Thaddeus D. Komacek

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Current Position

51 Pegasi b Postdoctoral Fellow • The University of Chicago • 2018-

Education

The University of Arizona August 2013-May 2018 • Tucson, AZ
Ph.D, Planetary Sciences
The University of Chicago 2009-2013 • Chicago, IL
B.S. Geophysical Sciences with Honors, B.A. Physics with a Specialization in Astrophysics

Publications

Peer-Reviewed Articles

1. Komacek T.D. and Abbot D.S., The Atmospheric Circulation and Climate of Terrestrial Planets Orbiting Sun-like and M-dwarf Stars over a Broad Range of Planetary Parameters, 2019, ApJ, 871, 245.
2. Koll D.D.B. and Komacek T.D., Atmospheric Circulations of Hot Jupiters as Planetary Heat Engines, 2018, ApJ, 853, 133.
3. Komacek T.D. and Youdin A.N., Structure and Evolution of Internally Heated Hot Jupiters, 2017, ApJ, 844, 94.
4. Komacek T.D., Showman A.P., and Tan X., Atmospheric Circulation of Hot Jupiters: Dayside-Nightside Temperature Differences. II. Comparison with Observations, 2017, ApJ, 835, 198.
5. Komacek T.D. and Abbot D.S., Effect of Surface-Mantle Water Exchange Parameterizations on Exoplanet Ocean Depths, 2016, ApJ, 832, 54.
6. Komacek T.D. and Showman A.P., Atmospheric Circulation of Hot Jupiters: Dayside-Nightside Temperature Differences, 2016, ApJ, 821, 16.
7. Rogers T.M. and Komacek T.D., Magnetic Effects in Hot Jupiter Atmospheres, 2014, ApJ, 794, 132.

Unrefereed Articles

1. Komacek T.D. and Tan X., Effects of Dissociation/Recombination on the Day–Night Temperature Contrasts of Ultra-hot Jupiters, 2018, Research Notes of the AAS, 2, 36.
2. Apai D. and 32 other authors including Komacek T.D., Exploring Other Worlds: Science Questions for Future Direct Imaging Missions (EXOPAG SAG15 Report), 2017, arXiv:1708.02821.

Honors and Awards

1. Recipient of 2018-2021 Heising-Simons Foundation 51 Pegasi b Postdoctoral Fellowship
2. Recipient of 2017 LPL Gerard P. Kuiper Memorial Award for graduate student scholarship
3. Recipient of 2015 and 2016 University of Arizona Galileo Circle Scholarship

4. Recipient of 2014-2017 NASA Earth and Space Science Fellowship Program Award
5. Recipient of 2013-2014 Lieutenant Colonel Kenneth Rondo Carson and Virginia Bryan Carson LPL Graduate Fellowship

Mentorship

Huanzhou (Jeffrey) Yang (Undergraduate visiting researcher, July-September 2018)

- Jeffrey is an undergraduate student from Peking University who spent the summer of 2018 working with Dorian Abbot and myself at the University of Chicago. Jeffrey is studying how the inner edge of the habitable zone depends on planetary radius and surface gravity using the general circulation model ExoCAM.

Teaching, Service & Outreach

Referee, Panel Member, Session Organizer (The Astrophysical Journal, Geophysical Research Letters, Nature Astronomy, NASA Exoplanets Research Program, American Geophysical Union)

University of Arizona (Teaching Assistant)

- Teaching assistant for "The Universe and Humanity: Origin and Destiny," Fall 2017, with Prof. Travis Barman
- Teaching assistant for "Our Golden Age of Planetary Exploration," Spring 2018, with Prof. Jeff Andrews-Hanna

Science Olympiad (National Science Olympiad Astronomy Co-Supervisor: 2009-Present)

- As a national event supervisor for the Astronomy event, I present at coaches clinics, develop educational materials and exams, and supervise the Astronomy event at invitational, regional, and national competitions.

International Olympiad on Astronomy and Astrophysics (United States Team: 2014-Present)

- I am a member of the U.S.A. team board, which involves organizing the National Astronomy Olympiad yearly.
- I was the 2014 U.S.A. team leader, which involved mentoring the (high-school) students competing in the competition and supervising the 2014 competition in Romania.

Noble Academy Python Club (2018-2019)

- I taught Chicago high school students the Python programming language as a weekly after-school activity.

Lunar and Planetary Laboratory (Journal Club Graduate Student Coordinator: 2015-2018)

- I organized, found speakers for, and ran the weekly journal club as a graduate student at LPL.

Ryerson Astronomical Society (UChicago) (President: 2011-2013; Webmaster: 2010-2011)

- As an undergraduate, I ran weekly meetings and public observing nights.
- Additionally, I organized and led trips for local elementary school students to tour Ryerson observatory.

Splash! Chicago (2009-2012)

- As an undergraduate, I developed and taught introductory astronomy courses for high school students.

Presentations

Invited Oral Presentations

1. "The Atmospheric Circulation of Ultra-Hot Jupiters." *Noon Balloon*, University of Chicago. November 16, 2018.
2. "A predictive theory for the atmospheric circulation of hot Jupiters." *Planetary lunch*, University of California, Santa Cruz. February 14, 2017.
3. "A predictive theory for vertical mixing in hot Jupiter atmospheres." *Exoplanet pizza lunch*, Harvard CfA. January 24, 2017.
4. "A predictive theory for the atmospheric circulation of hot Jupiters." *MIT Atmospheric Sciences seminar*, MIT. January 23, 2017.
5. "Effect of surface-mantle water exchange parameterizations on the prevalence of waterworlds." *Kavli Institute brown bag*, MIT. January 23, 2017.
6. "Partitioning of water between surface and mantle: what makes a waterworld?" *Origins seminar*, University of Arizona. October 31, 2016.
7. "Understanding water cycling between mantle and surface on terrestrial exoplanets using simplified models." *Lunar and Planetary Laboratory Conference*, University of Arizona. August 19, 2016.

Contributed Oral Presentations

1. Komacek T.D., Showman A.P., and Parmentier V. (2018) Vertical Mixing in Hot Jupiter Atmospheres. *Lake Michigan Exoplanet Meeting.*
2. Komacek T.D. and Abbot D.S. (2018) The Atmospheric Circulation of Terrestrial Planets over a Broad Range of Planetary Parameters. *Sagan Fellows Symposium.*
3. Komacek T.D. and Koll D.D.B. (2018) Constraining Atmospheric Drag in Hot Jupiter Atmospheres Using Doppler Spectroscopy. *High Resolution Spectroscopy for Exoplanet Atmospheres.*
4. Komacek T.D., Showman A.P., and Parmentier V. (2018) Vertical Mixing in Hot Jupiter Atmospheres. *Cloud Academy, École de Physique des Houches.*
5. Komacek T.D. and Abbot D.S. (2018) The Atmospheric Circulation and Cloud Behavior in a Large Suite of Terrestrial Planet GCMs. *CCTP* **III**.
6. Komacek T.D. and Abbot D.S. (2018) The Atmospheric Circulation and Cloud Behavior in a Large Suite of Terrestrial Planet GCMs. *51 Pegasi b Summit.*
7. Komacek T.D. and Showman A.P. (2017) The Atmospheric Circulation of Hot Jupiters: A Hierarchical Modeling Approach. *DPS* **49**.
8. Komacek T.D. and Abbot D.S. (2017) Effect of Surface-Mantle Water Exchange Parameterizations on the Prevalence of Waterworlds. *AbSciCon.*

9. Komacek T.D. and Abbot D.S. (2016) Partitioning of Water between Surface and Mantle on Terrestrial Exoplanets: Effect of Surface-Mantle Water Exchange Parameterizations on Ocean Depth. *AGU*.

10. Komacek T.D. and Showman A.P. (2016) A Predictive Theory for the Atmospheric Circulation of Hot Jupiters. *DPS* **48**.

11. Komacek T.D. and Showman A.P. (2016) A Predictive Theory for the Atmospheric Circulation of Hot Jupiters. *Exoclimes* **IV**.

12. Komacek T.D. and Youdin A.N. (2015) Structure and Evolution of Internally Heated Hot Jupiters. *DPS* **47**.

13. Komacek T.D. and Showman A.P. (2015) Transitions in Efficiency of Heat Redistribution in Hot Jupiter Atmospheres. *International Colloquium of the Paris Institute of Astrophysics* **31**.

14. Komacek T.D., Rogers T.M., Barman, T.S., Showman A.P., Youdin A.N. (2014) Effects of Magnetism on the Atmospheres and Evolution of Hot Jupiters. *DPS* **46**.

Contributed Poster Presentations

1. Komacek T.D., Abbot D.S. (2018) The Atmospheric Circulation and Observable Properties of a Large Suite of Terrestrial Planet GCMs. *AGU*.

2. Komacek T.D., Showman A.P., Tan X., Parmentier V. (2017) A Predictive Theory for Vertical Mixing in Hot Jupiter Atmospheres. *École de Physique des Houches*.

3. Komacek T.D. and Showman A.P. (2016) A Predictive Theory for the Atmospheric Circulation of Hot Jupiters. *Kavli Summer Program in Astrophysics*.

4. Komacek T.D. and Showman A.P. (2015) Dayside-Nightside Temperature Differences in Hot Jupiter Atmospheres. *AGU*.

5. Komacek T.D. and Showman A.P. (2015) Dayside-Nightside Temperature Differences in Hot Jupiter Atmospheres. *ESS* **3**.

6. Komacek T.D., Young D. (2015) Exoplanet Science in the National Science Olympiad. *DPS* **47**.

7. Komacek T.D. and Youdin A.N. (2015) Effects of Turbulent Mixing on the Evolution and Structure of Hot Jupiters. *SPF* **1**.

8. Youdin A.N. and Komacek T.D. (2014) Hot Jupiter Radii: A Turbulent History. *DPS* **46**.

9. Komacek T.D., Young D., Schroeder D.M., Van Hecke M.A. (2014) Star Formation and Exoplanetary Systems in the National Science Olympiad Astronomy Event for High School Students. *DPS* **46**.

10. Komacek T.D., Rogers T.M., Showman A.P. (2014) Magnetohydrodynamic Simulations of Hot Jupiters: Temperature Dependent Magnetic Conductivity. *Exoclimes* **III**.

11. Komacek T.D., Ciesla F.J, Davison T.M. (2013) A Model For the Three-Dimensional Heating of a Planetesimal. *LPSC* **44**.