

CHENG LI

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EDUCATION	Ph.D. Planetary Science, California Institute of Technology	2017
	B.S. Atmospheric Physics, Peking University	2011
RESEARCH POSITIONS	University of Michigan, Ann Arbor	2021 –
	Assistant Professor	
	University of California, Berkeley	2019 – 2020
	51 Pegasi b Postdoc Fellow	
AWARDS	Jet Propulsion Laboratory	2017 – 2019
	NASA Postdoc Program Fellow	
	51 Pegasi b Fellowship (Heising-Simons Foundation)	2019
	NASA Postdoc Program Fellowship (NPP)	2016
PUBLICITY	NASA Earth and Space Science Fellowship	2015
	Student of Academic Excellence, Peking University	2010
	The Piang'an Insurance Inspirational Scholarship	2009
	The Junyuan Tang Undergraduate Scholarship	2008 – 2011
	The First Prize of the 23 rd National Olympiad in physics, Shanghai, China	2006
	CNN: How much water does Jupiter really have? Here's what NASA's Juno mission found https://www.cnn.com/2020/02/19/world/juno-jupiter-water-mystery-scn/index.html	2020
	Popularmechnics.com: Here's how aliens might see Earth https://www.popularmechnics.com/space/solar-system/a28774057/how-aliens-might-see-earth/	2019
	Heising-Simons Foundation: New class of the 51 Pegasi b fellowship https://www.hsfoundation.org/fellow/cheng-li-ph-d/	2019
Nature: Jupiter's secrets revealed by NASA probe https://www.nature.com/news/jupiter-s-secrets-revealed-by-nasa-probe-1.22027	2017	
Scientific American: Juno Reveals Jupiter's Deep Secrets https://www.scientificamerican.com/article/juno-reveals-jupiters-deep-secrets/	2015	
CBS: Storms the size of Earth on Saturn, explained	2015	

<http://www.cbsnews.com/news/storms-the-size-of-earth-on-saturn-explained/>

Afpbb.com: 土星の巨大嵐「大白斑」の謎を解明、米大学研究 2015
<http://www.afpbb.com/articles/-/3045309>

Sciencepost.fr: Les tempêtes géantes de Saturne sont enfin expliquées 2015
<https://sciencepost.fr/les-tempetes-geantes-de-saturne-sont-enfin-expliquees/>

Media.inaf.it: Saturno: è diluvio universal 2015
<https://www.media.inaf.it/2015/04/14/saturno-e-diluvio-universale/>

News.sciencenet.cn: 土星大气水分导致风暴累积后大爆发 2015
<http://news.sciencenet.cn/htmlpaper/201551513531928636440.shtm>

RESEARCH TOPICS

- [1] Photochemical modeling of Titan’s atmosphere, discovering a stable layer near 500 km above surface
- [2] Modeling moist convection in hydrogen atmospheres, explaining the periodicity of Saturn’s Giant storms.
- [3] Mapping the global distribution of ammonia gas in Jupiter’s atmosphere using the observations from the Juno microwave radiometer.
- [4] Theoretical calculation on the moist thermodynamics of an atmospheric laden with multiple condensing species
- [5] Development of a new three-dimensional Cloud Resolving Model (CRM) for planetary atmospheres.
- [6] Development of a novel generic radiative transfer model applied to planetary atmosphere and exoplanets
- [7] Discovering the abundance of water in Jupiter’s atmosphere (major scientific objective of the Juno mission)
- [8] Vortex dynamics: analysis of the stability of a polygonal distribution of vortices using a shallow water model

MEMBERSHIP

American Geophysical Union / American Astronomical Society

PROFESSIONAL SERVICE

Presentation Judge: 2016 EGU OSPP / 2017 AGU OSPP
Session Chair: 2017 AGU / 2018 AGU / 2018 DPS
Referee: Astrophysical Journal / Nature Astronomy / Astronomy and Astrophysics / Journal of Fluid Mechanics / Icarus / Journal of Atmospheric Sciences
Grant Reviewer: 2017 NASA NESSF / 2018 NSF

PUBLICATIONS

- [24] **Li, Cheng**, A. Ingersoll, A. Klipfel, H. Brettle, Modeling the Stability of Polygonal Patterns of Vortices at the Poles of Jupiter as Revealed by the Juno Spacecraft, *PNAS*, *submitted* (2020)
- [23] H. Ge, **C. Li**, X. Zhang, D. Lee, A Global Non-hydrostatic Atmospheric Model with a Mass and Energy Conserving Vertically-Implicit-Correction (VIC) Scheme, *ApJ*, *in revision* (2020)
- [22] T. Guillot, **C. Li**, S. Bolton, S. Brown, A. Ingersoll, M. Janssen, S. Levin, J. Lunine, G. Orton, P. Steffes, D. Stevenson, Storms and the Depletion of Ammonia in Jupiter: II. Explaining the Juno observations, *JGR-Planets*, *in press* (2020)
- [21] L.N. Fletcher, G.S. Orton, T.K. Greathouse, J.H. Rogers, Z. Zhang, F.A. Oyafuso, G. Eichstadt, H. Melin, **C. Li**, S.M. Levin, S. Bolton, M. Janssen, H-J. Mettig, D. Grassi, A. Mura, A. Adriani, Jupiter's Equatorial Plumes and Hot Spots: Spectral Mapping from Gemini/TEXES and Juno/MWR, *JGR-Planets*, *in press* (2020)
- [20] **Li, Cheng**, A. Ingersoll, S. Bolton, S. Levin, M. Janssen, S. Atreya, J. Lunine, P. Steffes, S. Brown, T. Guillot, M. Allison, J. Arballo, A. Bellotti, V. Adumitroaie, S. Gulkis, A. Hodges, L. Li, S. Misra, G. Orton, F. Oyafuso, D. Santos-Costa, H. Waite, Z. Zhang, The water abundance in Jupiter's equatorial zone, *Nature Astronomy*, doi::10.1038/s41550-020-1009-3 (2020)
- [19] Fan, S., **C. Li**, J. Li, S. Bartlett, J. Jiang, V. Natraj, D. Crisp, Y. Yung, Earth as an Exoplanet: A Two-dimensional alien map, *ApJ*, 888:L1 (2019)
- [18] Le, T., **C. Li**, V. Natraj, X. Zhang, X. Liu, Q. Yang, W. Wu, A. Braverman, J. Jiang, H. Su, V. Payne, Y. Yung. Evaluation of modeled hyperspectral infrared spectra against AIRS observations under all sky scenarios using a novel statistical approach, *JGR-atmosphere*, *in revision* (2019)
- [17] Fan, S., D. Shemansky, **C. Li**, P. Gao, Y. Yung. Retrieval of abundances of hydrocarbon and nitrile species in Titan's upper atmosphere, *ESS*, 6, 1057 (2019)
- [16] **Li, Cheng**, X. Chen. Simulating Non-hydrostatic Atmospheres on Planets (SNAP): formulation, validation, and application to the Jovian atmosphere, *ApJS*, 240,2 (2018)
- [15] **Li, Cheng**, T. Le, X. Zhang, Y. Yung, 2018. A High-performance Atmospheric Radiation Package: with applications to the radiative energy budgets of giant planets, *JQSRT*, 217,353-362 (2018)
- [14] Blain, Doriann, T. Fouchet, T. Greathouse, T. Encrenaz, B. Charnay, B. Bezdard, **C. Li**, E. Lellouch, G. Orton, L. Fletcher, P. Drossart, 2018. Mapping of Jupiter's tropospheric NH₃ abundance using ground-based ITRF/TEXES observations at 5 um, *Icarus*, 314,106-120 (2018)

- [13] Brown, Shannon, M. Janssen, V. Adumitroaie, S. Bolton, S. Gulkis, A. Ingersoll, S. Levin, **C. Li**, L. Li, J. Lunine, S. Misra, G. Orton, P. Steffes, F. Tabataba-Vakili, I. Kolmasova, M. Imai, O. Santolik, W. Kurth, G. Hospodarsky, D. Gurnett, J. Connerney. Detection of lightning sferics on Jupiter from Pole to Pole, *Nature*, 558, 87-90 (2018)
- [12] **Li, Cheng**, A. Ingersoll, F. Oyafuso. Moist adiabats with multiple condensing species: A new theory with application to giant planet atmospheres, *JAS*, 75(4),1063-1072 (2018)
- [11] **Li, Cheng**. Disrupting the atmospheric beat, *Nature Astronomy*, 1.11:753 (2017)
- [10] Ingersoll, A.P., V. Adumitroaie, M. Allison, S. Atreya, A. Bellotti, S. Bolton, S. Brown, S. Gulkis, M. Janssen, S. Levin, **C. Li**, L. Li, J. Lunine, G. Orton, F. Oyafuso, P. Steffes. Implications of the ammonia distribution on Jupiter from 1 to 100 bars as measured by the Juno microwave radiometer. *GRL*, 44,7576-7685 (2017)
- [9] **Li, Cheng**, A.P. Ingersoll, M.A. Janssen, S.M. Levin, S.T. Bolton, V. Adumitroaie, M.D. Allison, J. Arballo, A.A. Bellotti, S.T. Brown, S. Ewald, L. Jewell, S. Misra, G.S. Orton, F.A. Oyafuso, P.G. Steffes, R. Williamson. The distribution of ammonia on Jupiter from inversion of Juno Microwave Radiometer data. *GRL*, 44(11) (2017)
- [8] Orton, G.S., T. Momary, A. Ingersoll, A. Adriani, C. Hanssen, M. Janssen, J. Arballo, S. Atreya, S. Bolton, S. Brown, M. Caplinger, D. Grassi, **C. Li**, S. Levin, M. Moriconi, A. Mura, G. Sindoni. Multiple-Wavelength Sensing of Jupiter During the Juno Mission's First Perijove Passage. *GRL*, 44(10) (2017)
- [7] Bolton, S.J., A. Adriani, V. Adumitroaie, J. Anderson, S. Atreya, J. Bloxham, S. Brown, J. E.P. Connerney, E. DeJong, W. Folkner, D. Gautier, S. Gulkis, T. Guillot, C. Hansen, W.B. Hubbard, L. Iess, A. Ingersoll, M. Janssen, J. Jorgensen, Y. Kaspi, S. Levin, **C. Li**, J. Lunine, Y. Miguel, A. Mura, G. Orton, T. Owen, M. Ravine, E. Smith, P. Steffes, E. Stone, D. Stevenson, R. Thorne, J. Waite, D. Durante, R. W. Ebert, T.K. Greathouse, V. Hue, M. Parisi, J. R. Szalay, R. Wilson. Jupiter's interior and deep atmosphere: the first close polar pass with the Juno spacecraft. *Science*, 356(6340) (2017)
- [6] Janssen, M.A., J. Oswald, S. Brown, S. Gulkis, S. Levin, S. Bolton, M. Allison, S. Atreya, D. Gautier, A. Ingersoll, J. Lunine, G. Orton, T. Owen, P. Steffes, V. Adumitroaie, A. Bellotti, L. Jewell, **C. Li**, et al. MWR: Microwave radiometer for the Juno Mission to Jupiter. *SSR*, 1-17 (2017)
- [5] Trammell, H., L. Li, X. Jiang, Y. Pan, M. Smith, E. Bering III, S. Horst, A. Vasavada, A. Ingersoll, M. Janssen, R. West, C. Porco, **C. Li**, A. Simon, K.

- Baines, 2016. Vortices in Saturn's Northern Hemisphere (2008-2015) observed by Cassini ISS. *JGR - Planets*, 121.9, 1814-1826 (2016)
- [4] **Li, Cheng**, A. Ingersoll. Moist convection in hydrogen atmospheres and the frequency of Saturn's giant storms, *Nature Geoscience*, 8, 398-403 (2015)
- [3] **Li, Cheng**, X. Zhang, P. Gao, Y. Yung. Vertical distribution of C₃-hydrocarbons in the stratosphere of Titan, *ApJL*, 803, L19 (2015)
- [2] Gao, P., R. Y. Hu, T. Robinson, **C Li**, Y. Yung. Stabilization of CO₂ atmosphere on exoplanets around M dwarf stars, *ApJ*, 806, 249 (2015)
- [1] **Li, Cheng**, X. Zhang, J. Kammer, M. Liang, R. Shia, Y. Yung. A non-monotonic eddy diffusivity profile of Titan's atmosphere revealed by Cassini observations. *PSS*, 104, Part A(0), 48-58 (2014)

**SELECTED
SEMINARS**

- C. Li** and the Juno team, Microwave observations of the giant planets - Cassini/Radar and Juno/MWR, JpGU 2019, Chiba, Japan (**Invited**) 2019/05
- C. Li** and the Juno team, The thermal structure of Jupiter's troposphere revealed by the Juno microwave radiometer, EGU 2019, Vienna 2019/04
- C. Li**, Modeling of Cyclonic Vortices at the Poles of Jupiter, 22nd AOFD, Maine 2019/03
- C. Li**, 3D mapping of Jupiter's ammonia distribution, U Michigan (**Invited**) 2018/10
- C. Li**, The unsolved questions raised by Juno/MWR, Harvard (**Invited**) 2018/07
- C. Li**, L. Schoon, M. Shete, N. Nakamura, Rossby wave Penetration and Breaking – insights from a rotating tank experiment, U Chicago Rossby palooza 2018/06
- C. Li**, A whole new Jupiter, UC Santa Cruz (**Invited**) 2018/02
- C. Li**, The first year of Juno observing Jupiter's atmosphere, UC Berkeley CIPS seminar (**Invited**) 2018/01
- C. Li** & A. Ingersoll, Shallow water modeling of Jovian polar jets and vortices, 50th DPS, Provo 2017/10
- C. Li** & M. Janssen, Aftermath of the Giant Saturn Storm of 2010-2011 as observed by the Cassini RADAR 2.2-cm radiometer, Cassini PSG meeting 2017/09
- C. Li** & the Juno/MWR science team, Preliminary results on Jupiter's atmosphere using the Juno Microwave Radiometer, 14th AOGS, Singapore (**Invited**) 2017/08
- C. Li** & A. Ingersoll, Shallow water modeling of Jovian polar jets and vortices, 21st AOFD, Portland 2017/06

C. Li & the Juno/MWR science team, Jupiter's global ammonia distribution, EGU 2017, Vienna	2017/04
C. Li , Juno's discovery of Jupiter's atmosphere: a beta version, Dix Planetary Science Seminar, Caltech (Invited)	2017/03
C. Li & the Juno/MWR science team, Ammonia in Jupiter's troposphere: first result from Juno Microwave Radiometer, 49 th AGU Fall Meeting, San Francisco	2016/12
C. Li , Water, ammonia and the 30-year cycle of Saturn's storm, Macau University of Science and Technology (Invited)	2016/01
C. Li , A story of Saturn's giant storms, Peking University (Invited)	2015/12
C. Li & A. Ingersoll, Saturn's giant storms: Moist convection in hydrogen atmospheres, 48 th AGU Fall Meeting, San Francisco (Invited)	2015/12
C. Li , Estimating water, ammonia and dynamics with inversions of Juno microwave data, Juno Science Meeting, JHU/APL	2015/11
C. Li & A. Ingersoll, Revisiting the Galileo Probe result by a stretched atmospheric model, 47 th DPS, Washington D.C.	2015/11
C. Li , Saturn's Giant Storms: Moist Convection in Hydrogen Atmospheres, Cassini PSG Meeting, Caltech/JPL	2015/10
C. Li & Y. Yung, Towards a complete understanding of hydrocarbon chemistry in the stratosphere of Titan: from C-1 to C-3, 46 th DPS, Tucson	2014/10
C. Li & A. Ingersoll, Moist convection in hydrogen atmospheres and the frequency of Saturn's giant storms, 47 th AGU Fall Meeting, San Francisco	2014/12
C. Li & A. Ingersoll, Modeling Saturn's giant storms, 45 th DPS, Denver	
C. Li & Y. Yung, Revision of photochemical modeling of Titan's atmosphere, 44 th DPS, Reno	2013/10 2012/10
C. Li & A. Ingersoll, Exploring the Giant Saturnian Storm in 2010: A Model of Moist Convection, 45 th AGU Fall Meeting, San Francisco	2012/12