

Ryan Clairmont

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EDUCATION

Stanford- Physics Major

September 2022 - Present

EXPERIENCE

Undergraduate Medical Physics Researcher | Stanford Levin Lab

Mar 2025 - Present

- Researching optical modulation detection in medical PET (Positron Emission Tomography) as an alternative to scintillation detection, which speeds up detection by an order of magnitude
- Researching Dicke superradiance for implementation in PET scintillator crystals
- Set up lab from scratch and working on the optical beamline

Undergraduate Physics Researcher | Stanford Kasevich Lab

Oct 2023 - Mar 2025

- Researching quantum spin squeezing on strontium atoms with applications to metrology and atom interferometry
- Designed a python laser cooling simulation to optimize laser cooling process for strontium; then implemented in the experiment
- Designed and built laser interferometer to remove fiber noise
- Built a strontium spectroscopy lock
- Built circuits to create PID locks, cancel electronic/mechanical noise, etc.

Opto-Mechanical Engineering Intern | Blue Marble Communications

June 2023 - September 2023

- Contributed to R&D on a novel optical communication terminal for satellites.
- Performed optical alignment of sensing and tracking systems.
- Developed a method to characterize the transmittance and reflectivity of optical filters at various wavelengths and incidence angles.
- Constructed a fast steering mirror and performed a vibration analysis.
- Used SolidWorks CAD to design and modify optical setups and various assembly components.

Intern | University of California, San Diego | Popmintchev Applied Physics Lab

March 2022 - September 2022

- Developed software using MATLAB for the measurement and analysis of ultrafast femtosecond laser pulses.
- Built FROG (Frequency-Resolved Optical Gating) apparatus to measure ultrafast femtosecond laser pulses.
- Designed laser equipment using SolidWorks (3D CAD software).

Published Researcher | Computational Astrophysics

December 2020 - September 2022

- Analyzed spectra of the Cat's Eye Nebula to create a novel computer model, which revealed the nebula's 3D structure. Discovered a pair of symmetric rings on the nebula.
- Findings support recent trends in nebula formation theory and sheds light on the formation of all planetary nebulae.
- Published results as first author in *Monthly Notices of The Royal Astronomical Society*.
- Research featured in the print magazine and online version of *ScienceNews*; also featured online in [Popular Science](#), [Yahoo News](#), [Space.com](#) and [SciTechDaily](#).

Intern | University of San Diego | Robertson-Anderson Biophysics Lab

June 2021 - August 2021

- Helped develop a new method (OpTiDDM) to probe the stress response of soft matter at a microscopic level.
- Operated optical tweezers (recent Nobel prize winning technology) to oscillate a bead in DNA to study how physical stress propagates through DNA.
- Used differential dynamic microscopy code in Python to analyze how physical stress moves through DNA. Modified and added code for the project.
- Published results in *Nature Communications* and *Journal of Rheology*.

PUBLICATIONS

Clairmont, R., Steffen, W., Koning, N. Morphokinematic modelling of the point-symmetric Cat's Eye, NGC 6543: Ring-like remnants of a precessing jet. *Monthly Notices of the Royal Astronomical Society*. September 2022. ([Link](#))

Pedireddy, KR., Clairmont, R., Neill, P., et al. Optical-Tweezers-integrating-Differential-Dynamic Microscopy maps the spatiotemporal propagation of nonlinear strains in polymer blends and composites. *Nature Communications*. September 2022. ([Link](#))

Tahani, M., Ngo, J., Glover, J., Clairmont, R., et al. MC-BLOS: Determination of the Line-of-Sight Component of Magnetic Fields Associated with Molecular Clouds. Accepted, *Astrophysical Journal*. Jul 2024. ([Link](#))

Pedireddy, KR., Clairmont, R., Robertson-Anderson, RM. Polymer threadings and rigidity dictate the viscoelasticity of entangled ring-linear blends and their composites with rigid rod microtubules. *Journal of Rheology*. September 2022. ([Link](#))

AWARDS AND ACKNOWLEDGEMENTS

- Regeneron International Science and Engineering Fair 2021 (ISEF) 1st Place Grand Award in Physics and Astronomy
- National Young Astronomer Award 2021
- Regeneron Science Talent Search Scholar 2022
- Eagle Scout (earned rank in 2019)