

Dr. Steven R. Goldman

Software Engineer II · Space Telescope Science Institute
3700 San Martin Drive Baltimore, MD 21218
sgoldman@stsci.edu

Research Interests: The effects of metallicity on the dust production, wind dynamics, mass-loss mechanism, and evolution of Asymptotic Giant Branch stars and Red Supergiants.

APPOINTMENTS

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| Science Software Engineer, STScI | February 2023 - present |
| Visiting Assistant Professor, Haverford College, PA | January 2023 - May 2023 |
| Observatory & Instrument Scientist, SOFIA | November 2021 - February 2023 |
| Postdoctoral Fellow, STScI | October 2017 - November 2021 |

EDUCATION

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| PhD in Astrophysics Keele University, UK | October 2013 - December 2017 |
| ◦ Advisor: Jacco Th. van Loon | |
| ◦ Thesis: <i>The metallicity dependence of maser emission and mass loss from red supergiants and asymptotic giant branch stars</i> | |
| B. S. in Physics St. Lawrence University, USA | September 2009 - July 2013 |

AWARDED PROPOSALS (PRINCIPAL INVESTIGATOR)

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| 2022 <i>Hubble Space Telescope</i> , PID: 17088 (\$137 k) | 30 primary orbits |
| 2022 SOFIA (first quintile) | 18 hours (canceled) |
| 2022 GASKAP-OH (Science team lead: LMC maser populations) | 50 hours |
| 2021 <i>Hubble Space Telescope</i> , PID: 16492 (\$65 k) | 4 primary orbits |
| 2021 SOFIA, PID: 75_0057 (\$40 k) | 4 hours |
| 2017 Australia Telescope Compact Array Telescope, PID: C2996 | 92 hours |
| 2017 Very Large Telescope VISIR, PID: 099.D-0907 | 1 Night |
| 2017 Very Large Telescope VISIR, PID: 098.D-0272 | 0.5 hours |
| 2016 Very Large Telescope XSHOOTER, PID: 097.D-0605 | 1.5 hours |
| 2015 Westerbork Synthesis Radio Telescope, PID: R14/010 | 30 hours |
| 2014 Southern African Large Telescope | 5.5 hours |

RECENT AWARDED PROPOSALS (CO-INVESTIGATOR)

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| <i>James Webb Space Telescope</i> (3 programs) | 72 primary / 2 parallel hours |
| <i>Hubble Space Telescope</i> (9 programs) | 120 primary / 535 parallel orbits |
| SOFIA (2 programs) | 20.25 hours |
| SOFIA Legacy (cut short by cancellation) | 100 hours → 4 hours |
| ACA (NESS) | 750 hours |
| Astrophysics Data Analysis Program (18-ADAP18-142) | \$335 k |
| ALMA | 5 hours |

SELECTED SEMINAR & CONFERENCE PRESENTATIONS

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| 2024 Talk, AAS Winter Meeting | New Orleans, USA |
| 2022 Invited Speaker, IAU General Assembly | Busan, South Korea |
| 2022 Featured Speaker, AstroPhilly22 | Villanova University, USA |
| 2022 Invited Colloquium | University of Auckland, New Zealand |
| 2022 Invited Colloquium | Auckland University of Technology, New Zealand |
| 2022 Invited Colloquium | University of Canterbury, New Zealand |
| 2022 Invited Talk, AAS Summer Meeting | Pasadena, USA |
| 2022 Invited Colloquium | NRC Herzberg, Canada |
| 2022 Poster, SOFIA Lake Arrowhead Conference, | CA, USA |
| 2021 Invited Panelist, Evolved Stars and their Circumstellar Environments | Global (Remote) |
| 2021 Invited Talk, GAPS: unsolved problems in red Giants And suPergiantS | Global (Remote) |
| 2021 Talk, DELVE: The Death-Throes of Evolved Stars | Global (Remote) |
| 2021 Invited Talk | St. Lawrence University, USA |
| 2020 Invited Talk | STScI, USA |
| 2020 Poster, AAS Winter Meeting | Honolulu, USA |
| 2019 Invited Colloquium | RIT, USA |
| 2019 Invited Colloquium | EAO Hawaii, USA |
| 2019 Talk, A Star Has Evolved: A Conference in the Honor of Hans Olofsson | Smögen, Sweden |
| 2019 Talk, HotSci | STScI, USA |
| 2019 Poster, AAS Winter Meeting | Seattle, USA |
| 2018 Poster, IAU General Assembly | Vienna, Austria |
| 2018 Talk, Cosmic Dust: origin, applications & implications | Copenhagen, Denmark |
| 2018 Talk, European Week in Astronomy and Space Science | Liverpool, UK |
| 2016 Talk, Blowing in the wind (Awarded Best Talk) | ICISE, Vietnam |
| 2016 Talk, Postgraduate Research Symposium (Awarded Best Talk) | Keele University, UK |
| 2016 Talk, SKA Delivering the Science | Cambridge University, UK |
| 2015 Talk, UK SKA Science Meeting | Manchester University, UK |
| 2015 Poster, Stellar End Products: The low mass - high mass connection | ESO, Germany |
| 2015 Invited Colloquium, | Kagoshima University, Japan |

TEACHING & MENTORING

Courses Taught:

Visiting Assistant Professor, *Astro 101*, Haverford College, (Spring 2023)
 Demonstrator/Lab Assistant, *Electronics*, Keele University (2014-2016)
 Demonstrator/Lab Assistant, *Programming I*, Keele University (2015)

Students Mentored:

Tessa Pearlstein Haverford College, Summer 2023
Dust Injection Rate of TP-AGB stars in the M33

Sean Garner SOFIA/USRA, Summer 2022
SOFIA/EXES Water Line Analysis of the Symbiotic Mira HM Sge

Nathan Wolthuis SOFIA/USRA, Summer 2022
HST/WFC3 Image Analysis of Nebular NII emission of HM Sge

OBSERVING EXPERIENCE

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|-----------------------------------|-----------|
| SOFIA | 3 flights |
| James Clerk Maxwell Telescope | 70 hours |
| Very Large Telescope | 1 night |
| Australia Telescope Compact Array | 92 hours |
| Parkes Radio Telescope | 36 hours |
| Arecibo L-band (ALFALFA) | 20 hours |

SOFTWARE DEVELOPMENT

Observatory Service

- *Drizzlepac*: Primary maintainer for the widely-used image re-alignment software used for the Hubble Space Telescope pipeline mosaicing.
- *SOFIA Data-Analysis Cookbooks and FAQs*: Jupyter notebooks demonstrating a variety of techniques for analyzing infrared data from SOFIA, as well as detailed explanations FAQs of common misconceptions.

Research

- The *DESK*: Independently led the development and publication of the first open-source python package to fit the light and colors of evolved stars with models to get meaningful properties.
- The *BEAST*: Improved on testing and functionality of a large-scale open-source astropy-affiliated python package with a large team with different levels of coding experience.

PRESS & OUTREACH

NASA Press release, *NASA's Hubble Finds Surprises Around a Star That Erupted 40 Years* ([Link](#))
 Phys.org, *Research investigates evolution of symbiotic binary HM Sagittae* ([Link](#))
 Sky at Night magazine interview about SOFIA New Zealand deployment ([Link](#))
 NASA press release, *SOFIA Watches a Binary Star System's Eclipse* ([Link](#))

Virtual Community Outreach, 2018–Present, (USA, Canada, & Mexico)

- *Skype-a-Scientist*, NASA's *Universe of Learning*, independently organized

Earth and Space Observatory volunteer, 2013–2017, (Keele University, UK)

AWARDED FELLOWSHIPS

2015 E. A. Milne Traveling Fellowship (£ 2500)
 2012 National Science Foundation Summer REU Fellowship

ACADEMIC SERVICE

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| Organized the SOFIA New Zealand Lecture Series | July 2022 |
| SOFIA School Co-Chair | February 2022 |
| STScI postdoctoral representative | 2020 - 2022 |
| DELVE conference SOC | February 2021 |
| Low-Density Universe Lunch Organizer | 2018 - 2019 |
| TAC Panel Support: Hubble & SOFIA | |
| Referee: Astrophysical Journal; Astronomy & Astrophysics | |

REFEREED PUBLICATIONS

Links: [ADS](#), [ORCID](#), [Google Scholar](#)**First-Authored Peer-Reviewed Publications:**

1. Goldman S. R. et al., 2024, ApJ, 961, 14
[A Multi-Wavelength Study of the Symbiotic Mira HM Sge with SOFIA & HST](#)
2. Goldman S. R. et al., 2022, ApJS, 259, 41 citations: 6
[A Census of Thermally-Pulsing AGB stars in the Andromeda Galaxy and a First Estimate of their Contribution to the Global Dust Budget](#)
3. Goldman S. R., 2020, JOSS, 5(54), 2554 citations: 7
[The Dusty Evolved Star Kit \(DESK\): A Python package for fitting the Spectral Energy Distribution of Evolved Stars. Journal of Open Source Software](#)
4. Goldman S. R. et al., 2019, ApJ, 884, 152 citations: 6
[AGB Stars in the Nearby Galaxy: Leo P](#)
5. Goldman S. R. et al., 2019, ApJ, 877, 49 citations: 31
[An Infrared Census Of Dust In Nearby Galaxies With Spitzer \(DUSTiNGS\): V. The Period-luminosity Relation For Dusty Metal-poor AGB Stars](#)
6. Goldman S. R. et al., 2018, MNRAS, 473, 3835 citations: 15
[A dearth of OH/IR stars in the Small Magellanic Cloud](#)
7. Goldman S. R. et al., 2017, MNRAS, 465, 403 citations: 126
[The wind speeds, dust content, and mass-loss rates of evolved AGB and RSG stars at varying metallicity](#)

Co-Authored Peer-Reviewed Publications:

8. Gull et al. 2022, ApJ, 941, 206
[A Panchromatic Study of Massive Stars in the Extremely Metal-Poor Local Group Dwarf Galaxy Leo A](#)
9. Ingallinera et al. 2022, MNRAS, 512, 21
[Evolutionary map of the Universe \(EMU\): 18-cm OH-maser discovery in ASKAP continuum images of the SCORPIO field](#)
10. Sankrit et al. 2022, ApJ, 926, 177
[SOFIA/FORCAST Monitoring of the Dust Emission from R Aqr: Start of the Eclipse](#)
11. Scicluna et al. 2022, MNRAS, 512, 1091
[The Nearby Evolved Stars Survey II: Constructing a volume-limited sample and first results from the James Clerk Maxwell Telescope](#)
12. Jones et al., 2021, MNRAS, 504, 565
[Infrared variable stars in the compact elliptical galaxy M32](#)
13. Girardi et al., 2020, ApJ, 901, 19
[PHAT XX. AGB stars and other cool giants in M31 star clusters](#)

14. Nanni A. et al., 2019, MNRAS, 487, 502
The mass-loss, expansion velocities and dust production rates of carbon stars in the Magellanic Clouds
15. Dharmawardena T. E. et al., 2019, MNRAS, 489, 3218
The Nearby Evolved Stars Survey: I. JCMT/SCUBA-2 Sub-millimetre detection of the detached shell of U Antliae
16. Karambelkar V. R. et al., 2019, ApJ, 877, 110
SPIRITS Catalog of Infrared Variables: Identification of Extremely Luminous Long Period Variables
17. Orosz G. et al., 2017, AJ, 153, 1190
Astrometry of OH/IR stars using 1612 MHz hydroxyl masers. I. Annual parallaxes of WX Psc and OH138.0+7.2
18. Groenewegen M. A. T. et al., 2016, A&A, 596, A50
The ALMA detection of CO rotational line emission in AGB stars in the Large Magellanic Cloud
19. McDonald I. et al., 2015, MNRAS, 453, 4324
ALMA reveals sunburn: CO dissociation around AGB stars in the globular cluster 47 Tucanae

Other Publications:

20. Goldman et al. 2022, Research Notes of the AAS, 6, 159
Sudden Dimming of the Symbiotic Mira HM Sge
21. Goldman et al. 2022, AAS Meeting, 240 proceedings, 426.04
A Census of Thermally-Pulsing AGB stars in the Andromeda Galaxy and a First Estimate of their Contribution to the Global Dust Budget
22. Sloan et al. 2021, AAS Meeting, 237 proceedings, 541.16
Spitzer's Last Look at the Small Magellanic Cloud.
23. Scicluna et al. 2020, arXiv:2002.03100 (Decadal white paper)
Studies of Evolved Stars in the Next Decade: EAO Submillimetre Futures White Paper Series
24. Karambelkar et al. 2020, , AAS Meeting, 235 proceedings, 335.04
SPIRITS catalog of infrared variables : Identification of extremely luminous long period variables
25. Goldman S. R. and Boyer M. L., 2019, IAU Meeting 343 proceedings, 14(S343), 406-408
Infrared light curves of dusty & metal-poor AGB stars
26. Goldman S. R. and Boyer M. L., 2019, AAS Meeting 233 proceedings, 33.06
Infrared light curves of dusty & metal-poor AGB stars