

Tommi Koskinen

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Contact information

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Positions

Assistant professor	University of Arizona	2017–present
Associate Staff Scientist	University of Arizona	2014–2017
Postdoctoral Research Associate	University of Arizona	2009–2014

Space missions

Colorado Ultraviolet Transit Experiment	Co-Investigator	2017–present
Atmospheric Remote-sensing Infrared Exoplanet Large-survey (ARIEL)	Consortium member	2015–present
Cassini–Huygens	Participating Scientist	2014–2017

Education

Ph.D (Astrophysics): <i>The stability of short-period extrasolar giant planets</i>	University College London, UK	2005–2008
MSci (Astrophysics)	University College London, UK	1999–2003

Research interests

My research focuses on models and observations of planetary upper and middle atmospheres. My work covers a wide range of different objects and techniques in the spirit of comparative planetology, spanning from the planets and satellites in the solar system to exoplanet systems. I have authored and co-authored more than 60 peer-reviewed journal articles (18 as first author and 12 as second author) and five book chapters, with 1800+ citations to date.

Refereed publications: First and second author

1. **Koskinen, T. T.**, Lavvas, P., Huang, C., Bergsten, G., Fernandes, R. B., Young, M. E., *Mass loss by atmospheric escape from extremely close-in planets*, *Astrophys. J.*, 929, 52 (2022)
2. Chadney, J., **Koskinen, T. T.**, Hu, X., Galand, M., Lavvas, P., Unruh, Y. C., Serigano, J., Hörst, S. M., Yelle, R. V., *Energy deposition in Saturn’s equatorial upper atmosphere*, *Icarus*, 372, 114724 (2022)
3. Yelle, R. V., **Koskinen, T. T.**, Palmer, M. Y., *Titan occultations of Orion’s belt observed with Cassini/UVIS*, *Icarus*, 368, 114587 (2021)
4. **Koskinen, T. T.**, Strobel, D. F., Brown, Z., *An empirical model of the Saturn thermosphere*, *Icarus*, 362, 114396 (2021)
5. Brown, Z. L., **Koskinen, T. T.**, Müller-Wodarg, I. C. F., West, R. A., Jouchoux, A., Esposito, L., *A pole-to-pole pressure temperature map of Saturn’s thermosphere from Cassini Grand Finale data*, *Nature Astronomy*, 4, 872–879 (2020) (graduate student)

6. Vriesema, J. W., **Koskinen, T. T.**, Yelle, R. V., *Electrodynamics in Saturn's thermosphere at low and middle latitudes*, *Icarus*, 344, 113390 (2020) (graduate student)
7. **Koskinen, T. T.**, Sandel, B. R., Yelle, R. V., Holsclaw, G. M., Quemerais, E., *Saturn in Lyman α : A comparison of Cassini and Voyager observations*, *Icarus*, 339, 113594 (2020)
8. Lavvas, P., **Koskinen, T. T.**, Steinrück, M., García Muñoz, A., Showman, A., *Photochemical hazes in sub-Neptunian atmospheres with focus on GJ1214b*, *Astrophys. J.*, 878, 118 (2019)
9. Müller-Wodarg, I. C. F., **Koskinen, T. T.**, Moore, L., Serigano, J., Yelle, R. V., Hörst, S., Waite, J. H., Mendillo, M., *Atmospheric waves and their possible effect on the thermal structure of Saturn's thermosphere*, *GRL*, 46, 2372–2380 (2019)
10. Fossati, L., **Koskinen, T. T.**, Lothringer, J. D., France, K., Young, M. E., Sreejith, A. G., *Extreme ultraviolet radiation from A-stars: Implications for ultra-hot Jupiters*, *Astrophys. J.*, 868, L30 (2018)
11. **Koskinen, T. T.**, Guerlet, S., *Atmospheric structure and helium abundance on Saturn from Cassini/UVIS and CIRS observations*, *Icarus*, **307**, 161–171 (2018)
12. Fossati, L., **Koskinen, T. T.**, France, K., Cubillos, P. E., Haswell, C. A., Lanza, A. F., Pillitteri, I., *Suppressed Far-UV stellar activity and low planetary mass loss in the WASP-18 system*, *Astrophys. J.*, 155, 113 (2018)
13. Chadney, J. M., **Koskinen, T. T.**, Galand, M., Unruh, Y. C., Sanz-Forcada, J., *Effect of stellar flares on the upper atmospheres of HD189733b and HD209458b*, *Astron. Astrophys.*, **608**, A75 (2017) (graduate student mentee)
14. Lavvas, P., **Koskinen, T. T.**, *Aerosol properties in the atmospheres of extrasolar giant planets*, *Astrophys. J.*, 847, 32 (2017)
15. Parke Loyd, R. O., **Koskinen, T. T.**, France, K., Schneider, C., Redfield, S., *Ultraviolet C II and Si III transit spectroscopy and modeling of the evaporating atmosphere of GJ436b*, *Astrophys. J.*, 834, L17 (2017) (graduate student mentee)
16. **Koskinen, T. T.**, Moses, J. I., West, R. A., Guerlet, S., Jouchoux, A., *The detection of benzene in Saturn's upper atmosphere*, *Geophys. Res. Lett.*, 43, 7895–7901 (2016)
17. **Koskinen, T. T.**, Erwin, J. T., Yelle, R. V., *On the escape of CH₄ from Pluto*, *Geophys. Res. Lett.*, 42, 7200–7205 (2015)
18. **Koskinen, T. T.**, Sandel, B. R., Yelle, R. V., Strobel, D. F., Müller-Wodarg, I. C. F., Erwin, J., *Saturn's variable thermosphere from Cassini/UVIS occultations*, *Icarus*, 260, 174–189 (2015)
19. **Koskinen, T. T.**, Yelle, R. V., Lavvas, P., Cho, J-Y. K., *Electrodynamics on extrasolar giant planets*, *Astrophys. J.*, 796, 16 (2014)
20. Lavvas, P., **Koskinen, T. T.**, Yelle, R. V., *Electron densities and alkali atoms in exoplanet atmospheres*, *Astrophys. J.*, 796, 15 (2014)
21. **Koskinen, T. T.**, Lavvas, P., Harris, M. J., Yelle, R. V., *Thermal escape from extrasolar giant planets*, *Phil. Trans. R. Soc. A*, 372, 20130089 (2014)
22. **Koskinen, T. T.**, Sandel, B. R., Yelle, R. V., Capalbo, F. J., Holsclaw, G. E., McClintock, W. E., Edgington, S., *The density and temperature structure near the exobase of Saturn from Cassini/UVIS solar occultations*, *Icarus*, 226, 1318–1330 (2013)
23. **Koskinen, T. T.**, Harris, M. J., Yelle, R. V., Lavvas, P., *The escape of heavy atoms from the ionosphere of HD209458b. I. A photochemical-dynamical model of the thermosphere*, *Icarus*, 226, 1678–1694 (2013)

24. **Koskinen, T. T.**, Yelle, R. V., Harris, M. J., Lavvas, P., *The escape of heavy atoms from the ionosphere of HD209458b. II. Interpretation of the observations*, *Icarus*, 226, 1695–1708 (2013)
25. **Koskinen, T. T.**, Yelle, R. V., Snowden, D. S., Lavvas, P., Sandel, B. R., Capalbo, F. J., Benilan, Y., West, R. A., *The mesosphere and thermosphere of Titan revealed by Cassini/UVIS stellar occultations*, *Icarus*, 216, 507–534 (2011)
26. **Koskinen, T. T.**, Cho, J. Y-K., Achilleos, N., Aylward, A. D., *Ionization of Extrasolar Giant Planet Atmospheres*, *Astrophys. J.*, 722, 178–187 (2010)
27. **Koskinen, T. T.**, Yelle, R. V., Lavvas, P., Lewis, N. K., *Characterizing the thermosphere of HD209458b with UV transit observations*, *Astrophys. J.*, 723, 116–128 (2010)
28. **Koskinen, T.T.**, Aylward, A.D., Miller, S., *The Upper Atmosphere of HD17156b*, *Astrophys. J.*, 693, 868–885 (2009)
29. **Koskinen, T.T.**, Aylward, A.D., Miller, S., *A Stability Limit for the Atmospheres of Giant Extrasolar Planets*, *Nature*, 450, 845–848 (2007)
30. **Koskinen, T.T.**, Aylward, A.D., Smith, C.G.A., Miller, S., *A Thermospheric Circulation Model for Extrasolar Giant Planets*, *Astrophys. J.*, 661, 515–526 (2007)

Refereed publications: Co-author

1. Serigano, J., Hörst, S. M., He, C., Gautier, T., Yelle, R. V., **Koskinen, T. T.**, Trainer, M. G., Radke, M. J., *Compositional measurements of Saturn’s upper atmosphere and rings from Cassini INMS: An extended analysis of measurements from Cassini’s Grand Finale orbits*, *J. Geophys. Res. Planets*, 127, e2022JE007238 (2022)
2. Brown, Z. L., Medvedev, A. S., Starichenko, E. D., **Koskinen, T. T.**, Müller-Wodarg, I. C. F., *Evidence for gravity waves in the thermosphere of Saturn and implications for global circulation*, *Geophys. Res. Lett.*, 49, e2021GL097219 (2022) (graduate student)
3. Fernandes, R. B., Mulders, G. D., Pascucci, I., Bergsten, G. J., **Koskinen, T. T.**, et al., *pterodactyls: A tool to uniformly search and vet for young transiting planets in TESS primary mission photometry*, accepted to *ApJ* (2022) (graduate student collaboration)
4. Bergsten, G. J., Pascucci, I., Mulders, G. D., Fernandes, R. B., **Koskinen, T. T.**, *The demographics of Kepler’s Earths and super-Earths into the habitable zone*, submitted to *ApJ* (2022) (graduate student collaboration)
5. Rodriguez, S., et al. (including **Koskinen, T. T.**), *Science goals and new mission concepts for future exploration of Titan’s atmosphere, geology, and habitability: titan POLar scout/orbitEr and in situ lake lander and DrONe explorer (POSEIDON)*, *Exp. Astron.* (2022)
6. France, K., et al. (including **Koskinen, T. T.**), *The Extreme-ultraviolet Stellar Characterization for Atmospheric Physics and Evolution (ESCAPE) mission: Motivation and overview*, in press at *JATIS*, arXiv:2201.13219 (2022)
7. Borsa, F., Fossati, L., **Koskinen, T. T.**, Young, M. E., Shulyak, D., *High-resolution detection of neutral oxygen in the atmosphere of an ultra-hot exoplanet*, *Nature Astronomy*, 6, 226–231 (2022)
8. Fossati, L., Young, M. E., Shulyak, D., **Koskinen, T.**, Huang, C., Cubillos, P. E., France, K., Sreejith, A. G., *Non-local thermodynamic equilibrium effects determine the upper atmospheric structure of the ultra-hot Jupiter KELT-9b*, *Astron. Astrophys.*, 653, A52 (2021)
9. Steinrueck, M., Showman, A., Lavvas, P., **Koskinen, T. T.**, Tan, X., Zhang, X., *3D simulations of photochemical hazes in the atmosphere of hot Jupiter HD189733b*, *MNRAS*, 504, 2783–2799 (2021) (graduate student)

10. Tribbett, P. D., Robinson, T. D., **Koskinen, T. T.**, *Titan in transit: Ultraviolet occultation observations reveal a complex atmospheric structure*, Plan. Sci. J., 2, 109 (2021)
11. Fossati, L., Shuluak, D., Sreejith, A. G., **Koskinen, T.**, et al., *A data-driven approach to constraining the atmospheric temperature structure of the ultra-hot Jupiter KELT-9b*, Astron. Astrophys., 643, A131 (2020)
12. France, K., Duvvuri, G., Egan, H., **Koskinen, T. T.**, et al., *The high-energy radiation environment around a 10 Gyr M dwarf: Habitable at last?*, Astron. J., 160, 237 (2020)
13. Young, M. E., Fossati, L., **Koskinen, T. T.**, Salz, M., Cubillos, P. E., France, K., *Non-local thermodynamic equilibrium transmission spectrum modeling of HD209458b*, Astron. Astrophys., 641, A47 (2020)
14. Serigano, J., Hörst, S. M., He, C., Gautier, T., Yelle, R. V., **Koskinen, T. T.**, Trainer, M. G., *Compositional measurements of Saturn's upper atmosphere and rings from Cassini INMS*, JGR Planets, 125, e2020JE006427 (2020)
15. Cubillos, P. E., Fossati, L., **Koskinen, T. T.**, Young, M. E., Salz, M., France, K., Sreejith, A. G., Haswell, C. A., *Near-ultraviolet transmission spectroscopy of HD209458b: Evidence of ionized iron beyond the planetary Roche lobe*, Astron. J., 159, 111 (2020)
16. Turner, J. D., de Mooij, E. J. W., Jayawardhana, R., Young, M. E., Fossati, L., **Koskinen, T. T.**, Lothringer, J. D., Karjalainen, R., Karjalainen, M., *Detection of ionized calcium in the atmosphere of the ultra-hot Jupiter KELT-9b*, Astrophys. J., 888, L13 (2020)
17. Pryor, W. R., Esposito, L. W., Jouchoux, A., West, R. A., Grodent, D., Gérard, J.-C., Radioti, A., Lamy, L., **Koskinen, T. T.**, *Cassini UVIS detection of Saturn's north polar hexagon in the Grand Finale orbits*, J. Geophys. Res. Planets, 124, 1979–1988 (2019)
18. Sreejith, A. G., Fossati, L., Fleming, B. T., France, K., **Koskinen, T. T.**, Egan, A., Rüdisser, A., Steller, M., *Colorado Ultraviolet Transit Experiment data simulator*, J. Astron. Telesc. Instrum. Syst., 5, 018004 (2019)
19. Pearson, K. A., Griffith, C. A., Zellem, R. T., **Koskinen, T. T.**, Roudier, G. M., *Ground-based spectroscopy of the exoplanet XO-2b using a systematic wavelength calibration*, AJ, 157, 21 (2019) (graduate student mentee)
20. Yelle, R. V., Serigano, J., **Koskinen, T. T.**, Hörst, S., Perry, M. E., Cravens, T. E., Perryman, R. S., Hunter Waite, J. Jr., *Thermal structure and composition of Saturn's upper atmosphere from Cassini/INMS measurements*, Geophys. Res. Lett., 45 (2018)
21. Lothringer, J., Barman, T., **Koskinen, T. T.**, *Extremely irradiated Hot Jupiters: Non-oxide inversions, H^- opacity, and thermal dissociation of molecules*, Astrophys. J., 866, 27 (2018) (graduate student mentee)
22. Gröller, H., Montmessin, F., Yelle, R., Lefevre, F., Forget, F., Schneider, N., **Koskinen, T. T.**, Deighan, J., Jain, S. K., *MAVEN/IUVS stellar occultation measurements of Mars atmospheric structure and composition*, J. Geophys. Res.: Planets, 123 (2018)
23. Cui, J., Zhao, L.-L., Yelle, R. V., Zhao, L.-L., Stone, S., Jiang, F.-Y., Cao, Y.-T., Yao, M.-J., **Koskinen, T. T.**, Wei, Y., *The impact of crustal magnetic fields on the thermal structure of the Martian upper atmosphere*, Astrophys. J., 853, L33 (2018)
24. Fleming, B., France, K., Nell, N., Kohnert, R., Pool, K., Egan, A., Fossati, L., **Koskinen, T. T.**, Vidotto, A., Hoadley, K., Desert, J.-M., Beasley, M., Petit, P., *The Colorado Ultraviolet Transit Experiment (CUTE): A dedicated cubesat mission to study exoplanetary mass loss and magnetic fields*, J. Astron. Telesc. Instrum. Syst., 4, 014004 (2018)

25. Fossati, L., Marcelja, S. E., Staab, D., Cubillos, P., France, K., Haswell, C. A., Ingrassia, S., Jenkins, J. S., **Koskinen, T. T.**, Lanza, A. F., Redfield, S., Youngblood, A., Pelzmann, G., *On the effects of ISM absorption on stellar activity measurements and its relevance for exoplanet studies*, *Astron. Astrophys.*, 601, A104 (2017)
26. Cui, J., Cao, Y.-T., Lavvas, P., **Koskinen, T. T.**, *The variability of HCN in Titan's upper atmosphere as implied by the Cassini Ion-Neutral Mass Spectrometer measurements*, *Astrophys. J.*, 826, L5 (2016)
27. Chadney, J. M., Galand, M., **Koskinen, T. T.**, Miller, S., Sanz-Forcada, J., Unruh, Y. C., Yelle, R. V., *EUV-driven Ionospheres and electron transport on extrasolar giant planets orbiting active stars*, *Astron. Astrophys.*, 587, A87 (2016) (graduate student mentee)
28. Capalbo, F. J., Bénilan, Y., Fray, N., Schwell, M., Champion, N., Es-sebbar, Et., **Koskinen, T. T.**, Lehoccki, I., Yelle, R. V., *New benzene absorption cross sections in the VUV, relevance for Titan's upper atmosphere*, *Icarus*, 265, 95–109 (2016) (graduate student mentee)
29. Gröller, H., Yelle, R. V., **Koskinen, T. T.**, et al., *Probing the Martian atmosphere with MAVEN/IUVS stellar occultations*, *Geophys. Res. Lett.*, 42, 9064–9070 (2015)
30. Tinetti, G., et al., (including **Koskinen, T. T.**), *The EChO science case*, *Exp. Astron.*, 40, 329–391 (2015)
31. Fossati, L., France, K., **Koskinen, T. T.**, Juvan, I. G., Haswell, C. A., Lendl, M., *Far-UV spectroscopy of the planet-hosting star WASP-13: high energy irradiance, distance, age, planetary mass loss rate, and circumstellar environment*, *Astrophys. J.*, 815, 118 (2015)
32. Capalbo, F. J., Bénilan, Y., Yelle, R. V., **Koskinen, T. T.**, *Titan's upper atmosphere from Cassini/UVIS solar occultations*, *Astrophys. J.*, 814, 86 (2015) (graduate student mentee)
33. Sandel, B. R., Gröller, H., Yelle, R. V., **Koskinen, T. T.**, et al., *Altitude profiles of O₂ on Mars from SPICAM stellar occultations*, *Icarus*, 252, 154–160 (2015)
34. Chadney, J., Galand, M., Unruh, Y., **Koskinen, T. T.**, Sanz-Forcada, J., *XUV-driven mass loss from extrasolar giant planets orbiting active stars*, *Icarus*, 250, 357–367 (2015) (graduate student mentee)
35. Menager, H., Barthélemy, M., **Koskinen, T. T.**, Lilensten, J., Ehrenreich, D., Parkinson, C., *Calculation of the H Lyman α emission of the hot Jupiters HD209458b and HD189733b*, *Icarus*, 226, 1709–1718 (2013) (graduate student mentee)
36. Capalbo, F. J., Benilan, Y., Yelle, R. V., **Koskinen, T. T.**, Sandel, B. R., Holsclaw, G. M., McClintock, W. E., *Solar occultation by Titan measured by Cassini/UVIS*, *Astrophys. J.*, 766, L16, 5pp. (2013) (graduate student mentee)
37. Lavvas, P., Yelle, R. V., **Koskinen, T. T.**, et al., *Aerosol growth in Titan's ionosphere*, *PNAS*, 110, 2729–2734 (2013)
38. Cui, J., Yelle, R. V., Strobel, D. F., Müller-Wodarg, I. C. F., Snowden, D. S., **Koskinen, T. T.**, Galand, M., *The CH₄ structure in Titan's upper atmosphere revisited*, *J. Geophys. Res.*, 117, E11006 (2012)
39. Tinetti, G., et al., (including **Koskinen, T. T.**), *EChO: Exoplanet Characterization Observatory*, *Exp. Astron.*, 34, 311–353 (2012)

Book Chapters

1. **Koskinen, T. T.**, Brown, Z., Müller-Wodarg, I. C. F., Strobel, D. F., *Saturn's thermosphere: A post-Cassini perspective*, for *Saturn: The Grand Finale*, Cambridge University Press, in review (2022)

2. Fletcher, L., Sromovsky, L., Hue, V., Moses, J. I., Guerlet, S., West, R., **Koskinen, T. T.**, *Saturn's seasonal atmosphere at northern summer solstice*, for Saturn: The Grand Finale, Cambridge University Press, arXiv:2012.09288 (2020)
3. Cho, J. Y-K., Thrastarson, H., **Koskinen, T. T.**, Read, P. L., Tobias, S. M., Moon, W., Skinner, J. W., *Exoplanets and the sun*, in Zonal Jets: Phenomenology, Genesis, and Physics (eds. B. Galperin, P. L. Read), Cambridge University Press (2019)
4. Strobel, D. F., **Koskinen, T. T.**, Müller-Wodarg, I. C. F., *Saturn's variable thermosphere*, in Saturn in the 21st century (eds. K. H. Baines, F. M. Flasar, N. Krupp, T. Stallard), Cambridge University Press (2019)
5. García Muñoz, A., **Koskinen, T. T.**, Lavvas, P., *Upper atmospheres and ionospheres of planets and satellites*, in Handbook of Exoplanets (eds. H. J. Deeg, J. A. Belmonte), Springer International Publishing AG (2017)

Recent white papers and conference proceedings

1. Drake, J. J., et al., (including **Koskinen, T. T.**), *NExTUP: the Normal-incidence Extreme Ultraviolet Photometer*, Proc. SPIE, 11821 (2021)
2. France, K., et al., (including **Koskinen, T. T.**), *The ESCAPE mission overview: exploring the stellar drivers of exoplanet habitability*, Proc. SPIE, 11821 (2021)
3. Tiscareno, M., et al., (including **Koskinen, T. T.**), *The Saturn Ring Skimmer mission concept: The next step to explore Saturn's rings, atmosphere, interior, and inner magnetosphere*, White Paper to the Planetary Science and Astrobiology Decadal Survey 2023–2032 (2020)
4. Hendrix, A., et al., (including **Koskinen, T. T.**), *Ultraviolet-based science in the solar system: Advances and next steps*, White Paper to the Planetary Science and Astrobiology Decadal Survey 2023–2032 (2020)
5. Wong, M. H., Luszcz-Cook, S., Sayanagi, K., Moore, L., **Koskinen, T.**, Moses, J. I., de Pater, I., *Gas giant and ice giant atmospheres: focused questions for 2023–2032*, White Paper to the Planetary Science and Astrobiology Decadal Survey 2023–2032 (2020)
6. Villareal D'Angelo, C., Vidotto, A. A., Esquivel, A., Sgró, M. A., **Koskinen, T. T.**, Fossati, L., *Star-planet interaction through spectral lines*, Solar and stellar magnetic fields: Origins and Manifestations, Proc. IAU Symposium No. 354 (2020)
7. France, K., Fleming, B. T., Drake, J. J., Mason, J. P., Youngblood, A., Bourrier, V., Fossati, L., Froning, C. S., **Koskinen, T. T.**, Kruczek, N., Lipsy, S., McEntaffer, R., Miles, D., Romaine, S., Siegmund, O. H. W., Wilkinson, E., *The extreme ultraviolet stellar characterization for atmospheric physics and evolution (ESCAPE) mission concept*, Proc. SPIE, 11118 (2019)
8. Rodriguez, S., et al., (including **Koskinen, T. T.**), *Science goals and mission concepts for a future orbital and in situ exploration of Titan*, White Paper to the ESA Voyage-2050 long-term plan (2019)
9. Youngblood, A., France, K., **Koskinen, T. T.**, et al., *EUV influences on exoplanet atmospheric stability and evolution*, Astro2020 Science White Paper (2019)
10. Youngblood, A., et al., (including **Koskinen, T. T.**), *EUV observations of cool dwarf stars*, Astro2020 Science White Paper (2019)

Invited talks, plenary presentations and seminars

1. **Koskinen, T. T.**, Brown, Z., Müller-Wodarg, I. C. F., Strobel, D. F., *Saturn's thermosphere: A post-Cassini perspective*, Saturn Science Conference 2020 (canceled due to the Covid-19 pandemic, related book chapters submitted)

2. Brown, Z. L., **Koskinen, T. T.**, West, R. A., Jouchoux, A., Esposito, L. W., *Polar temperature profiles of Saturn from Grand Finale UVIS stellar occultations*, Cassini Science Symposium plenary talk, Boulder, CO, 2018 (graduate student)
3. **Koskinen, T. T.**, Yelle, R. V., Serigano, J., Hörst, S., Waite, J. H. and the SAMWG team, *Densities in Saturn's thermosphere: A multi-instrument perspective*, Cassini Project Science Group (PSG) meeting plenary talk, Rome, Italy, 2018
4. **Koskinen, T. T.**, *Cool giants and hot exoplanets: Adventures in upper atmospheres*, Jet Propulsion Laboratory seminar, Pasadena, CA, 2017
5. **Koskinen, T. T.**, *Thermal escape from hot extrasolar planets*, Department of Physics and Astronomy seminar, George Mason University, Fairfax County, 2017
6. **Koskinen, T. T.**, Guerlet, S., *UVIS/CIRS constraints on Saturn's He abundance*, Cassini PSG 71 plenary talk, Monrovia, CA, 2017
7. **Koskinen, T. T.**, Moses, J. I., West, R. A., Guerlet, S., Jouchoux, A., *The detection of benzene in Saturn's upper atmosphere*, Cassini PSG 69 plenary talk, ESTEC, Noordwijk, Netherlands, 2016
8. **Koskinen, T. T.**, Strobel, D. F., *The expansion and contraction of Saturn's thermosphere*, Cassini PSG 65 plenary talk, Italian Space Agency, Rome, Italy, 2015
9. **Koskinen, T. T.**, Sandel, B. R., Yelle, R. V., Strobel, D. F., Müller-Wodarg, I. C. F., Erwin, J., *Saturn's upper atmosphere from Cassini/UVIS occultations*, Cassini PSG 63 plenary talk, ESTEC, Noordwijk, Netherlands, 2014
10. **Koskinen, T. T.**, Lavvas, P., Yelle, R. V., Cho, J. Y-K., Kataria, T., *Electrodynamics in giant exoplanet atmospheres*, American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, 2014
11. **Koskinen, T. T.**, Strobel, D. F., Müller-Wodarg, I. C. F., *Saturn's variable thermosphere. Part 1: The view from UV occultations*, Saturn Science Conference: Saturn in the 21st century, Madison, WI, 2014
12. **Koskinen, T. T.**, *Sunsets on Saturn: A new perspective on the upper atmosphere from Cassini UVIS occultations*, Center for Space Physics seminar, Boston University, Boston, MA, 2014
13. **Koskinen, T. T.**, *Giants playing with fire: the story of thermal atmospheric escape*, International Space Science Institute (ISSI) meeting, Bern, Switzerland, 2013
14. **Koskinen, T. T.**, *Thermal escape from extrasolar giant planets*, Royal Society Discussion Meeting, London, UK, 2013
15. **Koskinen, T. T.**, *Characterizing planetary upper atmospheres with UV observations (and models)*, Groupe de Spectrométrie Moléculaire et Atmosphérique seminar, Université Reims Champagne-Ardenne, Reims, France, 2012
16. **Koskinen, T. T.**, Yelle, R. V., Harris, M. J., Lavvas, P., *The escape of exoplanetary atmospheres under strong irradiation*, AGU Fall Meeting, San Francisco, CA, 2012
17. **Koskinen, T. T.**, *Characterizing the upper atmospheres of extrasolar planets*, Institute de Planétologie et d'Astrophysique de Grenoble seminar, Université de Grenoble, Grenoble, France, 2012
18. **Koskinen, T. T.**, Yelle, R. V., Harris, M. J., Lavvas, P., *Interpreting the observations of the upper atmospheres of extrasolar planets*, Modeling Atmospheric Escape, Charlottesville, VA, 2012
19. **Koskinen, T. T.**, Yelle, R. V., Snowden, D. S., Lavvas, P., Sandel, B. R., Capalbo, F. J., Benilan, Y., West, R. A., *Titan's upper atmosphere revealed by Cassini/UVIS stellar occultations*, EPSC, Nantes, France, 2011
20. **Koskinen, T. T.**, *Thermospheres of extrasolar giant planets*, Department of Physics and Astronomy seminar, University College London, London, UK, 2010

21. **Koskinen, T. T.**, Aylward, A., *Simulations of exoplanet thermospheres in 3D*, Royal Astronomical Society National Astronomy Meeting, Belfast, UK, 2008
22. **Koskinen, T. T.**, *Exoplanetary atmospheres and their dynamics*, Cumberland Lodge Meeting, Windsor Great Park, UK, 2008

Conference and workshop presentations (oral first author, student or postdoc)

1. **Koskinen, T. T.**, *Mass loss from extremely close-in planets*, ARIEL Upper Atmospheres Working Group seminar, 2022, via Zoom
2. Brown, Z. L., **Koskinen, T. T.**, Medvedev, A. S., Starichenko, E. D., Müller-Wodarg, I. C. F., *Evidence for gravity waves in the thermosphere of Saturn and implications for meridional circulation*, American Geophysical Union (AGU) Fall Meeting 2021 (graduate student)
3. Steinrück, M., **Koskinen, T. T.**, Lavvas, P., Tan, X., Zhang, X., *Simulating radiative feedback of photochemical hazes in general circulation models of hot Jupiters*, Division of Planetary Science (DPS) Meeting 2021, virtual (graduate student)
4. Brown, Z., **Koskinen, T. T.**, Guerlet, S., Moses, J., *A snapshot of photochemical products in Saturn's mesosphere*, DPS Meeting 2021, virtual (graduate student)
5. Steinrück, M., **Koskinen, T. T.**, Lavvas, P., Tan, X., Zhang, X., *Simulating radiative feedback of photochemical hazes in general circulation models of hot Jupiters*, European Planetary Science Congress (EPSC) 2021, virtual (graduate student)
6. Huang, C., **Koskinen, T. T.**, *A hydrodynamic study of radiative cooling and escape of metal species in Hot Jupiter atmospheres*, American Astronomical Society (AAS) meeting 2021, virtual (postdoc)
7. Brown, Z., **Koskinen, T. T.**, *The distribution of hydrocarbons in Saturn's mesosphere from Cassini's Grand Finale*, DPS Meeting 2020, virtual (graduate student)
8. Steinrueck, M., Showman, A., Lavvas, P., **Koskinen, T. T.**, Zhang, X., Tan, X., *Three-dimensional simulations of photochemical hazes in the atmosphere of Hot Jupiter HD189733b*, EPSC Meeting 2019, 2020 & DPS Meeting 2020, both virtual (graduate student)
9. Huang, C., **Koskinen, T. T.**, *A hydrodynamic study of radiative cooling and escape of metal species in Hot Jupiter atmospheres*, American Astronomical Society (AAS) meeting 2020, virtual (postdoc)
10. Brown, Z., **Koskinen, T. T.**, Müller-Wodarg, I., West, R., Jouchoux, A., Esposito, L., *Thermospheric circulation and pole-to-pole temperatures from Cassini Grand Finale occultations*, EPSC-DPS Joint Meeting 2019, Geneva, Switzerland (graduate student)
11. Vriesema, J., **Koskinen, T. T.**, Yelle, R., Müller-Wodarg, I., *Results from an improved model of electrodynamics in Saturn's upper atmosphere*, European Planetary Science Congress (EPSC)-Division of Planetary Sciences (DPS) Joint Meeting 2019, Geneva, Switzerland (graduate student)
12. Palmer, M., Yelle, R., **Koskinen, T. T.**, *Latitudinal variations in Titan's atmosphere: UVIS observations of three simultaneous stellar occultations*, EPSC-DPS Joint Meeting 2019, Geneva, Switzerland (graduate student)
13. **Koskinen, T. T.**, Brown, Z., West, R., Jouchoux, A., Esposito, L., *Saturn's upper atmosphere from the Cassini/UVIS Grand Finale stellar occultations*, EPSC 2018, Berlin, Germany
14. **Koskinen, T. T.**, Yelle, R. V., Holsclaw, G. M., Sandel, B. R., *Saturn in Lyman α : A comparison of Cassini and Voyager observations*, Cassini Science Symposium, Boulder, CO, 2018
15. Vriesema, J., **Koskinen, T. T.**, Yelle, R. V., *Exploring low-latitude electrodynamics in Saturn's thermosphere*, Cassini Science Symposium, Boulder, CO, 2018 (graduate student)

16. **Koskinen, T. T.**, Guerlet, S., *Constraints on atmospheric structure and helium abundance of Saturn from Cassini/UVIS and CIRS observations*, DPS Meeting 49, Provo, UT, 2017
17. **Koskinen, T. T.**, Moses, J. I., West, R., Guerlet, S., Jouchoux, A., *New observational constraints on hydrocarbon chemistry in Saturn's upper atmosphere*, EPSC-DPS Joint Meeting, Pasadena, CA, 2016
18. **Koskinen, T. T.**, Strobel, D. F., West, R. A., Yelle, R. V., *Variability in Saturn's upper atmosphere from Cassini/UVIS occultations*, EPSC, Nantes, France, 2015
19. **Koskinen, T. T.**, Sandel, B. R., Yelle, R. V., Strobel, D. F., Müller-Wodarg, I. C. F., Erwin, J., *Saturn's variable thermosphere from Cassini/UVIS occultations*, DPS Meeting 46, Tucson, AZ, 2014
20. **Koskinen, T. T.**, Sandel, B. R., Yelle, R. V., Capalbo, F. J., Holsclaw, G. M., McClintock, B. E., Edgington, S., *The thermosphere of Saturn from Cassini UVIS occultations*, DPS Meeting 45, Denver, CO, 2013
21. **Koskinen, T. T.**, Yelle, R. V., Harris, M., Lavvas, P., *Characterizing the atmospheres of extrasolar planets with UV transit observations*, UV Astronomy: HST and Beyond, Kaua'i, Hawai'i, 2012
22. **Koskinen, T. T.**, Yelle, R. V., Snowden, D. S., Lavvas, P., Sandel, B. R., Capalbo, F. J., Benilan, Y., West, R. A., *Recent results from analysis of UVIS stellar occultations*, Titan Science Meeting, Abbaye Saint Jacut-de-la-Mer, France
23. **Koskinen, T. T.**, Yelle, R. V., Snowden, D. S., Lavvas, P., Sandel, B. R., Capalbo, F. J., Benilan, Y., West, R. A.: *New perspectives on the upper atmosphere of Titan from Cassini UVIS stellar occultations*, DPS Meeting 42, Pasadena, CA, 2010
24. **Koskinen, T. T.**, *Thermospheres of extrasolar giant planets*, EPSC, Rome, Italy, 2010
25. **Koskinen, T. T.**, *A 3D Model for the Upper Atmospheres and Ionospheres of Extrasolar Giant Planets*, Molecules 2008, Paris, France
26. **Koskinen, T. T.**, Aylward, A., Miller, S., *3D Simulations of the Upper Atmosphere and Ionosphere of HD17156b*, EPSC, Potsdam, Germany, 2008
27. **Koskinen, T. T.**, Aylward, A., Miller, S., *Thermospheres of Extrasolar Giant Planets*, EPSC, Berlin, Germany, 2007

Outreach and public talks

1. *The search for habitable planets*, Quail Creek Resort Community, Green Valley, AZ, 2022
2. *What are Hot Jupiters?*, Flandrau Planetarium, Tucson, AZ, 2018
3. *The new Copernican revolution: Discovery and characterization of extrasolar planets*, Quail Creek Resort Community, Green Valley, AZ, 2015
4. *The myth and science of the northern lights: From the land of Santa Claus to distant exoplanets*, Finnfest USA, Minneapolis, MN, 2014
5. *The myth and science of the northern lights: From the land of Santa Claus to distant exoplanets*, Finnfest USA, Tucson, AZ, 2012
6. *Extrasolar Giant Planets and the Stability of Their Atmospheres*, University College London Astronomy Diploma Club, London, UK, 2007

Prizes and awards

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| 2018 | NASA Group Achievement Award to the Cassini Ultraviolet Imaging Spectrograph (UVIS) Science Team |
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- 2008 Jon Darius Memorial Prize for Outstanding Postgraduate Research in Astronomy, University College London
- 2005–2008 Perren and Departmental studentship awards, University College London

Grants, subcontracts and other funding

1. NASA Cassini Data Analysis Program (CDAP): *The changing seasons of Saturn's upper atmosphere viewed in the ultraviolet*, 2022–2025 (Principal Investigator)
2. NASA Astrophysics Research and Analysis (APRA) subcontract: *The CUTE science mission and operations: A cubesat studying the most extreme exoplanets*, 2021–2023 (Co-Investigator)
3. NASA Cassini Data Analysis Program (CDAP): *Saturn's Saturn's upper atmosphere revealed by new Cassini/UVIS occultations*, 2019–2023 (Principal Investigator)
4. NASA Cassini Data Analysis Program (CDAP): *A comprehensive investigation of Titan's middle and upper atmosphere*, 2019–2022 (Co-Investigator)
5. NASA New Frontiers Data Analysis Program (NFDAP): *Atmospheric structure and escape on Pluto*, 2018–2022 (Principal Investigator)
6. NASA Exoplanet Research Program (XRP): *The middle atmospheres of exoplanets*, 2018–2022 (Co-Investigator)
7. Space Telescope Science Institute (STScI) Hubble Space Telescope (HST) Guest Observer (GO) program: *NUV spectroscopy of HD189733b: Measuring the mass-loss and ionization state of a prototypical escaping atmosphere*, 2018–2022 (Co-Investigator)
8. NASA Astrophysics Research and Analysis (APRA) subcontract: *Colorado Ultraviolet Transit Experiment: Mass loss and magnetic fields in exoplanetary systems*, 2017–2021 (Co-Investigator)
9. Space Telescope Science Institute (STScI) Hubble Space Telescope (HST) Guest Observer (GO) program: *Cloudy solutions to the anomalous emission of HD80606b*, 2020–2021 (Co-Investigator)
10. Jet Propulsion Laboratory (JPL) subcontract: *Saturn working group discipline legacy products: Density structure in Saturn's upper atmosphere*, 2017–2018 (Co-Principal Investigator)
11. Jet Propulsion Laboratory (JPL) subcontract: *Saturn's upper atmosphere for the Grand Finale*, 2017–2018 (Co-Principal Investigator)
12. STScI HST GO program: *Unveiling the circumstellar environment of the most extreme hot Jupiters*, 2015–2018 (Co-Investigator and Admin-PI)
13. NASA CDAP: *Characterizing the density and temperature structure in the upper atmospheres of Saturn and Titan*, 2014–2017 (Principal Investigator)
14. NASA CDAP: *Characterizing the density and temperature profiles in the upper atmosphere of Saturn*, 2013–2014 (Principal Investigator)
15. JPL subcontract: *Analysis of stellar occultations by Saturn observed by the Cassini/UVIS instrument in preparation for the end of the Cassini Solstice (XXM) mission*, 2012–2013 (Co-Principal Investigator)

Graduate student advising and mentoring

I am the current faculty advisor to one graduate students and mentor other graduate students at LPL. In the past, I have advised, mentored, and co-authored papers with eleven other graduate students. In summary, I have authored or co-authored more than 20 refereed publications that involve graduate students in a prominent role.

Graduate student advisees and co-advisees

1. Zarah Brown, LPL, 2017–present
2. Maria Steinrück, LPL, graduated 2021
3. Jess Vriesema, LPL, graduated 2020 (Co-Advisor: Roger Yelle)

Graduate student mentees and co-authors

1. Galen Bergsten, LPL, 2021–present (Advisor: Ilaria Pascucci)
2. Rachel Fernandes, LPL, 2017–present (Advisor: Ilaria Pascucci)
3. Kyle Pearson, LPL, graduated 2020 (Advisor: Caitlin Griffith)
4. Joshua Lothringer, LPL, graduated 2019 (Advisor: Travis Barman)
5. Robert Parke Loyd, University of Colorado Boulder, graduated 2017 (Advisor: Kevin France)
6. Joshua Chadney, Imperial College London, graduated 2015 (Advisor: Marina Galand)
7. Helene Menager, IPAG Grenoble, France (Advisor: Mathew Barthelemy)
8. Fernando Capalbo, Université Paris-Est Créteil et Université Paris Diderot (Advisor: Yves Benilan)

Postdoctoral scholars

1. Chenliang Huang, 2019–present

Courses taught

Spring 2022	STR/PTY5170B2	University and Humanity (68 undergrads)
Fall 2021	STR/PTY5170B2	University and Humanity (103 undergrads)
Fall 2020	ASTR/PTY5170B2	University and Humanity (72 undergrads)
Fall 2019	ASTR/PTY5170B2	Universe and Humanity (120 undergrads)
Spring 2019	PTY5544	High Atmospheres (graduate class)
Fall 2018	ASTR/PTY5170B2	Universe and Humanity (96 undergrads)

Service

Department	Library Committee Chair, 2021–2022
Department	Submitted two course proposals for General Education classes, 2021–2022
Professional	NASA review panel member, 2022
Professional	NASA review panel member, 2021
Department	Graduate Admissions and Advice Committee (GAAC), 2018–present
Department	Faculty representative to the Graduate Student Colloquium, 2019–2020
Department	Department Life Committee, 2018–2019
Department	Faculty representative to the Journal Club, 2017–2018
Professional	Session organizer: <i>Planetary aeronomy: Near and Afar</i> , EPSC-DPS, Geneva, Switzerland, 2019
Professional	NASA review panel chair, 2019
Professional	Session organizer, proposer and chair: <i>Planetary aeronomy: Near and Afar</i> , EPSC, Berlin, Germany, 2018

Service

- Professional NASA review panel chair, 2019
- Professional Session organizer, proposer and chair: *Planetary aeronomy: Near and Afar*, EPSC, Berlin, Germany, 2018
- Professional NASA review panel member, 2018
- Professional Cassini Saturn Atmosphere Modeling Group member, 2014–2018
- Professional Reviewer for *Nature*, *Icarus*, *Astrophysical Journal*, *Astronomy and Astrophysics*, *Canadian Journal of Physics*, *Planetary and Space Science*, *Research in Astronomy and Astrophysics*

References

Available on request