Clarissa Rizzo C. Do Ó, PhD

B. Thomas Soifer Postdoctoral Fellow · California Institute of Technology
cdoo@caltech.edu · GitHub · Website · SciX

Education

- **University of California, San Diego** 2020–2025
  PhD, Physics (2025); MS, Physics (2023). Advisor: Quinn Konopacky.
- **University of California, Santa Barbara** 2016–2020
  BS, Physics (Honors); minor in Astronomy and Planetary Science.

Research Appointments

📎 published; 📎 in review; 📎 in prep. Each clip represents one paper from that appointment.

- **California Institute of Technology** 2025–present
  B. Thomas Soifer (EXP) Postdoctoral Fellow. 📎📎📎📎 (1 published; 1 in review; 2 in prep).
- **University of California, San Diego** 2020–2025
  NSF Graduate Research Fellow and San Diego Fellow. 📎📎📎📎📎 (5 published).
- **Lockheed Martin, Test Engineer Intern** 2020
- **Caltech/NASA JPL SURF Fellow** 2019
- **UCSB Edison Scholar** 2018

Research, Technical, and Public Leadership

- **Coronagraphy and wavefront control.** Developed the first closed loop pointing controller using light reflected directly from a vector vortex coronagraph on Caltech's HCST. Suppressed low-frequency drift by more than two orders of magnitude and maintained contrast during a one-hour test (Do Ó et al. 2026). A funded L'Oréal project extends this architecture to Zernike wavefront sensing.
- **Gaia astrometry and orbit fitting software.** Identified 29 known exoplanet systems with plausible outer companion signals using G23H astrometry and published radial velocity and imaging constraints (Do Ó et al., submitted). Lead developer of *orbitize!* v4's Gaia DR4 module for orbit fitting.
- **Roman reflected light observation planning.** Developed an orbit-to-observability framework that propagates orbital posteriors through phase-dependent brightness and instrument response to predict planet position and contrast. Co-led its use in Roman Coronagraph observation planning.
- **Orbital dynamics.** Fit the orbits of 21 directly imaged companions with observable-based priors; combined imaging astrometry and spectroscopic radial velocities to refine orbital architectures; connected hydrodynamic simulations and long-term integrations to explain the stability of PDS 70's two giant planets.
- **Science communication.** I explain exoplanet science and demystify paths into research for an audience of **440,000+ followers** on Instagram and TikTok.

Fellowships, Grants, and Honors

>$615,000 in fellowship, grant, and award support.

- **L'Oréal For Women in Science Grant** 2026
- **UC San Diego Dean's Dissertation Award** 2026
- **B. Thomas Soifer (EXP) Postdoctoral Fellowship, Caltech** 2025
- **ExoPAG 31 Travel Grant** 2024
- **SPIE Astronomical Telescopes + Instrumentation Travel Grant** 2024
- **Carol and George Lattimer Award for Graduate Excellence** 2023
- **NASA ExoExplorers Award** 2023
- **School of Physical Sciences Cohort Program Mentorship Award, UC San Diego** 2022
- **National Science Foundation Graduate Research Fellowship (NSF GRFP)** 2020
- **San Diego Fellowship** 2020
- **UC San Diego Physics Excellence Award** 2020
- **Caltech Summer Undergraduate Research Fellowship (SURF)** 2019
- **Edison GRE Scholarship** 2019
- **Edison Summer Research Program Scholarship** 2018
- **Starting Lines Essay Publication Prize, UC Santa Barbara** 2018

Observing and Collaborations

- Roman Coronagraph Community Participation Program and Project Science Team (2025–present).
- Keck/KPIC Science Team (2023–present).
- GPI 2.0 Science and Instrument Team (2020–present).
- Co-I: JWST Cycle 4 GO 8063 (59 hr); Keck KPIC (3 nights), Keck NIRC2 (6 nights), and Palomar PARVI (6 nights).

Publications

37 publications: 16 journal articles and 21 conference proceedings, including six first author publications. Five additional manuscripts are available as preprints, including one first author manuscript submitted to *AJ*. Full record on SciX.
h-index = 11, with 296 total citations (SciX, November 14, 2026).

First Author Publications

1. **Do Ó, C. R.**, Sjoberg, K., Lamitina, L., et al. (2026). Laboratory demonstration of low order wavefront control using light reflected off the vortex coronagraph. *Proc. SPIE*, 14145, 141456D.
2. **Do Ó, C. R.**, Bae, J., Konopacky, Q. M., et al. (2025). On the Orbital Evolution of Multiple Wide Super-Jupiters: How Disk Migration and Dispersal Shape the Stability of the PDS 70 System. *ApJ*, 995, 190.

3. **Do Ó, C. R.**, Perera, S., Maire, J., et al. (2024). GPI 2.0: exploring the impact of different readout modes on the wavefront sensor's EMCCD. *Proc. SPIE*, 13097, 1309742.
4. **Do Ó, C. R.**, Sappey, B., Konopacky, Q. M., et al. (2024). Orbital and Atmospheric Characterization of the 1RXS J034231.8+121622 System Using High-Resolution Spectroscopy Confirms That the Companion Is a Low-Mass Star. *AJ*, 167, 278.
5. **Do Ó, C. R.**, O'Neil, K. K., Konopacky, Q. M., et al. (2023). The Orbital Eccentricities of Directly Imaged Companions Using Observable-Based Priors: Implications for Population-level Distributions. *AJ*, 166, 48.
6. **Do Ó, C. R.**, Perera, S., Maire, J., et al. (2023). GPI 2.0: Performance Evaluation of the Wavefront Sensor's EMCCD. *Adaptive Optics for Extremely Large Telescopes 7*, paper 44.

First Author Manuscript in Review

7. **Do Ó, C. R.**, Thompson, W., Blakely, D., et al. (2026). Astrometric Evidence for Outer Giant Planets in Known Exoplanet Systems. Submitted to *AJ*; arXiv:2609.37160.

Coauthored Journal Articles

8. Llop-Sayson, J., Fogal, A., Mang, J., et al. (2026). An Updated Model for ϵ Eridani b and Prospects for Imaging with the Roman Coronagraph. *AJ*, 172, 292.
9. Gibbs, A., Ruffio, J.-B., Bidot, A., et al. (2026). Discovery of an Exterior Third Planet Orbiting β Pictoris. *ApJL*, 1006, L11.
10. Sappey, B., Konopacky, Q., **Do Ó, C. R.**, et al. (2025). HD 206893 B at High Spectral Resolution with the Keck Planet Imager and Characterizer. *AJ*, 169, 175.
11. Hsu, C.-C., Wang, J. J., Blake, G. A., et al. (2024). PDS 70b Shows Stellar-like Carbon-to-oxygen Ratio. *ApJL*, 977, L47.
12. Horstman, K., Ruffio, J.-B., Batygin, K., et al. (2024). RV Measurements of Directly Imaged Brown Dwarf GQ Lup B to Search for Exosatellites. *AJ*, 168, 175.
13. Zhang, Y., Xuan, J. W., Mawet, D., et al. (2024). Atmospheric Characterization of the Super-Jupiter HIP 99770 b with KPIC. *AJ*, 168, 131.
14. Blunt, S., Wang, J., Hirsch, L., et al. (2024). *orbitize!* v3: Orbit Fitting for the High-contrast Imaging Community. *JOSS*, 9, 6756.
15. Crotts, K. A., Matthews, B. C., Duchêne, G., et al. (2024). A Uniform Analysis of Debris Disks with the Gemini Planet Imager. I. An Empirical Search for Perturbations from Planetary Companions in Polarized Light Images. *ApJ*, 961, 245.
16. Xuan, J. W., Wang, J., Finnerty, L., et al. (2024). Validation of Elemental and Isotopic Abundances in Late-M Spectral Types with the Benchmark HIP 55507 AB System. *ApJ*, 962, 10.
17. Thompson, W., Lawrence, J., Blakely, D., et al. (2023). Octofitter: Fast, Flexible, and Accurate Orbit Modeling to Detect Exoplanets. *AJ*, 166, 164.
18. Maire, A.-L., Delrez, L., Pozuelos, F. J., et al. (2023). Workshop Summary: Exoplanet Orbits and Dynamics. *PASP*, 135, 106001.

19. Xin, Y., Xuan, J. W., Mawet, D., et al. (2023). On-sky speckle nulling through a single-mode fiber with the Keck Planet Imager and Characterizer. *JATIS*, 9, 035001.
20. Thompson, W., Marois, C., **Do Ó, C. R.**, et al. (2023). Deep Orbital Search for Additional Planets in the HR 8799 System. *AJ*, 165, 29.

Coauthored Conference Proceedings

21. Wang, J. J., Millar-Blanchaer, M. A., Ygouf, M., et al. (2026). The Roman Coronagraph Community Participation Program: data reduction pipeline design and implementation. *Proc. SPIE*, 14145, 141450X.
22. Lannon, G., Chilcote, J., Konopacky, Q. M., et al. (2026). GPI 2.0: detector status and potential new data analysis method for the Gemini Planet Imager. *Proc. SPIE*, 14149, 141494V.
23. Choudhary, S., **Do Ó, C. R.**, & Savransky, D. (2026). Improving the efficiency of dynamic completeness calculations for exoplanet direct imaging. *Proc. SPIE*, 14145, 141455W.
24. Wolff, N., Nguyen, J. S., Macintosh, B., et al. (2026). GPI 2.0: simulated performance of the AO upgrade. *Proc. SPIE*, 14150, 141507Q.
25. Mawet, D., Redmond, S. F., **Do Ó, C. R.**, et al. (2026). Advancing the apodized vortex coronagraph toward Habitable Worlds Observatory requirements. *Proc. SPIE*, 14145, 1414522.
26. Soummer, R., Laginja, I., Por, E. H., et al. (2026). CATKit2-HCI: a collaborative framework for advancing high-contrast coronagraph testbeds. *Proc. SPIE*, 14145, 1414564.
27. Anche, R. M., Mizuki, T., Hom, J., et al. (2026). The Roman Coronagraph Community Participation Program: observation planning and data reduction for polarimetric mode. *Proc. SPIE*, 14145, 141454V.
28. Wolff, S. G., Bailey, V. P., Hom, J., et al. (2026). The Roman Coronagraph Community Participation Program: trials and triumphs of designing an observing program for a technology demonstration instrument. *Proc. SPIE*, 14145, 141450U.
29. Girard, J. H., Cady, E., Zimmerman, N. T., **Do Ó, C. R.**, et al. (2026). The Roman Coronagraph Community Participation Program: early calibration plan and pilot observation of a companion. *Proc. SPIE*, 14145, 141450W.
30. Perera, S., Maire, J., **Do Ó, C. R.**, et al. (2024). GPI 2.0: pre-integrated pyramid wavefront sensor results. *Proc. SPIE*, 13097, 130971S.
31. Chilcote, J., Konopacky, Q., Hamper, R., et al. (2024). GPI 2.0: upgrade status of the Gemini Planet Imager. *Proc. SPIE*, 13096, 1309699.
32. Perera, S., Chilcote, J., Konopacky, Q., et al. (2023). Upgrading the Gemini Planet Imager to GPI 2.0. *Proc. SPIE*, 12680, 1268001.
33. Peng, D., Chilcote, J., Konopacky, Q., et al. (2023). Testing and performance of IFS upgrades for GPI 2.0. *Proc. SPIE*, 12680, 126801Y.

34. Xin, Y., Xuan, J. W., Mawet, D., et al. (2023). On-sky speckle nulling through a single-mode fiber with the Keck Planet Imager and Characterizer. *Adaptive Optics for Extremely Large Telescopes 7*, paper 7.
35. Spalding, E., **Do Ó, C. R.**, Peng, D., et al. (2022). GPI 2.0: baseline testing of the Gemini Planet Imager before the upgrade. *Proc. SPIE*, 12184, 1218448.
36. Peng, D., Curliss, M., Limbach, M. A., et al. (2022). GPI 2.0: performance of upgrades to the Gemini Planet Imager CAL and IFS. *Proc. SPIE*, 12184, 1218443.
37. Perera, S., Maire, J., **Do Ó, C. R.**, et al. (2022). GPI 2.0: pyramid wavefront sensor status. *Proc. SPIE*, 12185, 121854C.
38. Chilcote, J., Konopacky, Q., Fitzsimmons, J., et al. (2022). GPI 2.0: upgrade status of the Gemini Planet Imager. *Proc. SPIE*, 12184, 121841T.

Coauthored Preprints

39. Thompson, W., Bouchard-Côté, A., Blakely, D., et al. (2026). The Brown Dwarf Desert is a Mass-Ratio Desert: Astrometric Demographics of 63,254 Stars. Submitted to *ApJL*; arXiv:2611.12881.
40. Thompson, W., et al. (2026). Joint Gaia-Hipparcos astrometry, RV, and Imaging posteriors from the G23H Hipparcos sample. Submitted to *ApJS*; arXiv:2611.12841.
41. Yahalomi, D. A., Price-Whelan, A. M., Speedie, J., et al. (2026). Preparing for the Gaia DR4 Epochalypse: Simulated Epoch Astrometry for Substellar Companion Orbit-Modeling Benchmarks. Submitted to AAS journals; arXiv:2611.06915.
42. Nguyen, J. S., Desdoigts, L., Greenbaum, A. Z., et al. (2026). A Candidate Innermost Fifth Planet in the HR 8799 System Revealed by JWST NIRISS Aperture Masking Interferometry. Submitted to *ApJ*; arXiv:2609.10507.

Presentations

27 presentations: 12 invited talks, 6 contributed talks, and 9 posters. Selected invited talks:

- **UCLA Astronomy Thursday Seminar** 2026
  Exoplanet Orbits as Probes of Planet Formation, Evolution, and Detection Prospects
- **University of Florida Astronomy Seminar** 2025
  Constraining the Formation of Directly Imaged Exoplanets Using their Orbital Architectures
- **Stanford KIPAC Tea Talk** 2024
  Constraining the Formation of Directly Imaged Exoplanets Using Orbit Fitting Techniques
- **NASA Jet Propulsion Laboratory** 2024
  Constraining the Formation of Directly Imaged Exoplanets Using Instrumentation and Orbit Fitting Techniques
- **Space Telescope Science Institute; NASA Ames Research Center** 2023
  Constraining the Formation of Directly Imaged Exoplanets Using Instrumentation and Orbit Fitting Techniques

Mentorship and Service

- **Research mentorship.** Mentor to four undergraduate researchers at Caltech, UC San Diego, UCLA, and Trinity College Dublin (2024–present); Caltech SURF mentor (2026); STARTastro mentor (2024–2025).
- **Community leadership.** Co-organizing a summer career day for students to interact with established scientists in a diversity of careers. Co-organized Cosmic Tours planetarium shows (2022–2025); served on the NYRIA 2024 and Cool Stars 22 local organizing committees; wrote for Astrobites and Astropontos (2022–2023). Founder and president of the Brazilian Student Association at UCSB (2018–2020).