Clarissa Rizzo Credidio Do Ó

Physics Ph.D. Candidate and NSF Fellow, UC San Diego

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Research Interests: Exoplanets, Astronomical Instrumentation, Orbit Determination and Dynamics, High Contrast Imaging, Adaptive Optics, Wavefront Sensing, High Resolution Spectroscopy, Protoplanetary Disks

🎓 Education

University of California, San Diego	September 2020 – Expected 2025
Physics, Ph.D.	*San Diego, CA*
University of California, San Diego	September 2020 – February 2023
Physics, M.S. - GPA 3.95	*San Diego, CA*
University of California, Santa Barbara	September 2016 – June 2020
Physics, B.S. (Honors) - Minor in Astronomy and Planetary Science	*Santa Barbara, CA*

💼 Research and Work Experience

University of California, San Diego — September 2020 – Present
NSF Graduate Research Fellow and Ph.D. Candidate (Advisor: Prof. Quinn Konopacky) — *San Diego, CA*

» Analyzed high resolution spectroscopy data from the Keck Planet Image Characterizer (KPIC) using Python in order to understand the atmosphere and orbit of the 1RXS0342+1216 binary star system.

» Wrote a Python data reduction pipeline to reduce directly imaged exoplanet data from the NIRC2 camera on the W. M. Keck Observatory.

» Analyzed the distribution of exoplanet eccentricities at a population level using observable-based priors and Bayesian statistics.

» Tested and characterized the EMCCD camera for the Gemini Planet Imager 2.0's (GPI 2.0) new pyramid wavefront sensor using a variety of optical set-ups along with C++ and Python.

» Simulated the dynamics and stability of the HR-8799 exoplanet system using NIRC2 data from the Keck II Telescope and N-body simulations in Python.

Lockheed Martin — January 2020 – September 2020
Test Engineer Intern — *Santa Barbara, CA*

» Wrote MATLAB scripts to automate the testing process of infrared focal plane arrays (FPAs) and used these scripts to test parts.

» Used Object-Oriented programming in MATLAB to automate scripts for analyzing telegraph noise on infrared focal plane arrays.

NASA Jet Propulsion Laboratory — June 2019 – September 2019
Astrophysics Research Intern (Mentor: Dr. Gautam Vasisht) — *Pasadena, CA*

» Worked on the commissioning of the Palomar Radial Velocity Instrument (PARVI), a high-resolution spectrograph on Palomar Observatory

» Wrote programs to predict the instrument's photon throughput, and performed photometry and spectrophotometry on data to compare my projections to the actual throughput.

» Performed simulations to analyze how the single-mode fiber optics coupling efficiency changes as we introduce optical aberrations into the system.

University of California, Santa Barbara — June 2018 – June 2020
Undergraduate Researcher (Advisor: Prof. Ben Mazin) — *Santa Barbara, CA*

» Designed and developed a database for the Mazin Lab, an astrophysics laboratory that uses Microwave Kinetic Inductance Technology to directly image extrasolar planets. The database is a website currently available on the laboratory's server.

» Wrote a program that corrected cosmic ray incidents for the new device developed by the lab (MEC - MKID Exoplanet Camera).

» Performed post-processing (angular differential imaging and spectral differential imaging) and made contrast curves on MEC data.

🏆 Awards, Grants and Honors

SPIE Astronomical Telescopes+Instrumentation Travel Grant	April 2024
Carol and George Lattimer Award for Graduate Excellence	February 2023
NASA ExoExplorers Award	January 2023
The School of Physical Sciences Cohort Program Mentorship Award at UCSD	September 2022
National Science Foundation Graduate Research Fellowship (NSF GRFP)	March 2020
San Diego Fellowship	March 2020

Caltech SURF (Summer Undergraduate Research Fellowship)	June 2019
Edison GRE Scholarship	May 2019
Edison Summer Research Program Scholarship	June 2018
Starting Lines Essay Publication Prize at UCSB	January 2018

</> Programming Languages and Skills

Python *Proficient*	**MATLAB** *Proficient*	**Linux** *Proficient*	**C/C++** *Beginner*

💼 Teaching, Service and Outreach

NYRIA Workshop 2024   December 2023 – Present
Local Organizing Committee Member   *San Diego, CA*
» Write funding proposals for local and national funding agencies to host a workshop at UC San Diego
» Participated in the organizing of lodging and schedule for the workshop

Cosmic Tours   May 2022 – Present
Organizer and Volunteer   *San Diego, CA*
» The UCSD Cosmic Tours are short planetarium shows given on a portable planetarium for K-12 schools and other outreach events.
» Set up, run and operate a portable planetarium for outreach shows in the San Diego area.
» Engage with the local school community in order to organize the planetarium schedule.

Astrobites   January 2022 – December 2023
Author   *Online Website*
» Wrote summaries of astro-ph papers from the arXiv and outreach articles for astrobites.org, funded by AAS
» Translated posts to Astropontos, Astrobites' sister website in Portuguese.

Cool Stars 22   June 2024
Local Organizing Committee Member   *San Diego, CA*
» Volunteered for a variety of tasks during Cool Stars 22 (e.g. A/V assist, headcounts for excursions, front desk organization)

Cohort Mentoring Program at UCSD   September 2022 – June 2023
Mentor   *San Diego, CA*
» Tutored underrepresented UCSD undergraduate students in their homework and school work.
» Guided students on graduate school and internship applications.

Physics 164 (Observational Astrophysics Lab at UCSD)   January 2022 – March 2022
Teaching Assistant   *San Diego, CA*
» Taught Students how to analyze astronomical data in Python.
» Operated and observed with the Lick Observatory's Nickel Telescope

📑 Presentations

Invited Talks:

1. "Constraining the Formation of Directly Imaged Exoplanets Using Instrumentation and Orbit Fitting Techniques" - **UCLA Lunch Seminar Series** (April 2024, Los Angeles, CA)

2. "Constraining the Formation of Directly Imaged Exoplanets Using Instrumentation and Orbit Fitting Techniques" - **NASA Jet Propulsion Laboratory Lunch Seminars** (April 2024, Pasadena, CA)

3. "Constraining the Formation of Directly Imaged Exoplanets Using Instrumentation and Orbit Fitting Techniques" - **Space Telescope Science Institute ESPF Seminar** (October 2023, Baltimore, MD)

4. "Constraining the Formation of Directly Imaged Exoplanets Using Instrumentation and Orbit Fitting Techniques" - **NASA Ames Research Center Seminar** (May 2023, Santa Clara, CA)

5. "At the Edge of Chaos: The Dynamics of Directly Imaged Exoplanet Systems" - **iTelescope Webinar** (May 2023, Online)

Contributed Talks:

1. "Constraining the Formation of Directly Imaged Exoplanets by Upgrading the Gemini Planet Imager (GPI)'s Wavefront Sensor" - **NASA ExoExplorers Talks** (April 2023, Online)

2. "Upgrading the Gemini Planet Imager 2.0's Wavefront Sensor" - **NYRIA Workshop** (November 2022, Sarcedo, Italy)

3. "The Palomar Radial Velocity Instrument's commissioning" - **NASA JPL Intern Talks** (July 2019, Pasadena, CA)

Posters:

1. "Orbital and Atmospheric Characterization of the 1RXS J034231.8+121622 System Using High-Resolution Spectroscopy Confirms That The Companion is a Low-Mass Star"" - **Cool Stars 22** (June 2024, San Diego, CA)

2. "GPI 2.0: GPI 2.0: Exploring The Impact of Different Readout Modes on the Wavefront Sensor's EMCCD" - **SPIE Astronomical Telescopes+Instrumentation** (June 2024, Yokohama, Japan)

3. "The Orbital Eccentricities of Directly Imaged Companions Using Observable-Based Priors: Implications for Population-level Distributions" - **Keck Science Meeting** (September 2023, Berkeley, CA)

4. "GPI 2.0: performance evaluation of the wavefront sensor's EMCCD" - **AO4ELT Conference** (June 2023, Avignon, France)

5. "The Orbital Eccentricities of Directly Imaged Companions Using Observable-Based Priors: Implications for Population-level Distributions" - **Keck Science Meeting** (September 2022, Pasadena, CA)

6. "GPI 2.0: performance evaluation of the wavefront sensor's EMCCD" - **SPIE Astronomical Telescopes & Instrumentation** (July 2022, Montreal, Canada)

7. "The Orbital Eccentricities of Directly Imaged Companions Using Observable-Based Priors: Implications for Population-level Distributions" - **Spirit of Lyot Conference** (June 2022, Leiden, Netherlands)

8. "A Database for the Stars Observed by the Mazin Lab using MKID Technology" - **APS' Conference for Undergraduate Women in Physics** (January 2019, Santa Barbara, CA)

9. "A Database for the Stars Observed by the Mazin Lab using MKID Technology" - **UCSB Undergraduate Research Colloquium** (August 2018, Santa Barbara, CA)

🖹 Publications

First Author:

1. **Clarissa R. Do Ó**, Ben Sappey, Quinn M. Konopacky, et al. "Orbital and Atmospheric Characterization of the 1RXS J034231.8+121622 System Using High-Resolution Spectroscopy Confirms That The Companion is a Low-Mass Star", The Astronomical Journal, Volume 167, Issue 6, id.278, 24 pp. (May 2024)

2. **Clarissa R. Do Ó**, Kelly K. O'Neil, Quinn M. Konopacky, et al. "The Orbital Eccentricities of Directly Imaged Companions Using Observable-Based Priors Implications for Population-level Distributions", The Astronomical Journal, Volume 166, Issue 2, id.48, 22 pp. (July 2023)

3. **Clarissa R. Do Ó**, Saavidra Perera, Jêrome Máire, et al. "GPI 2.0: GPI 2.0: Exploring The Impact of Different Readout Modes on the Wavefront Sensor's EMCCD", Proceedings of the SPIE Astronomical Telescopes+Instrumentation 2024 (July 2024)

4. **Clarissa R. Do Ó**, Saavidra Perera, Jêrome Máire, et al. "GPI 2.0: performance evaluation of the wavefront sensor's EMCCD", Adaptive Optics for Extremely Large Telescopes 7th Edition, ONERA, Jun 2023, Avignon, France. ⟨10.13009/AO4ELT7-2023-045⟩. ⟨hal-04419969⟩ (October 2023)

Significant Contributions:

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1. Ben Sappey, Quinn M. Konopacky, **Clarissa R. Do Ó**, et al. "HD 206893 B at High Spectral Resolution using KPIC/NIRSPEC", in prep

2. William Thompson, Christian Marois, **Clarissa R. Do Ó**, et al. "Deep orbital search for additional planets in the HR 8799 system", The Astronomical Journal, Volume 165, Issue 1, id.29, 20 pp. (2023)

3. Saavidra Perera, Jeffrey Chilcote, Quinn M. Konopacky, et al. (including **Clarissa Do Ó**), et al. "Upgrading the Gemini planet imager to GPI 2.0", Proceedings of the SPIE 12680, Techniques and Instrumentation for Detection of Exoplanets XI, 1268001 (2023)

4. Saavidra Perera, Jêrome Máire, **Clarissa R. Do Ó**, et al. "GPI 2.0: Pyramid Wavefront Sensor Status", Proceedings of the SPIE, Volume 12185, id. 121854C 7 pp. (2022)

5. Eckhart Spalding, **Clarissa Do Ó**, Dillon Peng, et al. "GPI 2.0: Baseline testing of the Gemini Planet Imager before the upgrade", Proceedings of the SPIE, Volume 12184, id. 1218448 11 pp. (2022)

N-th Author:

1. Dillon Peng, Maeve Curliss, et al. (including **Clarissa Do Ó**). "GPI 2.0: performance of upgrades to the Gemini Planet Imager CAL and IFS", Proceedings of the SPIE, Volume 12184, id. 1218443 9 pp. (2022)

2. Jeffrey Chilcote, Quinn M. Konopacky, et al. (including **Clarissa Do Ó**). "GPI 2.0: upgrade status of the Gemini Planet Imager", Proceedings of the SPIE, Volume 12184, id. 121841T 15 pp. (2022)

3. Katelyn Horstman, Jean-Baptiste Ruffio, et al. (including **Clarissa R. Do Ó**). "RV measurements of directly imaged brown dwarf GQ Lup B to search for satellites", submitted to AJ

4. Jerry W. Xuan, Jason Wang, et al. (including **Clarissa R. Do Ó**). "Validation of Elemental and Isotopic Abundances in Late-M Spectral Types with the Benchmark HIP 55507 AB System", The Astrophysical Journal, Volume 962, Issue 1, id.10, 21 pp. (2024)

5. Katie A. Crotts, Brenda C. Matthews, et al. (including **Clarissa R. Do Ó**). "A Uniform Analysis of Debris Disks with the Gemini Planet Imager. I. An Empirical Search for Perturbations from Planetary Companions in Polarized Light Images", The Astrophysical Journal, Volume 961, Issue 2, id.245, 35 pp. (2024)

6. William Thompson, Jensen Lawrence, et al. (including **Clarissa R. Do Ó**). "Octofitter: Fast, Flexible, and Accurate Orbit Modeling to Detect Exoplanets", The Astronomical Journal, Volume 166, Issue 4, id.164, 20 pp. (2023)

7. Anne-Lise Marie, Laetitia Derez, et al. (including **Clarissa Do Ó**). "Workshop Summary: Exoplanet Orbits and Dynamics", Publications of the Astronomical Society of the Pacific, Volume 135, Issue 1052, id.106001, 17 pp. (2023)

8. Yinzi Xin, Jerry W. Xuan, et al. (including **Clarissa Do Ó**). "On-sky speckle nulling through a single-mode fiber with the Keck Planet Imager and Characterizer", July 2023, Journal of Astronomical Telescopes, Instruments, and Systems, Volume 9, id. 035001 (2023).

💬 Languages

English *Fluent*	**Portuguese** *Fluent*	**Spanish** *Proficient*	**German** *Advanced Beginner*