diagram helioseismology," *Solar Phys.*, 289, 2823
- Hindman, B.W. & Jain, R. 2014, "An interpretation of flare-induced and decayless coronal-loop oscillations as interference patterns," *Astrophys. J.*, 784, 103.
- Hindman, B.W. & Jain, R. 2013, "Equilibrium models of coronal loops that involve curvature and buoyancy," *Astrophys. J.*, 778, 174.
- Jain, R. & Hindman, B.W. 2012, "What can be learned from the seismology of a coronal loop using only a handful of frequencies?" *Astron. & Astrophys.*, 545, A138.
- Hindman, B.W. & Jain, R. 2012, "Axisymmetric Scattering of p Modes by Thin Magnetic Tubes," *Astrophys. J.*, 746, 66.
- Miesch, M.S. & Hindman, B.W. 2011, "Gyroscopic Pumping in the Solar Near-Surface Shear Layer," *Astrophys. J.*, 743, 79.
- Featherstone, N.A., Hindman, B.W. & Thompson, M.J. 2011, "Ring-analysis measurements of sunspot outflows," in *Proc. GONG 2010 – SoHO 24: A new era of seismology of the Sun and solar-like stars*, J. Phys. Conference Series vol. 271, 012002.
- Gascoyne, A., Jain, R. & Hindman, B.W. 2011, "Sensitivity of p-Mode Absorption on Magnetic Region Properties and Kernel Functions," *Astron. & Astrophys.*, 526, 93.

- Jain, R., Gascoyne, A. & Hindman, B.W. 2011, "Axisymmetric absorption of p modes by an ensemble of thin, magnetic-flux tubes," in *Proc. GONG 2010 – SoHO 24: A new era of seismology of the Sun and solar-like stars*, J. Phys. Conference Series vol. 271, 012016.
- Jain, R., Gascoyne, A. & Hindman, B.W., 2011, "Interaction of p modes with an ensemble of thin magnetic-flux tubes," *MNRAS*, 415, 1276.
- Routh, S., Haber, D.A., Hindman, B.W., Bogart, R.S. & Toomre, J., 2011, "The Influence of Tracking Rate on Helioseismic Flow Inferences," in *Proc. GONG 2010 – SoHO 24: A new era of seismology of the Sun and solar-like stars*, J. Phys. Conference Series vol. 271, 012014.
- Moradi, H., Baldner, C., Birch, A.C., Braun, D.C., Cameron, R.H., Duvall, T.L., Jr., Gizon, L., Haber, D., Hanasoge, S.M., Hindman, B.W., Jackiewicz, J., Khomenko, E., Komm, R., Rajaguru, P., Rempel, M., Roth, M., Schlichenmaier, R., Schunker, H.J., Spruit, H.C., Strassmeier, K.G., Thompson, M.J. & Zharkov, S. 2010, "Modeling the Subsurface Structure of Sunspots," *Solar Phys.*, 267, 1.
- Gough, D. & Hindman, B.W. 2010, "Helioseismic detection of deep meridional flow," *Astrophys. J.*, 714, 960.
- Gordovskyy, M., Jain, R. & Hindman, B.W. 2009, "The role of mode mixing in the absorption of p -modes," *Astrophys. J.*, 694, 1602.
- Hindman, B.W., Haber, D.A. & Toomre, J. 2009, "Subsurface circulations within active regions," *Astrophys. J.*, 698, 1749.
- Jain, R., Hindman, B.W., Braun, D.C. & Birch, A.C. 2009, "Absorption of p modes by thin magnetic flux tubes," *Astrophys. J.*, 695, 325.
- Hindman, B.W. & Jain, R. 2008, "The generation of coronal loop waves below the photosphere by p -mode forcing," *Astrophys. J.*, 667, 769.
- Komm, R., Howe, R., Hill, F., Miesch, M., Haber, D.A. & Hindman, 2007, "Divergence and vorticity of subsurface flows derived from ring-diagram analysis of MDI and GONG data," *Astrophys. J.*, 667, 571.
- Birch, A.C., Gizon, L., Hindman, B.W. & Haber, D.A. 2007, "The linear sensitivity of ring diagrams to local flows," *Astrophys. J.*, 662, 730.
- Hindman, B.W., Haber, D.A. & Toomre, J. 2006, "Helioseismically determined near-surface flows underlying a quiescent filament," *Astrophys. J.*, 653, 725.
- Mason, D., Komm, R.W., Hill, F., Howe, R., Haber, D.A. & Hindman, B.W., 2006, "Flares, magnetic fields, and subsurface vorticity: a survey of GONG and MDI data," *Astrophys. J.*, 645, 1543.
- Howe, R., Komm, R.W., Gonzalez-Hernandez, I., Hill, F., Ulrich, R., Haber, D.A., Hindman, B.W., Schou, J. & Thompson, M.J., 2006, "Large-scale zonal flows near the solar surface," *Solar Phys.*, 235, 1.
- Hindman, B.W., Gough, D.O., Thompson, M.J. & Toomre, J., 2005, "Helioseismic ring analyses of artificial data computed for two-dimensional shearing flows," *Astrophys. J.*, 621, 512.
- Hindman, B.W., Gizon, L., Duvall, T.J., Jr., Haber, D.A. & Toomre, J. 2004, "Comparison of solar subsurface flows assessed by ring and time-distance analyses," *Astrophys. J.*, 613, 1253.
- Haber, D.A., Hindman, B.W., Toomre, J. & Thompson, M.J. 2004, "Organized subsurface flows near active regions," *Solar Phys.*, 220, 371.
- Howe, R., Komm, R.W., Hill, F., Haber, D.A. & Hindman, B.W. 2004, "Activity-related changes in local solar acoustic mode parameters from Michelson Doppler Imager and Global Oscillations Network Group," *Astrophys. J.*, 608, 562.

- Haber, D.A., Hindman, B.W., Toomre, J., Bogart, R.S., Larsen, R.M. & Hill, F., 2002, “Evolving submerged meridional circulation cells within the upper convection zone revealed by ring-diagram analysis,” *Astrophys. J.*, 570, 855.
- Hindman, B.W., Haber, D.A., Toomre, J. & Bogart, R.S., 2000, “Local fractional frequency shifts used as tracers of magnetic activity,” *Solar Phys.*, 192, 363.
- Haber, D.A., Hindman, B.W., Toomre, J., Bogart, R.S., Thompson, M.J. & Hill, F., 2000, “Solar shear flows deduced from helioseismic dense-pack samplings of ring diagrams,” *Solar Phys.*, 192, 335.
- Hindman, B.W. & Brown, T.M., 1998, “Acoustic power maps of solar active regions,” *Astrophys. J.*, 504, 1029.
- Hindman, B.W., Jain, R. & Zweibel, E.G., 1997, “The surface amplitudes and frequencies of p -mode oscillations in active regions,” *Astrophys. J.*, 476, 392.
- Bogdan, T.J., Hindman, B.W., Cally, P.S. & Charbonneau, P., 1996, “Absorption of p -modes by slender magnetic flux tubes and p -mode lifetimes,” *Astrophys. J.*, 465, 406.
- Jain, R., Hindman, B.W. & Zweibel, E.G., 1996, “The influence of magnetism on p -mode surface amplitudes,” *Astrophys. J.*, 464, 476.
- Hindman, B.W., Zweibel, E.G. & Cally, P.S., 1996, “Driven acoustic oscillations within a vertical magnetic field,” *Astrophys. J.*, 459, 760.
- Hindman, B.W. & Zweibel, E.G., 1994, “The effects of a hot outer atmosphere on acoustic–gravity waves,” *Astrophys. J.*, 436, 929.

Proceedings Papers:

- Matilsky, L.I., Hindman, B.W., & Toomre, J. 2019, “Exploring the influence of density contrast on solar near-surface shear,” in *Proc. of 20th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun*, ed. S.J. Wolk, submitted
- Greer, B., Hindman, B.W., Toomre, J. 2013, “Center-to-Limb Velocity Systematic in Ring-Diagram Analysis,” in *Proc. NSO Workshop #17: Fifty Years of the Seismology of the Sun and Stars*, eds. K. Jain, S. Tripathy, F. Hill, and A. Pevtsov, ASP Conference Series vol. 478, 199
- Jain, R., Hindman, B.W., Braun, D.C. & Birch, A.C. 2009, “Absorption of p modes by magnetic plage,” in *Proc. SOHO 21 / GONG 2008: Solar-Stellar Dynamos as Revealed by Helio- and Asteroseismology*, (eds. M. Dikpati, T. Arentoft, I. Gonzalez-Hernandez, C. Lindsey, F. Hill), ASP Conference Series vol. 416, 55.
- Howe, R., Haber, D.A., Hindman, B.W., Komm, R., Hill, F. & González-Hernández, I., 2008, “Helioseismic Frequency Shifts in Active Regions,” in *Proc. NSO Workshop #24 – Subsurface and Atmospheric Influences on Solar Activity*, (eds. R. Howe, R.W. Komm, K.S. Balasubramaniam, G.J.D. Petrie), ASP Conference Series vol. 383, 305.
- Burtseva, O., González-Hernández, I., Hill, F., Howe, R., Jain, K., Kholikov, S., Komm, R., Leibacher, J., Toner, C., Tripathy, S., Haber, D., Hindman, B., Ladenkov, O. & Chou, D.-Y., 2006, “MDI and GONG inferences of the changing Sun,” in *Proc. SOHO 17 – 10 Years of SOHO and Beyond*, (ed.H. Lacoste & L. Ouwehand), ESA SP-617, 41.
- Featherstone, N.A., Haber, D.A., Hindman, B.W. & Toomre, 2006, “Helioseismic probing of giant cell flows,” in *Beyond the Spherical Sun*, (ed. K. Fletcher), ESA SP-624, 133.
- Haber, D.A., Hindman, B.W., Toomre, J. & Bogart, R.S., 2006, “Large-scale circulations using ring-analysis,” in *Beyond the Spherical Sun*, (ed. K. Fletcher), ESA SP-624, 45.

- Hindman, B.W., Haber, D.A. & Toomre, J., 2006, "Subsurface convective flows within active regions," in *Beyond the Spherical Sun*, (ed. K. Fletcher), ESA SP-624, 11.
- Brown, B.P., Haber, D.A., Hindman, B.W. & Toomre, J., 2004, "Variations of solar subsurface weather in the vicinity of active regions," in *Helio- and Asterioseismology: Towards a Golden Future*, (ed. D. Danesy), ESA SP-559, 345.
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