

Yohai Kaspi

Department of Earth and Planetary Sciences
Weizmann Institute of Science
Rehovot, Israel, 76100

Tel: +972-8-934-4238
email: yohai.kaspi@weizmann.ac.il
www.weizmann.ac.il/eserpages/kaspi/

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 |
| | Thesis title: Turbulent convection in an anelastic rotating sphere:
a model for the circulation on the giant planets.
Advisor: Prof. Glenn R. Flierl, MIT | |
| M.Sc. | Physics
Weizmann Institute of Science (WIS), Rehovot, Israel | 2002 |
| | Thesis title: A mechanism for the abrupt warming and simultaneous
ice sheet discharge involved in Heinrich Events.
Advisor: Prof. Eli Tziperman, WIS | |
| 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.
- 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

- | | |
|--|-----------|
| • Weizmann Institute Scientific Council Prize of Excellence | 2017 |
| • EU Marie Curie Award Fellowship | 2012-2016 |
| • NASA Group Achievement Award, Juno Science Team | 2012 |
| • NOAA Climate and Global Change Postdoctoral Award Fellowship | 2008-2010 |
| • Teaching Excellence Award, MIT | 2007 |
| • Charney Prize, MIT | 2002-2005 |
| • MIT Presidential Fellowship | 2002-2003 |

Teaching

- The global circulation of the atmosphere, WIS Spring 2015
- 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
- Turbulence in the oceans and atmospheres, WIS Fall 2016

Research Grants

- Israeli Space Agency 2017-2020
The JUICE mission occultation measurements of Jupiter.
- Israel Ministry of Science Space Research Grant 2017-2020
Data analysis of the 2016-2018 Juno and Cassini spacecraft observations.
- Israeli Science Foundation Research Grant 2016-2020
A coupled Eulerian-Lagrangian approach for studying midlatitude storm track dynamics.
- Minerva Foundation Research Grant 2016-2019
Theory and modeling of atmospheric jets on giant planets in relation to the Juno and Cassini gravity experiments.
- Israel Ministry of Science Space Research Grant 2015-2018
Inferring the sub-cloud-layer atmospheric dynamics on Jupiter from Juno's gravity measurements.
- Israel Ministry of Science Research Grant 2014-2017
Planning for the JUICE mission occultation measurements on Jupiter.
- German Israel Foundation Young Investigator Grant 2013-2014
Storm track variability over past and future climates.
- Marie Curie EU-FP7 Career Integration Award 2012-2016
The role of water vapor in midlatitude storm track dynamics.
- Israeli Science Foundation Research Grant 2012-2016
The mechanisms controlling the position and intensity of midlatitude storm tracks and their response to climate change.
- Israel Science Foundation New Investigator Equipment Grant 2012-2014
High performance computer cluster for developing an atmospheric dynamics group at WIS.

Service

- Vice-chair of the American Meteorological Society's Atmosphere and Ocean Fluid Dynamics (AOFD) committee, 2015 - present.
- Organizer of the Latsis Symposium on Atmosphere and Climate Dynamics: From Clouds to Global Circulations, Zurich, Switzerland, June 2014.
- Organizer of the GFD Days Symposium, Sde Boqer, Israel, January 2016 & January 2017.
- Organizer of Stormtracks 2018: Perspectives on storm tracks in a changing climate, Stockholm, Sweden, August, 2018.
- Organizer of Departmental seminar, Earth and Planetary Sciences, WIS, 2011-2017.
- 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.

Students and Postdocs supervised

MSc

- Rei Chemke 2013-2014
Thesis title: Poleward migration of eddy-driven jets.
- Ilai Guendelman 2016 - present
Thesis title: Hadley cell dynamics over a wide range of orbital parameters.
- Keren Duer 2017 - present
Thesis title: The interaction between Jupiter's magnetic field its atmospheric flows.

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: Postdoctoral fellow, WIS
- Hilla Afargan-Gerstman 2012-2018
Thesis title: The seasonal cycle of storm track eddies. [link](#)
Current position: Postdoctoral fellow, WIS

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: Chamberlain fellow, University of Chicago.

Publications

Bold face denotes members of the Kaspi Research group

56. **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 kilometres deep, *Nature*, Vol. 555, 223-226. [link](#)
55. 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](#)

54. 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](#)
53. **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.*, in revision.
52. **Yuval, J.** and **Y. Kaspi**, 2018, Eddy response to changes in jet characteristics, *J. Atmos. Sci.*, Vol. 75, 1371-1383. [link](#)
51. 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, 2018, Measurement and implications of Saturn's gravity field and ring mass, *Science*, in revision.
50. **Galanti E., Y. Kaspi**, Y. Miguel, T. Guillot, D. Durante, P. Racioppa, and L. Iess, 2018, Saturn's deep atmosphere revealed by the Cassini Grand Finale gravity measurements. *Geophys. Res. Lett.*, in revision.
49. 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](#)
48. **Tamarin, T.** and **Y. Kaspi**, 2017, Enhanced poleward propagation of storms under climate change, *Nature Geoscience*, Vol. 10, 908-913. [link](#)
47. **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](#)
46. **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](#)
45. **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](#)
44. **Chemke, R.** and **Y. Kaspi**, 2017, Dynamics of massive atmospheres, *Astrophys. J.*, 845:1. [link](#)
43. **Galanti, E.** and **Y. Kaspi**, 2017, Prediction for the flow-induced gravity field of Saturn: implications for Cassini's Grande Finale, *Astrophys. J. Lett.*, 843:L25 [link](#)
42. **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](#)
41. 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](#).
40. **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](#)
39. Galperin, B., S. Sukoriansky, R.M.B. Young, **R. Chemke**, **Y. Kaspi**, P.L. Read N. Dikovskaya, 2017, Barotropic and geostrophic turbulence, Review chapter in book on zonal jets. [link](#)
38. 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.

37. **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](#)
36. **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](#)
35. **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](#)
34. **Tamarin T. and Y. Kaspi**, 2017, Mechanisms controlling the poleward deflection of midlatitude storm tracks, *J. Atmos. Sci.*, Vol. 74, 553-572. [link](#)
33. **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](#)
32. **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](#)
31. **O'Neill, M. E. and Y. Kaspi**, 2016, Slantwise convection on fluid planets, *Geophys. Res. Lett.*, Vol. 43, 10611-10620. [link](#)
30. **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](#)
29. **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](#)
28. Showman A. P., **Y. Kaspi**, R. Achterberg and A. P. Ingersoll, 2016, The global atmospheric circulation of Saturn, Invited review chapter for: Saturn in the 21st Century, in press. [link](#)
27. **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](#)
26. **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](#)
25. **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](#)
24. **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](#)
23. **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](#)
22. **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](#)
21. 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, 2016. Zonal jets in gas giants. ISSI Jets book chapter, in press. [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](#)