Yohai Kaspi

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Research Interests: Geophysical fluid dynamics; general circulation of atmospheres and oceans; climate dynamics; dynamics of giant planet atmospheres and interiors; gravity science; atmospheric occultations.

Education

Ph.D.	**Physical Oceanography** Massachusetts Institute of Technology (MIT), Cambridge, MA, and Woods Hole Oceanographic Institution (WHOI), Woods Hole, MA, Joint Program	2008
M.Sc.	**Physics** Weizmann Institute of Science (WIS), Rehovot, Israel	2002
B.Sc.	**Physics and Mathematics** Hebrew University, Jerusalem, Israel	2000

Professional Appointments

- Visiting Professor, JSPS Fellow, University of Tokyo — Spring 2018
- Visiting Professor, Princeton University & Geophysical Fluid Dynamics Laboratory — 2017 - 2018
- Associate Professor, Weizmann Institute of Science — 2017 - present
- Assistant Professor, Weizmann Institute of Science — 2011 - 2017
- Postdoctoral Fellow, California Institute of Technology — 2008 - 2011

Professional Activities

- Co-PI of the 3GM experiment for ESA's JUICE mission to the Jupiter and the Galilean satellites.
- Vice-chair of the American Meteorological Society's Atmosphere and Ocean Fluid Dynamics (AOFD) committee, 2015 - present.
- Member of the Science Team for NASA's Juno mission to Jupiter.
- Member of the World Climate Research Programme (WCRP) CLIVAR Climate Dynamics Panel.

Awards and Fellowships

- Japanese Society for the Promotion of Science (JSPS) Visitors Scholar Fellowship — 2018
- Weizmann Institute Scientific Council Prize of Excellence — 2017
- EU Marie Curie Award Fellowship — 2012
- NASA Group Achievement Award, Juno Science Team — 2012
- NOAA Climate and Global Change Postdoctoral Award Fellowship — 2008
- Teaching Excellence Award, MIT — 2007
- Charney Prize, MIT — 2003
- MIT Presidential Fellowship — 2002

Service

- Co-Organizer of the Latsis Symposium on Atmosphere and Climate Dynamics: From Clouds to Global Circulations, Zurich, Switzerland, June 2014.
- Co-Organizer of the GFD Days Symposium, Sde Boqer, Israel, January 2016, January 2017 & January 2019.
- Co-Organizer of Stormtracks 2018: Perspectives on storm tracks in a changing climate, Uto, Sweden, August, 2018.
- Co-Organizer of AMS Atmospheres and Oceans Fluid Dynamics meeting, USA, 2021.
- Organizer of Departmental seminar, Earth and Planetary Sciences, WIS, 2011-2019.
- Peer-review journal reviewer: Nature, Science, Nature Geoscience, Nature Climate Change, Icarus, Geophysical Research Letters, The Astrophysical Journal, Fluid Dynamics Research, Journal of the Atmospheric Sciences, Quarterly Journal of the Royal Meteorological Society, Journal of Climate, Journal of Geophysical Research, Journal of Hydrometeorology, Climate Dynamics, Planetary and Space Science, Monthly Notices of the Royal Astronomical Society, Physics of the Earth and Planetary Interiors.
- Grant reviewer: NASA Outer Planets program, NASA Solar Systems Research Programs, Israeli Science Foundation, German-Israeli Science Foundation, The Leverhulme Trust, Deutsche Forschungsgemeinschaft, The Pazi Foundation.

Teaching

- The global circulation of the atmosphere, WIS — Spring 2015, Spring 2019
- Global warming debates, WIS — Fall 2013
- Atmospheric and oceanic baroclinic instability theory, WIS & IUI Eilat — Spring 2013
- Atmospheric and oceanic fluid dynamics, WIS — Fall 2012, Fall 2015, Fall 2018
- Turbulence in the oceans and atmospheres, WIS — Fall 2016

Students and Postdocs supervised

MSc

- Rei Chemke — 2013-2014
  Thesis title: Poleward migration of eddy-driven jets.
- Ilai Guendelman — 2015 - 2017
  Thesis title: Hadley cell dynamics over a wide range of orbital parameters.
- Keren Duer — 2016 - 2018
  Thesis title: The interaction between Jupiter's magnetic field its atmospheric flows.
- Dana Raiter — 2018 - present
  Topic: The Longitudinal dependence of the Hadley circulation
- Or Hadas — 2018 - present
  Topic: Storm track dynamics

PhD

- Talia Tamarin — 2012-2017
  Thesis title: The poleward deflection of midlatitude storm tracks and its variation under climate change. link
  Current position: James McDonnell Postdoctoral fellow, University of Reading
- Rei Chemke — 2014-2017
  Thesis title: The latitudinal dependence of geostrophic turbulence in the atmosphere. link
  Current position: NOAA Climate and Global Change Postdoctoral fellow, Columbia University

- Janni Yuval 2013-2017
  Thesis title: Sensitivity of atmospheric turbulence to the spatial structure of baroclinicity: implications for storm tracks and climate change. link
  Current position: EAPS Distinguished Postdoctoral fellow, MIT
- Hilla Afargan-Gerstman 2012-2018
  Thesis title: The seasonal cycle of storm track eddies. link
  Current position: Postdoctoral fellow, ETH Zurich
- Ilai Guendelman 2017 - present
  Thesis topic: Seasonal variation of planetary climate
- Keren Duer 2018 - present
  Thesis topic: Magnetohydrodynamics on giant planets

Postdoc

- Marzia Parisi 2014-2016
  Research topic: Determining the depth of Jupiter's Great Red Spot with Juno's gravity measurements
  Current position: Research scientist, Jet Propulsion Laboratory
- Morgan E. O'Neill 2015-2017
  Research topic: Convection on fluid planets
  Current position: Assistant Professor, Stanford University

Publications

Bold face denotes members of the Kaspi Research group

69. **Kaspi, Y., E. Galanti**, A. P. Showman, D. J. Stevenson, T. Guillot, L. Iess and S. J. Bolton, 2020 Comparison of the deep atmospheric dynamics of Jupiter and Saturn in light of the Juno and Cassini gravity measurements, *Space Sci. Reviews,* in revision. link
68. **Raiter, D., E. Galanti and Y. Kaspi**, 2020, The tropical conveyor belt: a Lagrangian analysis of the large-scale tropical atmospheric circulation*, Geophys. Res. Lett.,* in revision.
67. **Duer K., E. Galanti and Y. Kaspi**, 2020, The range of Jupiter's flow structures fitting the Juno asymmetric gravity measurements, *J. Geophy. Lett*, Submitted. link
66. Fletcher L. N., **Y. Kaspi,** T. Guillot and A. P. Showman, 2020 How well do we understand the belt/zone circulation of Giant Planet atmospheres?, *Space Sci. Reviews*, in press. link
65. **Galanti E., D. Raiter, Y. Kaspi** and E. Tziperman, 2020, The longitudinally-dependent Hadley circulation: seasonality and interannual variability, *J. Climate*, in review. link
64. T. Imamura, J. Mitchell, S. Lebonnois, **Y. Kaspi**, A. P. Showman and O. Korablev, 2020, Superrotation in planetary atmospheres. *Space Sci. Reviews,* Submitted. link
63. Fletcher et al., 2020, Ice Giant Systems: The Scientific Potential of Missions to Uranus and Neptune, *Planet. and Space Sci.,* submitted. link
62. **Yuval J. and Y. Kaspi**, 2020, Eddy activity response to global warming like temperature changes, *J. Climate*, Vol. 33, 1381-1404. link
61. Parisi M., W. M. Folkner, **E. Galanti, Y. Kaspi**, D. R. Buccino , K. Oudrhiri and S. J. Bolton, 2020, A mascon approach to estimating the depth of Jupiter's Great Red Spot with the Juno mission, *Planet. and Space Sci.,* in press. link
60. **Duer K., E. Galanti** and **Y. Kaspi**, 2019, Analysis of Jupiter's deep jets combining Juno gravity and time varying magnetic field measurements, *Geophys. Res. Lett.,* 879:L22. link

59. **Guendelman I.** and **Y. Kaspi**, 2019, Atmospheric dynamics on terrestrial planets: the seasonal response to changes in orbital, rotational and radiative timescales, *Astrophys. J.*, 881:67. link
58. **Galanti E., Y. Kaspi**, F. J. Simons, D. Durante, M. Parisi, S. J. Bolton, 2019, Determining the depth of Jupiter's Great Red Spot: a Slepian approach. *Astrophys. J.*, 874:L24. link
57. Iess L., B. Militzer, **Y. Kaspi**, P. Nicholson, D. Durante, P. Racioppa, A. Anabtawi, **E. Galanti**, W. Hubbard, M. J. Mariani, P. Tortora, S. Wahl, M. Zannoni, 2019, Measurement and implications of Saturn's gravity field and ring mass, *Science,* Vol. 364, 1052. link
56. **Galanti E.**, **Y. Kaspi**, Y. Miguel, T. Guillot, D. Durante, P. Racioppa, and L. Iess, 2019, Saturn's deep atmosphere revealed by the Cassini Grand Finale gravity measurements. *Geophys. Res. Lett.,* Vol. 46, 616-624. link
55. Galperin, B., S. Sukoriansky, R.M.B. Young, **R. Chemke**, **Y. Kaspi**, P.L. Read N. Dikovskaya, 2019, Barotropic and geostrophic turbulence, ISSI Zonal Jets book chapter. link
54. Sanchez-Lavega A., L. Sromovsky, A. P. Showman, A. D. Del Genio, R. Young, E. Garcia-Melendo, **Y. Kaspi**, G. S. Orton, N. Barrado-Izagirre, D. Choi, and J. M. Barbara, 2019, Zonal jets in gas giants, ISSI Zonal Jets book chapter. link
53. **Guendelman I.** and **Y. Kaspi**, 2018, An axisymmetric limit for the width of the Hadley cell in a planet with large obliquity and long seasonality, *Geophys. Res. Lett.,* Vol. 45, 13213–13221. link
52. **Yuval J.**, **Afargan, H.** and **Y. Kaspi**, 2018, The seasonal subtropical to eddy-driven jet transition leading to a Pacific midwinter minimum in eddy activity, *Geophys. Res. Lett.,* Vol. 45, 9995-10002. link
51. **Kaspi Y.**, **E. Galanti**, W. B. Hubbard, D. J. Stevenson, S. J. Bolton, L. Iess, T. Guillot, J. Bloxham, J. E. P. Connerney, H. Cao, D. Durante, W. M. Folkner, R. Helled, A. P. Ingersoll, S. M. Levin, J. I. Lunine, Y. Miguel, B. Militzer, M. Parisi and S. M. Wahl 2018, Jupiter's atmospheric jet streams extend thousands of kilometers deep, *Nature,* Vol. 555, 223-226. link
50. Iess L., W. M. Folkner, D. Durante, M. Parisi, **Y. Kaspi**, **E. Galanti**, T. Guillot, W. B. Hubbard, D. J. Stevenson, J. D. Anderson, D. R. Buccino, L. Gomez Casajus, A. Milani, R. Park, P. Racioppa, D. Serra, P. Tortora, M. Zannoni, H. Cao, R. Helled, J. I. Lunine, Y. Miguel, B. Militzer, S. Wahl, J. E. P. Connerney, S. M. Levin and S. J. Bolton. Measurement of Jupiter's asymmetric gravity field, 2018, *Nature,* Vol. 555, 220-222. link
49. Guillot T., Y. Miguel, B. Militzer, W. B. Hubbard, **Y. Kaspi**, **E. Galanti**, H. Cao, R. Helled, S. M. Wahl, L. Iess, W. M. Folkner, D. J. Stevenson, J. I. Lunine, D. R. Reese, A. Biekman, M. Parisi, D. Durante, J. E. P. Connerney, S. M. Levin and S. J. Bolton 2018, A suppression of differential rotation in Jupiter's deep interior, *Nature,* Vol. 555, 227-230. link
48. **Yuval J**. and **Y. Kaspi**, 2018, Eddy response to changes in jet characteristics, *J. Atmos. Sci*., Vol. 75, 1371-1383. link
47. Collins M., S. Minobe, M. Barreiro, S. Bordoni, **Y. Kaspi**, A. Kuwano-Yoshida, N. Keenlyside, E. Manzini, C. H. O'Reilly, R. Sutton, S-P. Xie and O. Zolina, 2018, Climate dynamics and regional climate change, *Nature Climate Change*, Vol. 8, 101-108. link
46. Showman A. P., **Y. Kaspi**, R. Achterberg and A. P. Ingersoll, 2018, The global atmospheric circulation of Saturn, Invited review chapter for: Saturn in the 21st Century. link
45. **Tamarin, T.** and **Y. Kaspi**, 2017, Enhanced poleward propagation of storms under climate change, *Nature Geoscience*, Vol. 10, 908-913. link
44. **Afargan H**. and **Y. Kaspi**, 2017, A midwinter minimum in Atlantic storm track intensity during years of a strong jet, *Geophys. Res. Lett.,* Vol. 44, 12511–12518. link
43. **Tamarin T.** and **Y. Kaspi**, 2017, The poleward shift of storm tracks under global warming: a Lagrangian perspective, *Geophys. Res. Lett.,* Vol. 44, 10666-10674. link
42. **Galanti E.**, H. Cao and **Y. Kaspi**, 2017, Constraining Jupiter's internal flows using Juno magnetic and gravity measurements, *Geophys. Res. Lett.,* Vol. 44, 8173-8181. link

41. **Chemke R.** and **Y. Kaspi**, 2017, Dynamics of massive atmospheres, *Astrophys. J*, 845:1. link
40. **Galanti E.** abd **Y. Kaspi**, 2017, Prediction for the flow-induced gravity field of Saturn: implications for Cassini's Grande Finale, *Astrophys. J. Lett.,* 843:L25 link
39. **Kaspi Y.**, T. Guillot , **E. Galanti**, Y. Miguel, R. Helled, W. B. Hubbard, B. Militzer, S. M. Wahl, S. Levin, J. E. P. Connerney, and S. J. Bolton 2017, The effect of differential rotation on Jupiter's low-degree even gravity moments, *Geophys. Res. Lett.,* Vol. 44, 5960-5968 link
38. Bolton S. J., A. Adriani, V. Adumitroaie, M. Allison, J. Anderson, S. Atreya, J. Bloxham, S. Brown, J. E. P. Connerney, E. DeJong, W. Folkner, D. Gautier, D. Grassi, S. Gulkis, T. Guillot, C. Hansen, W. B. Hubbard, L. Iess, A. Ingersoll, M. Janssen, J. Jorgensen, **Y. Kaspi,** S. M. Levin, C. Li, J. Lunine, Y. Miguel, A. Mura, G. Orton, T. Owen, M. Ravine, E. Smith, P. Steffes, E. Stone, D. J. Stevenson, R. Thorne, J. Waite, D. Durante, R. W. Ebert, T. K. Greathouse, V. Hue, M. Parisi, J. R. Szalay, R. Wilson, 2017, Jupiter's interior and deep atmosphere: the first close polar pass with the Juno spacecraft, *Science,* Vol. 356, 821-825 link.
37. **Galanti E.**, D. Durante, S. Finocchiaro, L. Iess, and **Y. Kaspi**, 2017, Estimating Jupiter gravity field using Juno measurements, trajectory estimation analysis, and a flow model optimization, *Astronom. J*, 154:2. link
36. Wahl S. M., W. B. Hubbard , B. Militzer, T. Guillot, Y. Miguel, N. Movshovitz, **Y. Kaspi** , R. Helled, D. Reese, **E. Galanti**, S. Levin, J.E. Connerney, and S. J. Bolton, 2017, Comparing Jupiter interior structure models to Juno gravity measurements and the role of an expanded core, *Geophys. Res. Lett.,* Vol. 44, Vol. 44, 4649–4659.
35. **O'Neill M. E.**, **Y. Kaspi** and L. N. Fletcher, 2017, New interpretation of the Galileo probe sounding indicating a neutrally stable Jovian atmosphere, *Geophys. Res. Lett.,* Vol. 44, 4008-4017. link
34. **Yuval J.** and **Y. Kaspi**, 2017, The effect of vertical baroclinicity concentration on atmospheric macroturbulence scaling relations, *J. Atmos. Sci*., Vol. 74, 1651-1667. link
33. **Galanti E.** and **Y. Kaspi**, 2017, Deciphering Jupiter's deep flow dynamics using the upcoming Juno gravity measurements and an adjoint based dynamical model, *Icarus,* Vol. 286, 46-55. link
32. **Tamarin T.** and **Y. Kaspi**, 2017, Mechanisms controlling the poleward deflection of midlatitude storm tracks, *J. Atmos. Sci*., Vol. 74, 553-572. link
31. **Galanti E.**, **Y. Kaspi** and E. Tziperman, 2017, A full, self-consistent, treatment of thermal wind balance on oblate fluid planets, *J. Fluid Mech*., Vol. 810, 175–195. link
30. **Chemke R.**, **Y. Kaspi** and I. Halevy, 2016, The thermodynamic effect of atmospheric mass on early Earth's temperature, *Geophys. Res. Lett.,* Vol. 43, 11414–11422. link
29. **O'Neill M. E.** and **Y. Kaspi**, 2016, Slantwise convection on fluid planets, *Geophys. Res. Lett.,* Vol. 43, 10611–10620. link
28. **Chemke R.**, **T. Dror** and **Y. Kaspi**, 2016, Barotropic kinetic energy and enstrophy transfers in the atmosphere, *Geophys. Res. Lett.*, Vol. 43, 7725–7734. link
27. **Chemke R.** and **Y. Kaspi**, 2016, The latitudinal dependence of the oceanic barotropic eddy kinetic energy and macro-turbulence energy transport, *Geophys. Res. Lett.,* Vol. 43, 2175–2183. link
26. **Kaspi Y., J. E. Davighi**, **E. Galanti** and W. B. Hubbard, 2016, The gravitational signature of internal flows in giant planets: Comparing the thermal wind approach with barotropic potential-surface methods, *Icarus*, Vol. 276, 170-181. link
25. **Chemke R.** and **Y. Kaspi**, 2016, The effect of eddy-eddy interactions on jet formation and macroturbulent scales, *J. Atmos. Sci*., Vol. 73, 2049-2059. link
24. **Tamarin T.** and **Y. Kaspi**, 2016, The poleward motion of extratropical cyclones from a potential vorticity tendency analysis, *J. Atmos. Sci*., Vol. 73, 1687-1707. link
23. **Galanti E.** and **Y. Kaspi**, 2016, An adjoint based method for the inversion of the Juno and Cassini gravity measurements into wind fields, *Astrophys. J*, 820:91. link

22. **Yuval J.** and **Y. Kaspi**, 2016, Eddy activity sensitivity to changes in the vertical structure of baroclinicity, *J. Atmos. Sci*., Vol. 73, 1709-1726. link
21. **Parisi M.**, **E. Galanti**, S. Finocchiaro, L. Iess and **Y. Kaspi**, 2016, Probing the atmospheric dynamics of Jupiter's Great Red Spot with the Juno gravity experiment, *Icarus*, Vol. 267, 232-242. link
20. Helled R., **E. Galanti** and **Y. Kaspi**, 2015, Saturn's fast spin determined from its gravitational field and oblateness, *Nature*, Vol. 520, 202-204. link
19. **Chemke R.** and **Y. Kaspi**, 2015, The latitudinal dependence of atmospheric jet scales and macroturbulent energy cascades, *J. Atmos. Sci*., Vol. 72, 3891–3907. link
18. **Kaspi Y.** and A. P. Showman, 2015, Atmospheric dynamics of terrestrial exoplanets over a wide range of orbital and planetary parameters, *Astrophys. J*, 804:60. link
17. **Chemke R.** and **Y. Kaspi**, 2015, Poleward migration of eddy-driven jets, *J. Adv. Model. Earth Sys.*, Vol. 07, 1457–1471. link
16. Showman A. P., R. D. Wordsworth, T. M. Merlis, and **Y. Kaspi**, 2014. Atmospheric circulation of terrestrial exoplanets. Comparative Climatology of Terrestrial Planets book chapter, pp. 277-326, U. Arizona press. link
15. **Kaspi Y.,** A. P. Showman, W. B. Hubbard, O. Aharonson and R. Helled, 2013. Atmospheric confinement of jet streams on Uranus and Neptune, *Nature*, Vol. 497, 344-347. link
14. **Kaspi Y.,** 2013, Inferring the depth of atmospheric dynamics on Jupiter and Saturn from odd gravity harmonics, *Geophys. Res. Lett.,* Vol. 40, 676-680. link
13. Liu J., T. Schneider and **Y. Kaspi**, 2013. Predictions of thermal and gravitational signals of Jupiter's deep zonal winds, *Icarus,* Vol. 224, 114-125. link
12. Ryoo J-M., **Y. Kaspi**, D. Waliser, E. Fetzer, G. Kiladis, D. Waugh, J. Kim, 2013, Impact of Rossby wave breaking on U.S. west coast winter precipitation during the 2008-2010 ENSO cycle, *J. Climate*, Vol. 26, 6360-6382. link
11. Showman A. P. and **Y. Kaspi**, 2013, Atmospheric dynamics of Brown Dwarfs and directly imaged exoplanets, *Astrophys. J*, 776:85. link
10. **Kaspi Y.** and T. Schneider, 2013. The role of stationary eddies in shaping midlatitude storm tracks, *J. Atmos. Sci*., Vol. 70, 2596-2613. link
9. **Kaspi Y.** and T. Schneider, 2011. Winter cold of eastern continental boundaries induced by warm ocean waters, *Nature*, Vol. 471, 621-624. link
8. Showman A. P., **Y. Kaspi**, and G. R. Flierl, 2011. Scaling laws for convection and jet speeds in the giant planets, *Icarus*, 211, 1258-1273. link
7. **Kaspi Y.** and T. Schneider, 2011. Downstream self-destruction of storm tracks, *J. Atmos. Sci*., Vol., 68, 2459-2464. link
6. **Kaspi Y.,** W. B. Hubbard, A. P. Showman and G. R. Flierl, 2010. The gravity signature of Jupiter's internal dynamics, *Geophys. Res. Lett.,* Vol. 37, L01204. link
5. **Kaspi Y.,** G. R. Flierl and A. P. Showman, 2009. The deep wind structure of the giant planets: Results from an anelastic general circulation model, *Icarus,* Vol. 202, 525-542. link
4. **Kaspi Y.,** 2008. Turbulent convection in an anelastic rotating sphere: A model for the circulation on the giant planets, Ph.D. Thesis, MIT-WHOI joint program. link
3. **Kaspi Y.** and G. R. Flierl, 2007. Formation of jets by baroclinic instability on gas planet atmospheres, *J. Atmos. Sci*., Vol.64, 3177-3194. link
2. **Kaspi Y.**, R. Sayag and E. Tziperman, 2004. A "triple sea-ice state" mechanism for the abrupt warming and synchronous ice sheet collapses during Heinrich events, *Paleoceanography*, Vol. 19, No. 3, PA3004. link
1. **Kaspi Y.**, 2002. A mechanism for the abrupt warming and simultaneous ice sheet discharge involved in Heinrich Events. M.Sc. Thesis, WIS. link