# Maude Gull

PhD Candidate | mgull@berkeley.edu | https://maudegull.github.io/ | OrcID: 0000-0003-3747-1394

## RESEARCH SUMMARY

I observe and investigate **metal-poor massive stars in the Local Group** to understand the processes that govern their evolution, final fates and influence on their environment across the Universe. In particular, I am quantifying the interplay between **metallicity, mass, mass-loss, rotation and binarity** of metal-poor massive stars during their lifetime. My interdisciplinary approach uses **machine learning and Bayesian Inference** and combines **panchromatic photometry** and **spectroscopy** to advance our observational knowledge of stellar astrophysics.

## EDUCATION

**University of California, Berkeley** | **Ph.D** in Astrophysics 08/2019 - 08/2025
Thesis: A Panchromatic Study of the Metal-poor Massive Stars in the Local Group
**University of California, Berkeley** | **M.A.** in Astrophysics 08/2019 - 12/2020
**Massachusetts Institute of Technology** | **B.Sc**. in Physics. 08/2015 - 06/2019
**Massachusetts Institute of Technology** | **B.Sc**. in Mathematics 08/2015 - 06/2019

## RESEARCH POSITIONS

**Postdoctoral Fellow**, Carnegie-Caltech Brinson Fellow, Carnegie Observatory *09/2025-present*
**Postdoctoral Fellow**, Carnegie-Caltech Brinson Fellow, Caltech *09/2025-present*

**Graduate** Student Researcher, Dept. of Astronomy, UC Berkeley *08/2019-08/2025*
*Metal-poor massive stars in the Local Group (Advisor: Daniel R. Weisz)*

**Graduate** Visiting Student, Inst. for Computational Cosmology, Durham University *08/2022-10/2022*
*KCWI view of Massive Stellar Clusters (Advisor: Anna Mcleod)*

**Undergraduate** Researcher, MIT
*Neutron-capture in Metal-poor stars in the Milky Way halo (Advisor: Anna Frebel)* *06/2016 – 06/2019*
*Formation of primordial black holes during Inflation (Advisor: Alan Guth)* *06/2017 – 06/2019*
*Performance Optimization of the Carnegie PFS (Advisor: Jennifer Burt)* *08/ 2017 – 12/ 2017*

## PUBLICATIONS

*Link to ADS Library*

- **Gull, Maude**; Weisz, Daniel R.; et al. (2025) *A Low Metallicity Massive Contact Binary Star System Candidate in WLM identified by Hubble and James Webb Space Telescope imaging*. The Astrophysical Journal. Volume 986 (1).
- **Gull, Maude**; Weisz, Daniel R.; et al. (2022) *A Panchromatic Study of Massive Stars in Extremely Metal-Poor Local Group Dwarf Galaxy LeoA*. The Astrophysical Journal. Volume 941 (2).
- **Gull, Maude**; Frebel, Anna; et al. (2020) *R-process-rich Stellar Streams in the Milky Way*. The Astrophysical Journal. Volume 912 (1).

- **Gull, Maude**; Frebel, Anna; Cain, Madelyn; et al. (2018). *Discovery of the first metal-poor star with a combined r- and s-process element signature*. The Astrophysical Journal. Volume 862 (2).
- Lennon, D. J., …, **Gull, Maude**; et al. *"Binarity at LOw Metallicity (BLOeM): Projected rotational velocities"*, arXiv:2512.12102, 2025.
- Choi Yumi, …, **Gull, Maude**; et al. (2025). *The Impact of UV Inclusion in Deriving Star Formation Histories of Low-mass Dwarf Galaxies*. The Astrophysical Journal. Volume 169 (5).
- Gilbert, Karoline; …; **Gull, Maude**; …; et al. (2025). *The Local Ultraviolet to Infrared Treasury I. Survey Overview of the Broadband Imaging*. The Astrophysical Journal Supplement Series. Volume 276 (1)
- Yamaguchi, Natsuko; El-Badry, Kareem; Rodriguez, Antonio C. ; **Gull, Maude;** et al. (2023). *Sodium enhancement in evolved cataclysmic variables*. Monthly Notices of the Royal Astronomical Society. Volume 524 (1).
- Cain, Madelyn; Frebel, Anna; **Gull, Maude;** et al. (2018). *Chemical abundances for a trio of r-process-enhanced stars - one strong, one moderate, and one mild*. The Astrophysical Journal. Volume 864 (1).

## AWARDED TELESCOPE TIME

*Observation Experience: 2 nights on MIKE (Magellan), 4 nights on LLAMAS (Magellan), 2 nights on FIRE (Magellan), 9 nights on LRIS (KECK), 4 nights on KCWI (KECK), 1 night on ESI (KECK),1 night on DEIMOS (KECK), 1 night on MOSFIRE (KECK)*

- **HST - *Emission-line stars in the extremely metal-poor dwarf galaxy Sextans A.***
  - *Cycle 31,* PI: M. Gull (GO-17428; 8 orbits. *Acceptance rate: 16.7%* ).
- **Magellan - *LLAMAS^2: ExtremeLy Low metAllicity Massive stars Atlas of Sextans A with LLAMAS -- Pilot Program***
  - *2026A,* PI: M. Gull
- **Magellan - *A FIRE view into OB stars and binaries in the Magellanic Bridge.***
  - *2025B,* PI: M. Gull
- **Magellan - *The Most Metal-Poor Massive Stars in our Neighborhood***
  - *2025B,* PI: M. Gull
- **Keck - *Metal-poor Massive stars, Ionizing Sources and their Surrounding Gas in the Local Group Dwarf Galaxy Leo A***
  - *2026A, 3 nights,* PI: M. Gull
- **Keck* - *Characterizing Massive Contact Binary Candidates in Metal-poor Environments***
  - *2026B, 2 nights* , PI: K. El-Badry (Science PI Gull)
- **Keck* - *Following up Very Massive Stars Candidates in M33 with KCWI/KCRM.***
  - *2023B, 1 night* ,PI: D. Weisz (Science PI Gull)
- **Keck* - *Characterizing Extremely Metal-poor Massive Stars in Leo A.***
  - *2023A, 2 nights* , PI: D. Weisz (Science PI Gull)
- **Keck* - *Characterizing Extremely Metal-poor Massive Stars in Leo A.***
  - *2022A, 2 nights* ,PI: D. Weisz (Science PI Gull)
- **Keck* - *Characterizing a Stripped Star at Extremely Low Metallicity.***
  - *2022A, 1 night* , PI: D. Weisz (Science PI Gull)
- **Keck* - *Characterizing Extremely Metal-poor Massive Stars in Leo A.***
  - *2020A, 2 nights* , PI: D. Weisz (Science PI Gull),
- **HST - UV spectroscopy of a serendipitously-detected He star in Leo A: an unprecedented glimpse of binary mass transfer at extremely low metallicity**

- *Cycle 29,* PI: Peter Senchyna ( GO-16717; 8 orbits, Co-I M.Gull)

- ***JWST - Anchoring the JWST population II distance ladder to Gaia.***
  - *Cycle 3,* PI: Alessandro Savino, (GO-04783; 24.4h, Co-I M.Gull)

**Note: UC Berkeley PhD students cannot formally be PI of any Keck Proposal, hence why the supervisor is listed as PI on the proposal.*

## AWARDS & FUNDING

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|---|---|
| Carnegie-Caltech Brinson Fellowship Observational Astronomy | 2025 |
| Outstanding Graduate Student MPS Mentor | 2025 |
| The Shining Lights Fellow | 2025 |
| Certificate of Appreciation for MPS, University of California, Berkeley | 2023, 2024,2025 |
| Cranor Fellowship, University of California, Berkeley ($4000 per year) | 08/2019–2025 |
| Outstanding GSI, University of California, Berkeley | 06/2022 |
| Travel Grant, IAU (1000 Euro one time) | 05/2022 |
| Annual Scholarship, Swiss Study Foundation (20'000 CHF one time) | 12/2019 |
| 30 Years - 30 Personalities Recognition, Swiss Study Foundation | 03/2021 |
| Swiss Study Foundation Scholar | 08/2020–02/2026 |
| The Barrett Prize, MIT | 06/2019 |
| The Order of the Lepton Award, MIT | 06/2019 |
| The John P. Huchra (1970) Memorial Fund Travel Award, MIT ($1000 one time) | 06/2017 |

## COLLOQUIUMS,TALKS, SEMINARS, AND POSTERS

- Contributed Talk; KITP Conference: The Lifecycle of Stellar Black Holes "Metal-poor Massive Binaries and Binary Products in the Local Group" 11/2025
- Colloquium; ARI Institute Special Colloquium (Heidelberg), "A Panchromatic Study of Metal-poor Massive Stars in the Local Group" 10/2025
- Contributed Talk; AAS Winter Meeting "A Panchromatic Study of Metal-poor Massive Stars in the Local Group" 01/2025
- Talk; Berkeley Lunch Talk, "Metal-poor Massive Contact Binary Candidates in the Local Group" 04/2025
- Talk; CIERA Observational Astronomy Meeting "A Panchromatic Study of Metal-Poor Massive Stars in the Local Group" 11/2024
- Seminar; Carnegie Observatory Lunch Seminar "A Panchromatic Study of Metal-Poor Massive Stars in the Local Group" 09/2024
- Talk; Caltech Astronomy Tea Talk "A Panchromatic Study of Metal-Poor Massive Stars and Binaries in the Local Group" 03/2024
- Talk; Berkeley Lunch Talk, "Massive Metal-Poor Stars in Leo A" 11/2023
- Contributed Talk; 3,2,1: Massive Triples, Binaries and Mergers "A Panchromatic Study of Extremely Metal-poor Massive Stars" 07/2023
- Talk; CCA Friday Galaxy Formation Meeting "A Panchromatic Study of Massive Stars in Extremely Metal-Poor Local Group Dwarf Galaxy Leo A" 02/2023
- Seminar; MPA Seminar on Stellar Astrophysics (SESTAS) "A Panchromatic Study of Massive Stars in Extremely Metal-Poor Local Group Dwarf Galaxy Leo A" 10/2022
- Talk; Durham University Friday Lunchtime Astronomy Talk (FLAT) "A Panchromatic Study of Massive Stars in Extremely Metal-Poor Local Group Dwarf Galaxy Leo A" 10/2022
- Contributed Talk; IAU Symposium 361 Massive Stars Near and Far "A Panchromatic Study of Massive Stars in Extremely Metal-Poor Local Group Dwarf Galaxy Leo A" 05/2022
- Contributed Talk; Stars, to mark the 80th birthday of Peter Eggleton "A Panchromatic Study of Massive Stars in Extremely Metal-Poor Local Group Dwarf Galaxy LeoA" 08/2022
- Poster; Keck Science Meeting 2021 (*Poster*) "Optical spectroscopy of massive stars in extremely metal-poor local group dwarf galaxy Leo A" 08/2021

## COLLABORATION MEMBERSHIPS

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|---|---|
| The Local UltraViolet and Infrared Treasury | 08/2019- |
| The Binarity at LOw Metallicity (BLOeM) campaign collaboration | 08/2025- |
| Sloan Digital Sky Survey | 09/2025- |

## TEACHING, MENTORING, OUTREACH

I deeply care about equity in education and access to science. I contributed to the the planning and implementation of the MPS scholars program at UC Berkeley. Additionally, I have been involved in several mentoring programs and community outreach programs throughout my science career.

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|---|---|
| MPS Student Advisory Board, University of California, Berkeley | 2022 –2025 |
| Rosalind Franklin Forum for Female Scientists | 2022 –2025 |
| Undergraduate Liaison, University of California, Berkeley | 2021-2022 |
| Compass/MPS/POWER Bay Area Mentor | 2020 – 2025 |
| Astronomy Night, Volunteer | 2019,2022-2024 |
| Science Ambassador for Community Resources for Science | Fall 2021, Spring 2023 |
| Graduate Student Instructor, University of California, Berkeley, C162/C294 Planets | Fall 2019 |
| Graduate Student Instructor, University of California, Berkeley, 7A Intro. to Astronomy | Fall 2022 |
| Teaching Assistant, MIT Physics Department, 8.01(L) CM I, 8.02 EM I | 2017-2019 |

## OTHER SKILLS

- Languages: German (Native), French (Native), English (Fluent), Spanish (Conversant)
- **Photography** (Sports, Performing Arts and Astro )