

# CURRICULUM VITAE

Gongjie Li

Jan 2024

## CONTACT INFORMATION

School of Physics  
Georgia Institute of Technology  
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## RESEARCH INTERESTS

Formation and habitability of planetary systems (*e.g.*, *formation of hot Jupiters; dynamical interactions in compact planetary systems; stellar flybys in clusters; planetary spin dynamics and effects on glacier cycles*). Origin of gravitational wave sources, and dynamics of stars around supermassive black holes.

## EDUCATION

### Harvard University

*Ph.D.* in Astrophysics, 2010 - 2015  
Advisor: Abraham (Avi) Loeb  
Thesis Topic: Long-term dynamics of high mass ratio multiples

### California Institute of Technology

*B.S.* in Astrophysics, with honors, 2006 - 2010  
Advisor: Nicholas Z. Scoville; Academic advisor: E. Sterl Phinney

## POSITIONS

### Georgia Institute of Technology

Assistant Professor, School of Physics, Jan. 2018 -  
Courtesy faculty, School of Earth and Atmospheric Sciences, Nov. 2018 -

### Harvard University

Junior Fellow at the Society of Fellows, July 2015 - Dec. 2017

## HONORS AND AWARDS

**CTL/BP Junior Faculty Teaching Excellence Award**, Georgia Tech, 2023  
**Scialog Fellow**, Signatures of Life in the Universe Fellows, Research Corporation, 2021  
**Scialog Fellow**, Time Domain Astrophysics Fellows, Research Corporation, 2019  
**Thank a Teacher Certificate** for excellence in teaching, Georgia Tech, 2018, 2019, 2021, 2022  
**Eric R. Keto Prize** for PhD Thesis in Theoretical Astrophysics, Harvard University, 2015  
**Raynor L. Duncombe Prize**, AAS Division of Dynamical Astronomy Student Stipend Award, 2015  
**Philip Putnam Chase Memorial Fellowship**, Harvard University, 2011 - 2012  
**Acknowledgment by the Council on Undergraduate Research** in Recognition on Outstanding Achievement in Research, 2009  
**Upper Class Merit Award**, Caltech, 2009  
**Carnation Merit Award**, Caltech, 2008

## FUNDING

**NASA ATP**, "Debris Disk Morphology due to Stellar Encounters", **Role:** PI, total: \$523,145, 2020 - 2024  
**NASA SSW**, "Dynamical Processes in the Outer Solar System and Constraints on Undetected Planets", **Role:** PI, total: \$517,584.47, 2020 - 2024  
**William F. Milton Award**, research grant for selected voting faculty members and Junior Fellows, Harvard University, **Role:** PI, total: \$40,000, Harvard University, 2016-2017

## ADVISING

### *Postdoc:*

**Billy Quarles**, Georgia Tech, 2018 - 2021; Now Assistant Professor at Valdosta State University

### *Ph.D. Students:*

**Chen Chen**, Georgia Tech, 2020 -

**Nathan Moore**, Georgia Tech, 2018 - 2023

**Hareesh Bhaskar**, Georgia Tech, 2017 - 2023; Now postdoc at Technion - Israel Institute of Technology

**Renyi Chen** (Joint with M. Tao), Georgia Tech, 2018 - 2021; Now at Google

### *Undergraduate Students:*

**Nicholas Maldonado**, Georgia Tech, 2022 -

**Josh Brandt**, Georgia Tech, 2022 -

**Christian Faulhaber**, Johns Hopkins University, 2022 -

**Yashvardhan Tomar**, Georgia Tech, 2019 - 2022; Now Graduate student at Caltech

**Lee Hassenzahl**, Georgia Tech, 2019 - 2021; Software Engineer at Cognito Forms

**Yunlin Zeng**, UCSB, 2019 - 2020; Now graduate student at Georgia Tech

**Dennis Dong**, Georgia Tech, 2019; Now graduate student at Stanford

**Karthik Yadavalli**, Georgia Tech, 2018 - 2020; Now graduate student at Penn State

**Laura Duffy**, Georgia Tech, 2018 - 2019; Now graduate student at Penn State

**Ziqian Hong**, USTC, spring 2018; Now graduate student at Penn State

## SERVICES

### **In the community:**

Committee Member, American Astronomical Society (AAS) Division on Dynamical Astronomy (2019 - 2022)

Scientific Organizing Committee, Astrobiology Science Conference, American Geophysical Union (AGU) (2022)

Scientific Organizing Committee, TRiple EvolutioN and DYnamics 3 Conference (2021)

Duncombe Prize Selection Committee, AAS, Division on Dynamical Astronomy (2018)

Scientific Organizing Committee, International Astronomical Union (IAU) "Planetary Systems and Bioastronomy" Division Meeting (2018)

NSF review panel and external reviewer (2017, 2018, 2024)

NASA review panel and external reviewer (2015, 2016, 2018, 2020, 2021, 2023)

Referee for *Astronomy & Astrophysics*; *Astrophysical Journal*; *Astrophysics and Space Science*; *Celestial Mechanics and Dynamical Astronomy*; *Icarus*; *Monthly Notices of the Royal Astronomical Society*; *Nature Astronomy*; *Research in Astronomy and Astrophysics*; *Dynamics*

## SELECTED OUTREACH, DIVERSITY AND INCLUSION

- Invited talk at the Alpharetta Public Library in Atlanta "*Dynamical Formation and Habitability of Exoplanets*", 2022
- Invited talk at the Buckhead Public Library in Atlanta "*Interactions between stars and super-massive black holes*", 2019
- Invited open house talk at the Bradley Observatory "*A Song of Ice and Fire — Dynamics of Planets Hot and Cold*", 2018
- Panelist at the Dragon Conference (Atlanta Multigenre Convention) on "*Why on Earth? Searching for Origins and Life Here and Elsewhere*", 2018
- Career development discussions at Agnes Scott College (women's college), 2018
- Research advisor at Harvard Banneker Institute (summer program for students of color and other underrepresented groups), 2017
- Volunteer for Science Festival "*Cambridge Explores the Universe*" at CfA, 2012 and 2017
- Lecturer for event "*Mysteries of the Cosmos*" at Cambridge Citywide Senior Center, 2015
- Instructor for outreach event *Einstein in the Classroom* at Cambridge Rindge and Latin public high school, which is noted for diversity, 2015
- Volunteer for workshop *Astronomy for Everyone* for high school students with dyslexia, ADHD,

and autism spectrum disorders at ITC, CfA, 2014

#### TEACHING

Instructor for PHYS-3021 (Stellar Astrophysics) at Georgia Tech, 2024  
Instructor for PHYS-4417 (Relativity) at Georgia Tech, 2021, 2022, 2023  
Instructor for PHYS-8813 (Radiative Processes) at Georgia Tech, 2021  
Instructor for PHYS-3515 (Mathematical Methods) at Georgia Tech, 2020  
Instructor for PHYS-3201 (Classical Mechanics) at Georgia Tech, 2018, 2019, 2022  
Teaching Assistant for SPU30 (Life as a Planetary Phenomenon) at Harvard, 2014  
Teaching Assistant for Ay151 (Astrophysical Fluid Dynamics) at Harvard, 2012  
Teaching Assistant for Ay1 (The Evolving Universe) at Caltech, 2008, 2010

#### PUBLICATIONS

\*: *my students or postdocs*

*Total of 52 journal articles, 35 led by Li/Li's group*

1. Torres, S., Naoz, S., **Li, G** & Rose, S.C. Raining rocks: an analytical formulation for collision time-scales in planetary systems, *Monthly Notices of the Royal Astronomical Society* 524 (1), 1025-1030, 2023
2. \*Bhaskar, H. G, **Li, G** & Lin, D. N. C. Enhanced Blackhole mergers in AGN discs due to Precession induced resonances, *The Astrophysical Journal* 952 (2), 98, 2023
3. **Li, G**, Bhaskar, H.G, Kocsis, B. & Lin, D. N. C. Spin Variations of Black Hole Binaries in AGN Disks, *The Astrophysical Journal* 950 (1), 48, 2023
4. Faridani, T. H., Naoz, S., **Li, G** & Inzunza, N. Let's Sweep: The Effect of Evolving  $J_2$  on the Resonant Structure of a Three-planet System, *The Astrophysical Journal*, 956 (2), 90, 2023
5. \*Moore, N.G, **Li, G**, Hassenzahl, L., Nesvold, E. R., Naoz, S. & Adams, F.C. Formation History of HD 106906 and the Vertical Warping of Debris Disks by an External Inclined Companion, *The Astrophysical Journal* 943 (1), 6, 2023
6. Chen, H., **Li, G**, Paradise, A. & Kopparapu, R. K. Sporadic Spin-orbit Variations in Compact Multiplanet Systems and Their Influence on Exoplanet Climate, *The Astrophysical Journal Letters*, 946, 2, 2023
7. \*Zeng, Y. G, Brandt, T. D., **Li, G**, Dupuy, T. J., Li, Y., Brandt, G M., Farihi, J., Horner, J., Wittenmyer, R. A., Butler, R. P., Tinney, C. G., Carter, B. D., Wright, D. J., Jones, H. R. A., O'Toole S. J. The Gliese 86 Binary System: A Warm Jupiter Formed in a Disk Truncated at 2 AU, *The Astronomical Journal*, 164, 188, 2022
8. \*Chen, R., **Li, G** & Tao, M. *Low spin-axis variations of circumbinary planets*, *Monthly Notices of the Royal Astronomical Society*, 515 (4), 5175, 2022
9. Li, S., Ozkan-Aydin, Y., Xiao, C., Small, G., Gynai, H. N., **Li, G**, Rieser, J. M., Laguna, P., Goldman, D. I. *Field-mediated locomotor dynamics on highly deformable surfaces*, *Proceedings of the National Academy of Sciences*, 119, 30, 2022
10. \*Chen, C., **Li, G** & Petrovich, C. *Mutual Inclination of Ultra-short-period Planets with Time-varying Stellar  $J_2$  Moments*, *The Astrophysical Journal* 930 (1), 58, 2022
11. \*Bhaskar, H., **Li, G.** & Lin, D. N. C. *Blackhole Mergers Through Ejection Resonances*, *The Astrophysical Journal Letters*, 934, 141, 2022
12. \*Quarles, B., Li, G. & Lissauer J. J. *Milankovitch cycles for a circumstellar Earth-analogue within  $\alpha$  Centauri-like binaries*, *Monthly Notices of the Royal Astronomical Society*, 509, 2, 2022
13. \*Chen, R., **Li, G** & Tao, M. *GRIT: a package for structure-preserving simulations of gravitationally interacting rigid-bodies*, *The Astrophysical Journal* 919 (1), 50, 2021
14. \*Quarles, B., Eggl, S., Rosario-Franco, M. & **Li, G.** *Exomoons in Systems with a Strong Perturber: Applications to  $\alpha$  Cen AB*, *The Astronomical Journal* 162 (2), 58, 2021
15. **Li, G.** *Tilting Planets during Planet Scattering*, *The Astrophysical Journal Letters*, 915L, 2L, 2021
16. Arca Sedda, M., **Li, G.** & Kocsis, B. *Order in the chaos. Eccentric black hole binary mergers in triples formed via strong binary-binary scatterings*, *Astronomy & Astrophysics*, 650, A189, 26, 2021

17. \*Bhaskar, H., **Li, G.**, Hadden, S., Payne, M. J., & Holman, M. J. *Mildly Hierarchical Triple Dynamics and Applications to the Outer Solar System*, The Astronomical Journal, 161, 1, 48, 23, 2021
18. \*Quarles, B., **Li, G.** & Rosario-Franco, M. *Application of Orbital Stability and Tidal Migration Constraints for Exomoon Candidates*, The Astrophysical Journal Letters, 902 (1), L20, 2020
19. Becker, J., Batygin, K., Fabrycky, D. C., Adams, F. C., Li, G., Vanderburg, A., Rodriguez, J. E. *The Origin of Systems of Tightly Packed Inner Planets with Misaligned, Ultra-Short-Period Companions*, The Astronomical Journal 160 (6), 254, 2020
20. \*Karthik Yadavalli, S., \*Quarles, B., Li, G. & Haghighipour, N. *Effects of Flux Variation on the Surface Temperatures of Earth-like Circumbinary Planets*, Monthly Notices of the Royal Astronomical Society, 499, 1, 1506 2020
21. \*Moore, N. W. H., Li, G., & Adams, F. C. *Inclination Excitation of Solar System Debris Disk due to Stellar Flybys*, The Astrophysical Journal, 901, 92, 2020
22. Kostov, V. B., Welsh, W. F., Haghighipour, N., Quarles, B., Agol, E., Doyle, L., Fabrycky, D. C., **Li, G.**, Martin, D. V., Mills, S., Mazeh, Ts., Orosz, J. A., Powell, B. P. *Multiple Transits during a Single Conjunction: Identifying Transiting Circumbinary Planetary Candidates from TESS*, The Astronomical Journal, 160, 174, 2020
23. Kostov, V. B., Orosz, J. A., Feinstein, A. D., ... **Li, G.**, ... *TOI-1338: TESS?First Transiting Circumbinary Planet*, The Astronomical Journal, 159, 253, 2020
24. **Li, G.**, Dai, F. & Becker, J. *USP Mutual Inclination Excitation due to Stellar Oblateness*, The Astrophysical Journal Letters, 890, 31, 2020
25. Quarles, B.\* , **Li, G.**, Kostov, V. & Haghighipour, N. *Orbital Stability of Circumstellar Planets in Binary Stars*, The Astronomical Journal, 159, 80, 2020
26. Yang, H., Bonga, B., Peng, Z. & **Li, G.** *Relativistic Mean Motion Resonance*, PRD, 100, 12, 2019
27. Quarles, B.\* , **Li, G.** & Lissauer, J. *Obliquity Evolution of Circumstellar Planets in Sun-like Stellar Binaries*, The Astrophysical Journal, 886, 56, 2019
28. Hong, Z.\* , Quarles, B.\* , **Li, G.** & Orosz J. A. *Could there be an undetected inner planet near the stability limit in Kepler-1647?* The Astronomical Journal, 158, 8, 2019
29. Zeng, L., Jacobsen, S. B., Sasselov, D. D., Petaev, M. I., Vanderburg, A., Lopez-Morales, M., Perez-Mercader, J., Mattsson, T. R., **Li, G.**, Heising, M. Z., Bonomo, A. S., Damasso, M., Berger, T. A., Cao, H., Levi, A., & Wordsworth, R.D. *Growth Model Interpretation of Planet Size Distribution*, Proceedings of the National Academy of Sciences of the United States of America, 116 (20) 9723-9728, 2019
30. Gohil, R., Ballantyne, D. R., & **Li, G.** *The stellar remnants of high redshift nuclear starburst discs: a potential origin for nuclear star clusters?* Monthly Notices of the Royal Astronomical Society, 485, 2935, 2019
31. **Li, G.**, Hadden, S., Payne, M. J. & Holman, M. J. *The Secular Dynamics of TNOs and Planet Nine Interactions*, The Astronomical Journal, 156, 263, 2018
32. Hadden, S., **Li, G.**, Payne, M. J. & Holman, M. J. *Chaotic Dynamics of Trans-Neptunian Objects Perturbed by Planet Nine*, The Astronomical Journal, 155, 249, 2018
33. Shan, Y.\* & **Li, G.** *Obliquity Variations of Habitable Zone Planets Kepler 62-f and Kepler 186-f*, The Astronomical Journal, 155, 6, 2018
34. **Li, G.**, Ginsburg, I., Naoz, S. & Loeb, A. *Eclipsing Stellar Binaries in the Galactic Center*, The Astrophysical Journal, 851, 131, 2017
35. Naoz, S., **Li, G.**, Zanardi, M., De Elía, G. C. & Di Sisto, R. P. *The Eccentric Kozai-Lidov Mechanism for Outer Test Particle*, The Astronomical Journal, 154, 18, 2017
36. Zanardi, M., De Elía, G. C. Di Sisto, R. P., Naoz, S., **Li, G.**, Guilera, O. M., & Brunini, A. *Planetary Scattering Around Low-mass Stars: Formation and Evolution of Icy Body Reservoirs*, Astronomy & Astrophysics, 30411, 17, 2017

37. Sekhar, A., Asher, D., Werner, S., Vaubaillon, J., & **Li, G.** *Change in General Relativistic Precession Rates due to Lidov-Kozai oscillations in Solar System*, Monthly Notices of the Royal Astronomical Society, 468, 1405, 2017
38. **Li, G.**, Holman, M. & Tao, M. *Uncovering Circumbinary Planetary Architectural Properties from Selection Biases*, The Astrophysical Journal, 831, 1, 2016
39. **Li, G.** & Adams, F. *Interaction Cross Sections and Survival Rates for Proposed Solar System Member Planet Nine*, The Astrophysical Journal Letters, 823, 3, 2016
40. **Li, G.** & Winn, J. *Are Tidal Effects Responsible for Exoplanetary Spin-Orbit Alignment?* The Astrophysical Journal, 818, 5, 2016
41. Steffen, J. & **Li, G.** *Dynamical considerations for life in multihabitable planetary systems*, The Astrophysical Journal, 816, 97, 2016
42. **Li, G.**, Naoz, S., Kocsis, B. & Loeb, A. *Tidal Disruption Rate in Black Hole Binaries*, Monthly Notices of the Royal Astronomical Society, 451, 1341, 2015
43. Scoville, N., Faisst, A., Capak, P., Kakazu, Y., **Li, G.** & Steinhardt C. *Dust Attenuation in High Redshift Galaxies ‘Diamonds in the Sky’*, The Astrophysical Journal, 800, 108, 2015
44. **Li, G.** & Adams, F. *Cross Sections for Planetary Systems Interacting with Passing Stars and Binaries*, Monthly Notices of the Royal Astronomical Society, 448, 344, 2015
45. **Li, G.** & Batygin, K. *Pre-LHB Evolution of the Earth’s Obliquity*, The Astrophysical Journal, 795, 67, 2014
46. **Li, G.**, Naoz, S., Valsecchi, F., Johnson, J. & Rasio, F. *The Dynamics of the Multi-planet System Orbiting Kepler-56*, The Astrophysical Journal, 794, 131, 2014
47. **Li, G.**, Naoz, S., Holman, M. & Loeb, A. *Chaos in the Test Particle Eccentric Kozai-Lidov Mechanism*, The Astrophysical Journal, 791, 86, 2014
48. **Li, G.** & Batygin, K. *On the Spin-axis Dynamics of a Moonless Earth*, The Astrophysical Journal, 790, 69, 2014
49. **Li, G.**, Naoz, S., Kocsis, B. & Loeb, A. *Eccentricity Growth and Orbit Flip in Near-coplanar Hierarchical Three-body Systems*, The Astrophysical Journal, 785, 116, 2014
50. Psaltis, D., **Li, G.** & Loeb, A. *Deviation of Stellar Orbits from Test Particle Trajectories Around Sgr A\* Due to Tides and Winds*, The Astrophysical Journal, 777, 57, 2013
51. **Li, G.** & Loeb, A. *Accumulated Tidal Heating of Stars Over Multiple Pericenter Passages Near SgrA\**, Monthly Notices of the Royal Astronomical Society, 429, 3040, 2013
52. **Li, G.**, Kocsis, B & Loeb, A. *Gravitational Wave Heating of Stars and Accretion Disks*, Monthly Notices of the Royal Astronomical Society, 425, 2407, 2012

SELECTED  
COLLOQUIA,  
SEMINARS AND  
INVITED  
CONFERENCE  
TALKS

- “Day-Night and Seasonal Variations for Planets in Compact Systems”, Extreme Solar System, March. 2024
- “Mathematical Astrophysics Meeting”, Leinweber Center for Theoretical Physics at the University of Michigan, Aug. 2023
- Physics Colloquium, UCSB, March. 2023
- Astronomy Seminar, Northwestern University, Feb. 2023
- Astronomy Seminar, Cambridge University, Dec. 2022
- Astronomy Colloquium, University of Washington, Nov. 2022
- Astronomy Colloquium, Indiana University Bloomington, Sept. 2022
- Physics Colloquium, University of Kentucky, April 2021
- Astrophysics Seminar, University of Florida, Nov. 2020
- Astrophysical and Planetary Sciences Colloquium, University of Colorado Boulder, Nov. 2019
- Physics and Astronomy Colloquium, University of Georgia, Jan. 2019
- Astronomy Colloquium, University of California, Los Angeles, Nov. 2018
- Strong Gravity Seminar, Perimeter Institute, Oct. 2018
- Earth and Atmospheric Sciences Seminar, Georgia Tech, Oct. 2018
- Triple Evolution and Dynamics Trendy-2 Workshop, Leiden University, Sept. 2018

- Planet Nine Workshop, California Institute of Technology, May 2018
- Astronomy Colloquium, Agnes Scott College, April 2018
- Exoplanets and Planet Formation Conference, Shanghai, Dec. 2017
- Stellar Dynamics in Galactic Nuclei, Princeton IAS, Nov. 2017
- LUVOIR Seminar, Goddard Space Flight Center, Oct. 2017
- Astronomy Colloquium, California Institute of Technology, May 2017
- Colloquium, Center of Math Sciences and Applications, Harvard University, April 2017
- Astronomy Colloquium, University of Arizona, April 2017
- Seminar, University of Hawaii, Feb. 2017
- Astronomy Colloquium, University of Hawaii, Feb. 2017
- Seminar, Cornell University, Feb. 2017
- Astronomy Colloquium, Cornell University, Feb. 2017
- Physics Colloquium, Georgia Institute of Technology, Jan. 2017
- Physics Colloquium, Massachusetts Institute of Technology, Dec. 2016
- Center for Theory and Computation Lunch Talk, University of Maryland, Dec. 2016
- Dynamics and Chaos in Astronomy and Physics Lecture, Luchon, Sept. 2016
- Fellows at the Frontiers Conference, Northwestern, Sept. 2016
- APCosPA-Planet2 RESCEU Summer School Lecture, University of Tokyo, Aug. 2016
- RESCEU Colloquium, University of Tokyo, Aug. 2016
- CITA Seminar, University of Toronto, June 2016
- Thunch Talk, Princeton University, April 2016
- Astronomy Colloquium, University of Illinois at Urbana Champaign, March 2016
- Dynamics and Accretion at the Galactic Center Conference, Aspen winter conference, Feb. 2016

IN THE MEDIA  
(SELECTED)

“Earth isn’t the only planet with seasons, but they can look wildly different on other worlds” (2024)

Links: Scientific American, Conversation, phys.org, popular science

“More clues that Earth-like exoplanets are indeed Earth-like” (2018)

Links: Gatech press release, popular science, phys.org, Newsweek, International Business Times, Daily Mail, Forbes

“Planet Nine: A world that shouldn’t exist” (2016)

Links: CfA press release, Boston Globe, space.com, gizmodo.com

“Coupling Up May Make Life Possible on Other Planets” (2015)

Links: UNLV press release, cnn.com, space.com, gizmodo.com, newscientist.com

“Orbit Flips in Exoplanet Systems” (2014)

Links: CfA press release, scitechdaily.com

“Kepler 56: The Death of Two Exoplanets”, press conference at the 224th AAS conference meeting (2014)

Links: CfA press release, space.com, huffingtonpost.com, sciencesetavenir.fr, o.canada.com, abc.es, cnbeta.com

Video: AAS press release