MARK PETER RAST

Contact Information:

Mail address: Department of Astrophysical and Planetary Sciences, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder CO 80309-0391, USA

Telephone: 303 492 5348

Fax: 303 492 6444

E-mail: mark.rast@colorado.edu

Education:

1979 BA (Philosophy) University of California, Davis

1987 BA (Physics) University of California, Santa Cruz

1992 PhD (Astrophysical, Planetary, and Atmospheric Sciences)
University of Colorado, Boulder

Career Sketch:

Rast received a BA degree in philosophy with honors from the University of California, Davis in 1979. He subsequently worked for the Federal Aviation Administration as an air traffic control specialist before pursuing and receiving a BA degree in physics with highest honors from the University of California, Santa Cruz in 1987. Rast then entered the graduate program at the University of Colorado, Boulder in the Department of Astrophysical, Planetary and Atmospheric Sciences. During the six month period of January – June 1990 he participated in the Institute for Theoretical Physics Program on "Helioseismology – Probing the Interior of a Star" at the University of California, Santa Barbara. Graduate work was completed in 1992 with the successful defense of a PhD thesis entitled "Compressible Convection with Ionization." Rast then moved to the University of Leeds, England as a research fellow in biophysical fluid dynamics, and from there to a two year postdoctoral position in the Advance Study Program at the National Center for Atmospheric Research. After two years as a research associate at the Joint Institute for Laboratory Astrophysics, Rast joined the scientific staff of the High Altitude Observatory at the National Center for Atmospheric Research. In 2006 he joined the faculty of University of Colorado, Boulder. His research interests include theory, modeling, and observation of stellar convective dynamics and scale selection, turbulent transport, the excitation of solar and stellar oscillations, spectropolarimetric inversions, the origin of solar/stellar irradiance variations, and recently epidemiological modeling. He served as the instrument scientist for the Precision Solar Photometric Telescope (PSPT) at Mauna Loa Solar Observatory (MLSO) over its period of operation from 1999 to 2015, and chair of the Daniel K. Inouye Solar Telescope (DKIST) Science Working Group from 2013 to 2021.

Teaching and Research Positions:

2018 – present	Professor, Department of Astrophysical and Planetary Sciences, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder
1998 – present	Member, Geophysical Turbulence Program, National Center for Atmospheric Research
2007 – 2022	Affiliate Scientist, High Altitude Observatory, National Center for Atmospheric Research
2018 – 2020	Associate Chair of Graduate Education, Department of Astrophysical and Planetary Sciences, University of Colorado, Boulder
2006 – 2018	Associate Professor, Department of Astrophysical and Planetary Sciences, Laboratory for Atmospheric and Space Physics, University of Colorado, Boulder
2011 – 2014	Professeur Invité, Laboratoire de Physique, École normale supérieure de Lyon, Centre national de la recherche scientifique
2010 – 2012	Affiliate, Renewable and Sustainable Energy Institute, A Joint Institute of the University of Colorado and the National Renewable Energy Laboratory
2004 – 2005	Scientist III (tenure equivalent), High Altitude Observatory, National Center for Atmospheric Research
2001 – 2003	Scientist II, High Altitude Observatory, National Center for Atmospheric Research
1998 – 2000	Scientist I, High Altitude Observatory, National Center for Atmospheric Research
1997	Instructor, Front Range Community College
1995 – 1997	Research Associate, Joint Institute for Laboratory Astrophysics, University of Colorado, Boulder
1993 – 1995	Postdoctoral Fellow, Advanced Study Program, National Center for Atmospheric Research
3/93 – 10/93	Research Fellow, Department of Applied Mathematical Studies, University of Leeds
1992 – 1993	Research Associate, Joint Institute for Laboratory Astrophysics, University of Colorado, Boulder
1988 – 1992	Research Assistant, Joint Institute for Laboratory Astrophysics, University of Colorado, Boulder
1/90 – 6/90	Affiliate Visitor, Institute for Theoretical Physics, University of California, Santa Barbara
1987 – 1990	Teaching Assistant, Department of Astrophysical, Planetary and Atmospheric Sciences, University of Colorado, Boulder

Publications:

Rast, M.P. 1979, *An Artificial Phenomenological Ensemble*.

Rast, M.P. 1987, "Dark Matter Capture and the Solar Neutrino Problem," BA Thesis, University of California, Santa Cruz.

Rast, M.P. 1991, "High wavenumber thermal convection enhanced in regions of partial ionization," in *Challenges to Theories of the Structure of Moderate Mass Stars* (ed. D.O. Gough and J. Toomre; Springer-Verlag), p. 179.

Rast, M.P. 1992, "Compressible Convection with Ionization," PhD Thesis, University of Colorado, Boulder.

Rast, M.P., and Toomre, J. 1993a, "Acoustic excitation by thermal boundary layer instability in a partially ionized convecting fluid," in *GONG 1992: Seismic Investigation of the Sun and Stars, ASP Conference Series, Vol. 42*, ed. T. Brown (San Francisco: Astronomical Society of the Pacific), p. 41.

Rast, M.P., Nordlund, Å., Stein, R.F., and Toomre, J. 1993a, "Ionization effects on solar granulation dynamics," in *GONG 1992: Seismic Investigation of the Sun and Stars, ASP Conference Series, Vol. 42*, ed. T. Brown (San Francisco: Astronomical Society of the Pacific), p. 57.

Rast, M.P., Nordlund, Å., Stein, R.F., and Toomre, J. 1993b, "Ionization effects in three-dimensional solar granulation simulations," *Astrophys. J. Lett.* 408, L53.

Rast, M.P., and Toomre, J. 1993b, "Compressible convection with ionization. I. Stability, flow asymmetries, and energy transport," *Astrophys. J.* 419, 224.

Rast, M.P., and Toomre, J. 1993c, "Compressible convection with ionization. II. Thermal boundary-layer instability," *Astrophys. J.* 419, 240.

Rast, M.P. 1994a, "Photospheric thermal instability and 'exploding' granule fragmentation" (Abstract), *EOS Trans. AGU* 75 (Supplement), 265.

Rast, M.P. 1994b, "Simultaneous solution of the Navier-Stokes and elastic membrane equations by a finite element method," *Int. J. Num. Meth. Fluids* 19, 1115.

Rast, M.P., and Gough, D.O. 1995, "High-frequency oscillations of a polytropic layer," in *GONG 1994: Helio- and Astero-seismology from the Earth and Space, ASP Conference Series, Vol. 76*, eds. R.K. Ulrich, E.J. Rhodes, Jr., W. Däppen (San Francisco: Astronomical Society of the Pacific), p. 322.

Rast, M.P. 1995, "On the nature of 'exploding' granules and granule fragmentation," *Astrophys. J.* 443, 863.

Rast, M.P. 1997, "Photospheric downflows: How deep, how coherent, how important?" in *SCORe'96: Solar Convection and Oscillations and their Relationship*, eds. F.P. Pijpers, J. Christensen-Dalsgaard, and C.S. Rosenthal (Dordrecht: Kluwer Academic), p. 135.

Rast, M.P., and Bogdan, T.J. 1998, "On the asymmetry of solar acoustic line profiles," *Astrophys. J.* 496, 527.

Rast, M.P. 1998, "Compressible plume dynamics and stability," *J. Fluid Mech.* 369, 125.

Rast, M.P. 1999a, "Thermal starting plumes, solar granulation, and the excitation of solar acoustic oscillations," in *High Resolution Solar Physics: Theory, Observations, and Techniques, Proceedings of the 19th Sacrameto Peak Summer Workshop, ASP*

Conference Series, Vol. 183, eds. T.R. Rimmele, K.S. Balasubramaniam, R.R. Radick (San Francisco: Astronomical Society of the Pacific), p. 443.

Rast, M.P. 1999b, "The thermal starting plume as an acoustic source," *Astrophys. J.* 524, 462. (NCAR Outstanding Publication Award, 2003)

Rast, M.P., Fox, P.A., Lin, H., Lites, B.W., Meisner, R.W., and White, O.R. 1999, "Bright rings around sunspots," *Nature* 401, 678.

Skartlien, R., and Rast, M.P. 2000, "P-mode intensity-velocity phase differences and convective sources," *Astrophys. J.* 535, 464.

Rast, M.P. 2000, "Solar granulation: A surface phenomenon," in *Geophysical and Astrophysical Convection*, eds. P.A. Fox and R.M. Kerr (Amsterdam: Gordon and Breach), p. 199.

Julien, K., Werne, J., Bizon, C., Fritts, D., and Rast, M. 2000, "Making waves in the Sun," *NPACI & SDSC Online* 4, No.19.

Emonet, T., Moreno-Insertis, F., and Rast, M.P. 2000, "The dynamics of buoyant magnetic ropees and the generation of vorticity in their periphery" (Abstract), *Bull. AAS* 32, 807.

White, O.R., Fox, P.A., Meisner, R., Rast, M.P., Yasukawa, E., Koon, D., Rice, C., Lin, H., Kuhn, J., and Coulter, R. 2000, "Data from the Precision Solar Photometric Telescope (PSPT) in Hawaii from March 1998 to March 1999," *Space Sci. Rev.* 94, 75.

Emonet, T., Moreno-Insertis, F., and Rast, M.P. 2001, "The zig-zag path of buoyant magnetic tubes and the generation of vorticity along their periphery," *Astrophys. J.* 549, 1212.

Rast, M.P. 2001, "The Navier-Stokes equations and their solution: Convection and oscillation excitation," in *The Dynamic Sun*, ed. A. Hanslmeier, p. 155.

Rast, M.P., Meisner, R.W., Lites, B.W., Fox, P.A., and White, O.R. 2001, "Sunspot bright rings: Evidence from case studies," *Astrophys. J.* 557, 864.

Rast, M.P. 2001, "A thermodynamically induced finite-amplitude convective instability in stellar envelopes," *Astrophys. J. Lett.* 561, L191.

Rast, M., and Hurlburt, N. 2001, "Nonlinear Instability of Compressible Starting Plumes" (Abstract) *APS/Division of Fluid Dynamics Meeting Abstracts*, DG.010.

Rast, M., and Meisner, R. 2002, "Measuring cycle variations in the solar limb darkening" (Abstract), *34th COSPAR Scientific Assembly.*

Rast, M., Ermolli, I., Sands, J., and Berrilli, F. 2002, "The supergranular intensity contrast" (Abstract), *34th COSPAR Scientific Assembly.*

Rempel, M., and Rast, M.P. 2002, "Numerical simulations of convective overshoot" (Abstract), *Bull. AAS* 34, 646.

Meisner, R.W., and Rast, M.P. 2002, "High precision orthogonal decomposition of the solar limb darkening" (Abstract), *Bull. AAS* 34, 734.

Rast, M.P. 2002, "A comment on 'Regular structures of the solar atmosphere'," *A & A* 392 L13.

Rast, M.P. 2003, "Supergranulation: New observation, possible explanation," in *Local and Global Helioseismology: The Present and Future, Proceedings of SOHO12/GONG+ 2002*, ed. H. Sawaya-Lacoste (European Space Agency, SP-517), p. 163.

Rast, M.P. 2003, "The scales of granulation, mesogranulation, and supergranulation," *Astrophys. J.* 597, 1200.

Rast, M.P., Lisle, J.P., and Toomre, J. 2004, "The spectrum of the solar supergranulation: Multiple nonwave components," *Astrophys. J.* 608, 1156.

Lisle, J.P., Rast, M.P., and Toomre, J. 2004, "Persistent north-south alignment of the solar supergranulation," *Astrophys. J.* 608, 1167.

Rast, M.P. 2005, "Solar variability: a brief review," *Mem. S.A.It.* 76, 719.

Criscuoli, S. and Rast, M.P. 2005, "A study of the photometrical properties of solar magnetic features by numerical simulation," *Mem. S.A.It.* 76, 945.

Ortiz, A. and Rast, M. 2005, "How good is the CaIIK as a proxy for the magnetic flux?," *Mem. S.A.It.* 76, 1018.

Clyne, J. and Rast, M. 2005, "A prototype discovery environment for analyzing and visualizing terascale turbulent fluid flow simulations," in *Visualization and Data Analysis 2005, Proc. of SPIE-IS&T Electronic Imaging, Vol. 5669*, eds. R.F. Erbacher, J.C. Roberts, M.T. Gröhn, and K. Börner,(Bellingham: SPIE press), p. 284.

Lindsey, C.A., Birch, A.C., Donea, A., and Rast, M. 2005, "Modeling seismic emission in the quiet sun" (Abstract), *AGU Spring Meeting*, #SP13A-06.

Aiouaz, T. and Rast, M.P. 2006, "Expansion of the supergranular magnetic network through the solar atmosphere,' in *Solar Activity and its Magnetic Origins, Proceedings IAU Symposium No. 233*, eds. V. Bothmer and A.A. Hady,(Cambridge: Cambridge University Press), p. 161.

Rast, M. 2006, "Supergranulation: Self-organization in the surface shear" (Abstract), *Bull. AAS* 38, 258.

Aiouaz, T. and Rast, M.P. 2006, "Expansion of the supergranular magnetic network through the solar atmosphere," *Astrophys. J. Lett.* 647, L183.

Criscuoli, S., Rast, M.P., Ermolli, I., and Centrone, M. 2007, "On the reliability of the fractal dimension measure of solar magnetic features and on its variation with solar activity," *A & A* 461, 331.

Rast, M.P., Mendoza, J., and Clyne, J. 2007, "Compressible thermal starting plume (portfolio)," *JOV* 10, 247.

Clyne, J., Mininni, P.D., Norton, A., and Rast, M. 2007, "Interactive desktop analysis of high resolution simulations: application to turbulent plume dynamics and current sheet formation," *NJP* 9, 301.

Ma K.-L., Blondin, J., Chen, J.H., Rast, M., and Samtaney, R. 2007, "Meet the scientists," in *2007 IEEE Visualization Conference DVD*.

Rast, M.P., Ortiz, A., and Meisner, R.W. 2008, "Latitudinal variation of the solar photospheric intensity," *Astrophys. J.* 673, 1209.

Rast, M. and Clyne, J. 2008, "Coupled analysis and visualization of high resolution astrophysical simulations," in *Numerical Modeling of Space Plasma Flows: Astronum 2007, ASP Conference Series, Vol. 385*, eds. N.V. Pogorelov, E. Audit, G.P. Zank (San Francisco: Astronomical Society of the Pacific), p. 299.

Gruchalla, K., Rast, M., Bradley, E., Clyne, J., and Mininni, P. 2009, "Visualization-driven structural and statistical analysis of turbulent flows," in *Advances in Intelligent Data Analysis VIII, IDA 2009, Lecture Notes in Computer Science, Vol. 5772*,

eds. N. Adams, C. Robardet, A. Siebes, J.-F. Boulicaut, (Berlin: Springer-Verlag), p. 321.

Criscuoli, S. and Rast, M.P. 2009, "Photometric properties of resolved and unresolved magnetic elements," *A & A* 495, 621.

Rast, M.P. and Pinton J.-F. 2009, "Point-vortex model for Lagrangian intermittency in turbulence," *Phys. Rev. E* 79, 046314.

Goldbaum, N.J., and Rast, M.P. 2009, "The convective signature of the solar supergranulation" (Abstract), *AAS/SPD Meeting* 40, 09.32.

Goldbaum, N., Rast, M.P., Ermolli, I., Sands, J.S., and Berrilli, F. 2009, "The intensity profile of the solar supergranulation," *Astrophys. J.* 707, 67.

Harder, J., Fontenla, J., Rast, M., Pilewskie, P., and Woods, T. 2010, "Measured and modeled trends in solar spectral irradiance variability in the visible and infrared" (Abstract), *38th COSPAR Scientific Assembly*, p. 16.

Haberreiter, M., Wedemeyer-Boehm, S., and Rast, M. 2010, "NLTE spectral synthesis based on 3D MHD convection simulations -understanding the role of the magnetic field in intensity variations" (Abstract), *38th COSPAR Scientific Assembly*, p. 132.

Rast, M.P., Harder, J.W., Casini, R., Criscuoli, S., Ermolli, I., Fontenla, J.M., Liu, H., Mcintosh, S.W., Schrijver, C. J., and Uitenbroek, H. 2010, "2010 Solar and Space Physics Decadal Survey White Paper: Next Steps in Solar Spectral Irradiance Studies," white paper.

Criscuoli, S., Ermolli, I., Fontenla, J., Giorgi, F., Rast, M., Solanki, S.K., and Uitenbroek, H. 2010, "Radiative emission of solar features in Ca II K," *Mem. S.A.It.* 81, 773.

Hock, R., Eparvier, F.G., McIntosh, S.W., and Rast, M.P. 2010, "Supergranule variability in Mt. Wilson Ca II K images" (Abstract), *Bull. AAS* 41, 401.07.

Rast, M.P. 2010, "Is there such a thing as quiet sun?," in *SOHO-23: Understanding a Peculiar Solar Minimum, ASP Conference Series, Vol. 428*, eds. S.R. Cranmer, J.T. Hoeksema, J.L. Kohl (San Francisco: Astronomical Society of the Pacific), p. 87.

Viticchié, B., Vantaggiato, M., Berrilli, F., Del Moro, D., Penza, V., Pietropaolo, E., and Rast, M. 2010, "Modeling the solar irradiance background via numerical simulation," *Astrophys. & Space Sci.* 328, 39.

Clyne, J., Gruchalla, K., and Rast, M. 2010, "VAPOR: Visual, statistical, and structural analysis of astrophysical flows," in *Numerical Modeling of Space Plasma Flows: Astronum 2009, ASP Conference Series, Vol. 429*, eds. N.V. Pogorelov, E. Audit, G.P. Zank (San Francisco: Astronomical Society of the Pacific), p. 323.

Ermolli, I., Criscuoli, S., Uitenbroek, H., Giorgi, F., Rast, M.P., and Solanki, S.K. 2010,"Radiative emission of solar features in the Ca II K line: comparison of measurements and models," *A & A* 523, A55.

McCaslin, J.O., Rast, M.P., and Mininni, P. 2010, "Vorticity and helicity of coherent turbulent structures in Taylor-Green and ABC flows" (Abstract), *AGU Fall Meeting*, #NG51B-1205.

Lord, J., Rast, M.P., McKinlay, C., Clyne, J., and Mininni, P.D. 2010, "Wavelet decomposition of Taylor-Green forced-turbulence: sensitivity of the incoherent component statistics to threshold value" (Abstract), *AGU Fall Meeting*, #NG51B-1207.

Auguston, K., Rast, M., Trampedach, R., and Toomre, J. 2011,"Modeling the near-surface shear layer: Diffusion schemes studied with CSS," in *GONG-SoHO 24: A new era of seismology of the Sun and solar-like stars*, *J. Physics: Conference Series* 271, 012070.

McIntosh, S.W., Leamon, R.J., Hock, R.A., Rast, M.P., and Ulrich, R.K. 2011, "Observing evolution in the supergranular length scale during periods of low solar activity," *Astrophys. J. Lett.* 730, L3.

Rast, M.P. and Pinton, J.-F. 2011, "Pair dispersion in turbulence: the subdominant role of scaling," *Phys. Rev. Lett.* 107, 214501.

Gruchalla, K., Rast, M., Bradley, E., and Mininni, P. 2011, "Segmentation and visualization of multivariate features using feature-local distributions," in *Advances in Visual Computing, Lecture Notes in Computer Science, Vol. 6938*, eds. G. Bebis, R. Boyle, B. Parvin, D. Koracin, S. Wang, K. Kyungnam, B. Benes, K. Moreland, C. Borst, S. DiVerdi, C. Yi-Jen, J. Ming (Berlin: Springer-Verlag), p. 619.

Harder, J. W., Fontenla, J. M., Rast, M. P., Snow, M. A., and Woods, T. N. 2011, "Measured and modeled trends in the solar spectral irradiance variability using the SORCE SIM and SOLSTICE instruments" (Abstract), *AGU Fall Meeting*, #GC22A-06.

Rast, M.P. and Pinton J.-F. 2011, "Turbulent dispersion in a point vortex flow: a limited role for scaling" (Abstract), *AGU Fall Meeting*, #NG43B-1480.

Lord, J., Rast, M.P., and Rempel, M. 2011, "The role of magnetic field in supergranular scale selection" (Abstract), *AGU Fall Meeting*, #SH53C-03.

Lord, J., Rast, M.P., McKinlay, C., Clyne, J., and Mininni, P.D. 2012, "Wavelet decomposition of forced turbulence: Applicability of the iterative Donoho-Johnstone threshold," *Phys. Fluids* 24, 025102.

Rast, M.P. and Harder, J.W. 2012,"Understanding the role of small scale flux in solar spectral irradiance variation," in *The Second ATST - EAST Meeting: Magnetic Fields from the Photosphere to the Corona, ASP Conference Series, Vol. 463*, eds. T. Rimmele, A. Tritschler, F. Wöger, V. Collados, H. Socos-Navarro, R. Schlichenmaier, M. Carlsson, T. Berger, A. Cadavid, P. Gilbert, P. Goode, M. Knölker (San Francisco: Astronomical Society of the Pacific), p. 65.

Rast, M. 2013, "Implications of high-resolution ATST observations for global dynamo and irradiance models" (Abstract), *American Astronomical Society, SPD meeting #44*, #400.05.

Lord, J.W., Cameron, R.H., Rast, M.P., Rempel, M., and Roudier, T. 2014, "The role of subsurface flows in solar surface convection: Modeling the spectrum of supergranular and larger scales," *Astrophys. J.* 793, 24.

Harder, J.W., Snow, M.A., Richard, E.C., Rast, M.P., Merkel, A.W., and Woods, T.N. 2014, "The Importance of Solar Spectral Irradiance to the Sun-Earth Connection: Lessons-learned from SORCE and to Future Missions" (Abstract #SH33B-04), *AGU Fall Meeting*.

Moore, C.S., Uitenbroek, H., Rempel, M., Criscuoli, S., and Rast, M.P. 2015, "The Effects Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere," *Astrophys. J.*, 799, 150.

Peck, C. and Rast, M.P. 2015, "Photometric Trends in the Visible Solar Continuum and Their Sensitivity to the Center-to-Limb Profile," *Astrophys. J.* 808, 192.

Rast, M. and Peck, C. 2015,"Sensitivity of Long-term Photometric Trends to Center-to-Limb Profile Variations" (Abstract), *IAU General Assembly meeting #29*, #2257070.

Rast, M. 2015, "Daniel K. Inouye Solar Telescope (DKIST) Critical Science Plan" (Abstract), *IAU General Assembly meeting #29*, #2257167.

Moore, C.S., Uitenbroek, H., Rempel, M., Criscuoli, S., and Rast, M. 2016, "The Effects of Magnetic Field Morphology on the Determination of Oxygen and Iron Abundances in the Solar Photosphere" (Abstract), *American Astronomical Society, AAS meeting #227*, id. #125.01.

Rast, M.P., Pinton, J.-F., and Mininni, P.D. 2016, "Turbulent transport with intermittency: Expectation of a scalar concentration," *Phys. Rev. E* 93, 043120.

Anders, E.H., Brown, B., Brandenburg, A., and Rast, M. 2016, "The structure and evolution of boundary layers in stratified convection" (Abstract), *American Astronomical Society, SPD meeting #47*, id. #7.12.

Agrawal, P., Rempel, M., Bellot Rubio, L., and Rast, M. 2016, "Turbulent transport of small-scale magnetic flux elements on the solar photosphere" (Abstract), *American Astronomical Society, SPD meeting #47*, id. #12.01.

Rast, M. and Martinez Pillet, V. 2016, "Resolving the source of the solar acoustic oscillations: What will be possible with DKIST?" (Abstract), *American Astronomical Society, SPD meeting #47*, id. #201.05.

Cossette, J.-F. and Rast, M. 2016, "Supergranulation as the Sun's largest buoyantly driven mode of convection" (Abstract), *American Astronomical Society, SPD meeting #47*, id. #203.05.

Peck, C., Rast, M., Criscuoli, S., Uitenbroek, H., and Rempel, M. 2016, "Interpreting irradiance distributions using high-resolution 3D MHD simulations" (Abstract), *American Astronomical Society, SPD meeting #47*, id. #303.02.

Cossette, J.-F. and Rast, M.P. 2016, "Supergranulation as the largest buoyantly driven convective scale of the Sun," *Astrophys. J. Lett.* 829, L17.

Tritschler, A., Rimmele, T.R., Berukoff, S., Casini, R., Kuhn, J.R., Lin, H., Rast, M.P., McMullin, J.P., Schmidt, W., Wöger, F., and the DKIST Team 2016, "Daniel K. Inouye Solar Telescope: High-resolution observing of the dynamic Sun," *Astron. Nachr.* 337, 1064.

Cossette, J.-F., Charbonneau, P., Smolarkiewicz, P.K., and Rast, M.P. 2017, "Magnetically-modulated heat transport in a global simulation of solar magneto-convection," *Astrophys. J.* 841, 65.

Peck, C., Rast, M., and Criscuoli, S. 2017, "Assessing the impact of small-scale magnetic morphology on solar variability" (Abstract), *American Astronomical Society, SPD meeting*, id. #48, id.5.03.

Peck, C.L., Criscuoli, S., and Rast, M.P. 2017, "An assessment of and solution to the intensity diffusion error intrinsic to short-characteristic radiative transfer methods," *Astrophys. J.* 850, 9.

Rast, M. 2017, "The amplitude of the deep solar convection and the origin of the solar supergranulation" (Abstract), *SDO 2016: Unraveling the Sun's Complexity*, id. #1.

Agrawal, P., Rast, M.P., Rempel, M., Gošić, M., Bellot Rubio, L.R, and Rempel, M. 2018, "Transport of internetwork magnetic flux elements in the solar photosphere," *Astrophys. J.* 854, 118.

Sujovolsky, N.E., Mininni, P.D., and Rast, M.P. 2018, "Single-particle dispersion in stably stratified turbulence," *Phys. Rev. Fluids* 3, 0346603.

Rimmele et al. 2018, "Status of the Daniel K. Inouye Solar Telescope: Unraveling the mysteries of the Sun" (Abstract), *American Astronomical Society, AAS meeting #232*, id. #316.01.

Peck, C.L., Rast, M.P., Criscuoli, S., and Rempel, M. 2019, "The solar photospheric continuum brightness as a function of mean magnetic flux density. I. The role of the magnetic structure size distribution," *Astrophys. J.* 870, 89.

Rast, M., Cauzzi, G., and Martínez Pillet V. 2019, "The Critical Science Plan for DKIST," *Il Nuovo Cimento* 42, 7.

McClure, R.L., Rast, M.P., and Martínez Pillet V. 2019, "Doppler events in the solar photosphere: The coincident superposition of fast granular flows and p-mode coherence patches," *Sol. Phys.* 294, 18.

Agrawal, P. Rast, M., and Ruiz Cobo, B. 2019, "Helioseismic inversion method applied to Stokes data" (Abstract), Solar Atmospheric and Interplanetary Environment (SHINE 2019), held 5-9 August, 2019 in Boulder, Colorado. Online at https://shinecon.org/CurrentMeeting.php, id.132.

Rast, M. and Trampedach, R. 2019, "Supegranulation on the Sun and stars: A simple model for its length scale" (Abstract), American Astronomical Society Meeting #234, id. 122.05. Bulletin of the American Astronomical Society, Vol. 51, No. 4.

Rast, M.P. 2020, "Deciphering solar convection," *Astrophysics and Space Science Proceedings* 57, 149.

Rimmele, T.R. and 73 collaborators 2020, "The *Daniel K. Inouye Solar Telescope* - Observatory overview," *Sol. Phys.* 295, 172.

Rast, M.P. and 85 collaborators 2021,"Critical Science Plan for the *Daniel K. Inouye Solar Telescope* (DKIST)," *Sol. Phys.* 296, 70.

Rimmele, T., Woeger, F., Tritschler, A., Casini, R., de Wijn, A., Fehlmann, A., Harrington, D., Jaeggli, S., Anan, T., Beck, C., Cauzzi, G., Schad, T., Criscuoli, S., Davey, A., Lin, H., Kuhn, J., Rast, M., Goode, P., Knoelker, M., Rosner, R., von der Luehe, O., Mathioudakis, M., and the DKIST Team 2021, "The National Science Foundation's Daniel K. Inouye Solar Telescope Status Update" (Abstract), American Astronomical Society Meeting #238, id. 106.01. Bulletin of the American Astronomical Society, Vol. 53, No. 6.

Bahauddin, S. and Rast, M. 2021, "Identifying Acoustic Wave Sources In A Simulated Solar Photosphere" (Abstract), American Astronomical Society Meeting #238, id. 205.07. Bulletin of the American Astronomical Society, Vol. 53, No. 6.

Bahauddin, S.M. and Rast, M.P. 2021, "Identifying acoustic wave sources on the Sun. I. Two-dimensional waves in a simulated photosphere," *Astrophys. J.* 915, 36.

Rast, M.P. 2022, "Contact statistics in populations of noninteracting random walkers in two dimensions," *Phys. Rev. E* 105, 014103.

Rast, M. 2022, "Exploring the cradle of the solar wind with the Daniel K. Inouye Solar Telescope (DKIST)" (Abstract), 44th COSPAR Scientific Assembly. Held 16-24 July, 2022, Abstract D2.1-0003-22.

Criscuoli, S., Bahauddin, S.M., Erfani, D., Faurobert, M., Kitiashvili, I., Rast, M., Peck, C.L., Rempel, M., Sadykov, V.M., Snow, M.A., Tritschler, A., Laughrey, C. 2022,

"Contribution to solar brightness of small-size magnetic elements" (Abstract), AGU Fall Meeting 2022, held in Chicago, IL, 12-16 December 2022, id. SH12D-1475.

Ishikawa, R., Katsukawa, Yukio, K., de Wijn, A., DeRosa, M.L., Rast, M., Oba, T., Quintero Noda, C., Riethmller, T. 2022, "Spectral line broadening and asymmetry observed with DKIST-ViSP" (Abstract), AGU Fall Meeting 2022, held in Chicago, IL, 12-16 December 2022, id. SH12D-1483.

Agrawal, P. Rast, M.P., and Ruiz Cobo, B. 2023, "An iterative OLA method for inversion of solar spectropolarimetric data: I. Single and multiple variable inversions of thermodynamic quantities," *Astrophys. J.* 944, 111.

Gosain, S., Martinez Pillet, V., Pevtsov, A., Gilbert, H., Gibson, S., de Wijn, A.G., Burkepile, J., Asai, A., Bain, H., Henney, C., Katsukawa, Y., Lin, H., Manchester, W., McAteer, J., Muglach, K., Rast, M., Roth, M., Zhang, J. 2023, "Ground-based synoptic studies of the Sun," Decadal Survey for Solar and Space Physics (Heliophysics) 2024-2033 white paper, Bulletin of the American Astronomical Society, Vol. 55, No. 3, e-id. 140.

Raouafi, N.E. and 353 collaborators 2023, "Firefly: The case for a holistic understanding of the global structure and dynamics of the Sun and the heliosphere," Decadal Survey for Solar and Space Physics (Heliophysics) 2024-2033 white paper, Bulletin of the American Astronomical Society, Vol. 55, No. 3, e-id. 333.

Bahauddin, S.M. and Rast, M.P. 2023, "Identifying acoustic wave sources on the Sun. II. Improved filter techniques for source wavefield seismology," *Astrophys. J.* 955, id.31.

Bahauddin, S. and Rast, M. 2023, "Observation of transient wavefields through DKIST: Dawn of ultrahigh-resolution source wavefield local helioseismology" (Abstract), 54th Meeting of the Solar Physics Division, id. 201.02, Bulletin of the American Astronomical Society, Vol. 55, No. 7, e-id 2023n7i201p02.

Hotta, H., Bekki, Y., Gizon, L., Noraz, Q. and Rast, M., 2023, "Dynamics of large-scale solar flows," *Space Science Reviews* 219, 77.