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

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

PhD in Astrophysics Keele University, UK — October 2013 - December 2017

- Advisor: Jacco Th. van Loon
- Thesis: *The metallicity dependence of maser emission and mass loss from red supergiants and asymptotic giant branch stars*

B. S. in Physics St. Lawrence University, USA — September 2009 - July 2013

AWARDED PROPOSALS (PRINCIPAL INVESTIGATOR)

2022 *Hubble Space Telescope*, 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 *Hubble Space Telescope*, 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)

James Webb Space Telescope (3 programs)	72 primary / 2 parallel hours
Hubble Space Telescope (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

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 Colloquim	University of Auckland, New Zealand
2022 Invited Colloquim	Auckland University of Technology, New Zealand
2022 Invited Colloquim	University of Canterbury, New Zealand
2022 Invited Talk, AAS Summer Meeting	Pasadena, USA
2022 Invited Colloquim	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 Evoled Stars	Global (Remote)
2021 Invited Talk	St. Lawrence University, USA
2020 Invited Talk	STScI, USA
2020 Poster, AAS Winter Meeting	Honolulu, USA
2019 Invited Colloquim	RIT, USA
2019 Invited Colloquim	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 Colloquim,	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 N II *emission of HM Sge*

OBSERVING EXPERIENCE

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

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

Organized and gave the SOFIA New Zealand Lecture Series	July 2022
SOFIA School Co-Chair	February 2022
STScI postdoctoral representative	2020 - 2022
Bystander Intervention Workshop	March 2021
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: 30
   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: 125
   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