

# Dr. Rixin Li

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## PROFESSIONAL APPOINTMENTS

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- **51 Pegasi b Postdoctoral Fellow** 08/2023 – Present  
Department of Astronomy, University of California, Berkeley
- **Postdoctoral Research Associate** 2020 – 2023  
The Cornell Center for Astrophysics and Planetary Science (CCAPS), Cornell University
- **NASA Earth and Space Science Graduate Research Fellow** 2016 – 2019  
Department of Astronomy, University of Arizona

## EDUCATION

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- Ph.D. in Astronomy & Astrophysics, University of Arizona 2014 – 2020  
Advisor: Andrew Youdin  
Thesis: *Simulating Planetesimal Formation in the Kuiper Belt and Beyond*
- B.Sc. in Astronomy, Peking University 2010 – 2014

## RESEARCH INTERESTS

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Planet formation; The solar system; Dynamics of exoplanets, dusty protoplanetary disks, object-disk interactions, and gravitational wave sources; Computational and theoretical astrophysics

## HONORS AND AWARDS

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- 51 Pegasi b Postdoctoral Fellowship, Heising-Simons Foundation (\$415k) 2023 – 2026  
**An additional \$138k can be easily applied as a new grant when I receive a faculty or permanent staff position, as stated in the award letter.**
- Director's Postdoctoral Fellowship, Los Alamos National Laboratory (\$220k, declined) 2023
- Departmental Scholarship Award, College of Science, University of Arizona 2020
- NASA Earth and Space Science Fellowship (NESSF), NASA (\$99k) 2016 – 2019
- Theoretical Astrophysics Program Small Matching Grants, U. of Arizona (\$1.5k) 2015
- College of Science Fellowship, University of Arizona (\$17k) 2014 – 2015
- Study Abroad Scholarship for Excellent Students, China Scholarship Council 2013
- First Lin-Qiao Prize for Excellent Undergraduate Research, Peking University 2012
- National Creative Research Fund for Undergraduate Research, Peking University 2012
- Scholarship for Outstanding Students, National Astronomical Observatories of China 2011

## SELECTED GRANTS AND PROGRAMS

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- **Sci PI:** 2023 – 2026 51 Pegasi b Fellowship, Heising-Simons Foundation (\$415k)  
*Toward a Coherent Picture of Planet Formation*
- **PI:** 2024 – 2025 ACCESS Allocation (PHY240264, 1.5 Million CPU Hours)  
*Late Formation of the Cold Classical Kuiper Belt*
- **Co-I:** ALMA Cycle 11 (2024.1.00902.S, PI: F. Long)  
*Connecting Inner and Outer Disks around Very Low Mass Objects*
- **Co-I:** NOIRLab 2024A (15.7 hours on WIYN/NEID, PI: C. Pittman)  
*Measuring the Propensity for In-Situ Terrestrial Planet Formation around Slowly-Accreting Stars*
- **Co-I:** ALMA Cycle 10 (2023.1.00946.S, PI: F. Long)  
*Tracing the Evolution of Substructures: A High-resolution Survey of Old Upper Sco Disks*
- **Co-I:** JWST Cycle 2 (GO-03153, PI: F. Long)  
*Why Do Some 50 Myr old Stars Still Accrete?*
- **Co-I:** ALMA Cycle 9 (2022.1.00646.S, PI: F. Long)  
*Tracing the Evolution of Substructures: A High-resolution Survey of Old Upper Sco Disks*
- **Co-I:** 2022 – 2023 ACCESS Allocation (AST120062, 29 Million CPU Hours, PI: J. Simon)  
*Numerical Simulations of Planetesimal Formation*

## SELECTED TALKS

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- 08/2024: **Invited** talk, *New Ideas on the Origin of Black Hole Mergers*, Niels Bohr Institute
- 08/2024: **Invited** talk, *2024 51 Pegasi b Summit*, San Francisco, CA, USA
- 06/2024: Seminar talk, Tsung-Dao Lee Institute
- 06/2024: **Invited** colloquium talk, Peking University
- 06/2024: **Invited** Seminar talk, Tsinghua University
- 04/2024: **Invited** IGPP Seminar talk, UC Santa Cruz
- 03/2024: **Invited** Seminar talk, CIERA/Northwestern University
- 01/2024: **Invited** colloquium talk, Xiamen University
- 12/2023: **Invited** talk, *RESCEU-NBIA Workshop on Gravitational-wave Sources*, Tokyo, Japan
- 11/2023: **Invited** seminar talks, the University of Michigan
- 11/2023: **Invited** talk, *TCAN Disk Hydro & Planet Formation Workshop*, University of Arizona
- 10/2023: **Invited** talk, *Bash Symposium 2023*, the University of Texas at Austin
- 08/2023: **Invited** talk, *2023 51 Pegasi b Summit*, San Francisco, CA, USA
- 05/2023: Seminar talk, *Astrophysics Coffee*, Institute for Advanced Study
- 04/2023: Seminar talk, *Exoplanet Lunch*, Princeton University

- 04/2023: Contributed talk, *Cornell Exoplanet Conference*, Cornell University
- 02/2023: **Invited** seminar talk, *Exoplanets & Stars Seminar*, Yale University
- 02/2023: **Invited** seminar talk, *Earth 2.0 Science Seminar Series* (virtual)
- 11/2022: **Invited** seminar talk, Center for Relativistic Astrophysics, Georgia Tech
- 11/2022: **Invited** seminar talk, Iowa State University (virtual)
- 07/2022: Contributed Talk, *OWL Exoplanet Summer Program*, UC Santa Cruz
- 06/2022: **Invited** talk, *Planets in the Desert - A Streaming Instability Code Comparison* (virtual)
- 06/2022: **Invited** seminar talk, The Center for Astrochemical Studies, MPE, Germany (virtual)
- 04/2022: **Invited** talk, *The 53rd DDA Meeting*, CCA, Flatiron Institute
- 04/2022: **Invited** discussion talk, *Stellar and Black Hole Binary Accretion and Evolution*, KITP
- 12/2021: Seminar talk, *Astrophysical Lunch*, CCAPS, Cornell University (virtual)
- 11/2020: Seminar talk, *Planetary Lunch*, CCAPS, Cornell University
- 12/2020: Seminar talk, *Origins Seminar*, University of Arizona (virtual)
- 11/2020: **Invited** talk, *Planetesimal Formation Meeting*, Lund University, Sweden (virtual)
- 10/2020: **Invited** talk, *Earth 2.0 Transit Survey Space Mission Science Meeting*, China (virtual)
- 01/2020: Contributed talk, *235th American Astronomical Society Meeting*, Hawaii
- 11/2019: **Invited colloquium** talk, New Mexico State University
- 07/2019: **Invited** talk, *Turbulence in PPDs Meeting*, Ringberg, Germany
- 07/2019: Seminar talk, *Planet and Star Formation Coffee*, MPIA, Germany
- 06/2019: Contributed talk, *From Star to Planet II*, Gothenburg, Sweden
- 05/2019: Contributed talk, *New Horizons in Planetary Systems*, Victoria, Canada
- 08/2017: Contributed talk, *Protoplanetary Disk Workshop*, Los Alamos National Lab
- 05/2017: Seminar talk, ITA, ZAH, University of Heidelberg, Germany

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## SELECTED SERVICES

- Referee for Nature Astronomy, AAS Journals (ApJ, ApJL), MNRAS, MNRAS Letters, Astronomy & Astrophysics, and Icarus, 15 papers in total
- Reviewer for 6 NASA panels, including Exoplanet Research Program (XRP), Emerging Worlds (EW), and FINESST Fellowship
- Panelist for *Hubble Space Telescope* and *James Webb Space Telescope* proposal reviews
- Organizing Committee Member for *Emerging Researchers in Exoplanetary Science 2023 & 2024* (See our *Bulletin of the AAS* article on [Lessons Learned in Conference Organization](#))
- Theoretical Astrophysics Center Seminars Committee Member at UC Berkeley, 2024 Spring & Fall
- External Member for 2023 Graduate Admission Committee, Cornell University

- Local Organizing Committee Member for *Star and Planet Formation in the Southwest 2* in 2018
- Steward Observatory *Astro-ph Science Coffee* discussion host for 2016 – 2019
- Discussion Leader for *Astro Code Coffee* at Steward Observatory in 2018

## TEACHING EXPERIENCE

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- Astronomy 7A, Fall 2023 — *Introduction to Astrophysics: Stars & Planets* UC Berkeley  
*Guest Lecturer* for a 90-min lower division class
- ASTRO 6531, Spring 2023 — *Astrophysical Fluid Dynamics* Cornell University  
*Guest Lecturer* for a 75-min graduate-level class
- ASTR 400B, Spring 2020 — *Galactic, Extra-Galactic Astronomy & Cosmology* U. of Arizona  
*Teaching Assistant* for Dr. Gurtina Besla  
Duties: Gave a 75-min *guest lecture*; Advised term projects; Grading; Led computational labs
- PHYS 105A, Fall 2015 — *Introduction to Scientific Computation* U. of Arizona  
*Teaching Assistant* for Dr. Philip Pinto and Dr. Andrew Youdin (two sessions)  
Duties: Grading; Led computational labs

## STUDENT MENTORING

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- Konstantin Gerbig, graduate student at Yale University  
*One student-led paper published, another one in preparation.*
- J. T. Laune, graduate student at Cornell University  
*One student-led paper published, another one in preparation.*
- Sabina Sagynbayeva, graduate student at Stony Brook University  
*One student-led paper submitted.*
- Yi-Xian Chen, graduate student at Princeton University (previously undergrad at Tsinghua Univ.)  
*Two student co-authored papers published.*

## SELECTED OUTREACH

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- Outreach talk: *Fun, Interactive, and Sharable Scientific Visualization* in 08/2023
- Fuertes Observatory Public Lecture Series in 03/2023: *The Story of Minor Planets*
- Member of the Cornell Astronomical Society, attending public viewing open house 2021 – 2023
- Member of Tucson Initiative for Minority Engagement in Science and TEchnology Program (TIMESTEP) for 2018 – 2020
- Senita Valley Elementary School Family Science Night in Tucson, AZ in 2015
- Volunteer at the International Astronomical Union 28th General Assembly, Beijing in 2012

## PUBLICATIONS

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9 first-author papers, 3 student-led papers, 25 total publications (Oct 2024).

h-index: 13; total citations: 1085 (ADS), 1186 (Google)

 ADS,  Google Scholar,  ORCID: 0000-0001-9222-4367

(\*: graduate/undergraduate student whom I mentored)

### First-author articles

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9. **Li, R.**, Chiang, E., Choksi, N., & Dai, F., *The Resonant Remains of Broken Chains from Major and Minor Mergers*, **2024**, arXiv:2408.10206, submitted to AJ
8. **Li, R.**, \*Chen, Y.-X., & Lin, D., *Dust Accumulation near the Magnetospheric Truncation of Protoplanetary Discs: II. The Effects of Dust Opacity*, **2024**, MNRAS, 529, 893
7. **Li, R.** & Lai, D., *Hydrodynamical Evolution of Black-Hole Binaries Embedded in AGN Discs: III. The Effects of Viscosity*, **2024**, MNRAS, 529, 348
6. **Li, R.** & Lai, D., *Hydrodynamical Evolution of Black-Hole Binaries Embedded in AGN Discs: II. Dependence on Equation of State, Binary Mass, and Separation Scales*, 2023, MNRAS, 522, 1881
5. **Li, R.** & Lai, D., *Hydrodynamical Evolution of Binaries embedded in Accretion Discs*, 2022, MNRAS, 517, 1602
4. **Li, R.**, \*Chen, Y.-X., & Lin, D., *Dust Accumulation near the Magnetospheric Truncation of Protoplanetary Discs around T Tauri Stars*, 2022, MNRAS, 510, 5246
3. **Li, R.** & Youdin, A., *Thresholds for Particle Clumping by the Streaming Instability*, 2021, ApJ, 919, 107
2. **Li, R.**, Youdin, A., & Simon, J., *Demographics of Planetesimals Formed by the Streaming Instability*, 2019, ApJ, 855, 69
1. **Li, R.**, Youdin, A. N., & Simon, J. B., *On the Numerical Robustness of the Streaming Instability: Particle Concentration and Gas Dynamics in Protoplanetary Disks*, 2018, ApJ, 862, 14

### Second- or third-author, including student-led articles

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11. Lim, J., Simon, J., **Li, R.**, Carrera, D., Baronett, S., Youdin, A., Lyra, W., & Yang, C.-C., *Probing Conditions for Strong Clumping by the Streaming Instability: Small Dust Grains and Low Dust-to-gas Ratio*, **2024**, arXiv:2410.17319, submitted to AAS Journals
10. \*Sagynbayeva, S., **Li, R.**, Kuznetsova, A., Zhu, Z., Jiang, Y.-F., & Armitage, P., *Circumplanetary Gas Disks are Rare: A Parameter Survey of Flow Morphology around Giant Planets*, **2024**, arXiv:2410.14896, submitted to AAS Journals
9. \*Laune, J. T., **Li, R.**, & Lai, D., *Migration of Accreting Planets and Black Holes in Disks*, **2024**, arXiv:2405.00296, accepted by ApJ, in press

8. Lim, J., Simon, J., **Li, R.**, Armitage, P., Carrera, D., Rea, D., & Youdin, A., *Streaming Instability and Turbulence: Conditions for Planetesimal Formation*, **2024**, ApJ, 969, 130L
7. \*Gerbig K. & **Li, R.**, *Planetesimal Initial Mass Functions following Diffusion Regulated Gravitational Collapse*, 2023, ApJ, 949, 81
6. Nesvorný, D., **Li, R.**, Simon, J., Youdin, A., Richardson, D., Marschall, R., & Grundy, W., *Binary Planetesimal Formation from Gravitationally Collapsing Pebble Clouds*, 2021, PSJ, 2, 27
5. Nesvorný, D., **Li, R.**, Youdin, A., Simon, J., & Grundy, W., *Trans-Neptunian Binaries as Evidence for Planetesimal Formation by the Streaming Instability*, 2019, **Nature Astronomy**, **3**, 808 (my simulation visualization was also featured on the issue cover)
4. Carrera, D., Simon, J., **Li, R.**, Kretke, K., & Klahr, H., *Protoplanetary Disk Rings as Sites for Planetesimal Formation*, 2021, AJ, 161, 96
3. Gole, D., Simon, J. B., **Li, R.**, Youdin, A., & Armitage, P., *Turbulence Regulates the Rate of Planetesimal Formation via Gravitational Collapse*, 2020, ApJ, 904, 132
2. Abod, C., Simon, J., **Li, R.**, Armitage, P., Youdin, A., Kretke, K., *The Mass and Size Distribution of Planetesimals Formed by the Streaming Instability. II. The Effect of the Radial Gas Pressure Gradient*, 2019, ApJ, 883, 192
1. Simon, J., Armitage, P., **Li, R.**, and Youdin, A., *The Initial Mass and Size Distribution of Planetesimals. I. The Role of Self-gravity*, 2016, ApJ, 822, 55

#### Other co-authored articles

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3. Long, F., Pascucci, I., Houge, A., Banzatti, A., Pontoppidan, K., Najita, J., Krijt, S., Xie, C., Williams, J., Herczeg, G., Andrews, S., Bergin, E., Blake, G., Colmenares, M., Harsono, D., Muñoz-Romero, C., **Li, R.**, Lu C., Pinilla P., Wilner D., Vioque M., Zhang K., *The First JWST View of a 40-Myr-old Protoplanetary Disk: the Late-stage Carbon-rich Phase*, **2024**, submitted to ApJL
2. Dai, F., Goldberg, M., Batygin, K., van Saders, J., Chiang, E., Choksi, N., **Li, R.**, Petigura, E., Gilbert, G., Millholland, S., Dai, Y.-Z., Bouma, L., Weiss, L., Winn, J., *The Prevalence of Resonance Among Young, Close-in Planets*, **2024**, arXiv:2406.06885, accepted by AJ, in press
1. Simon, J., Armitage, P., Youdin, A., and **Li, R.**, *Evidence for Universality in the Initial Planetesimal Mass Function*, 2017, ApJL, 847, 12

#### Published open source softwares in Astrophysics Source Code Library

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2. Rubble: *Simulating Dust Size Distributions in Protoplanetary Disks*, 2021, ascl:2109.011
1. PLAN: *A Clump-finder for Planetesimal Formation Simulations*, 2019, ascl:1911.001