Dr. Steven R. Goldman

Software Engineer · Space Telescope Science Institute
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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

Software Engineer II, STScI	February 2023 - present
Visiting Assistant Professor, Haverford College, PA	January 2023 - present
Observatory & Instrument Scientist, SOFIA	November 2021 - February 2023
Postdoctoral Fellow, Space Telescope Science Institute	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 (2 programs)	60 primary / 2 parallel orbits
Hubble Space Telescope (7 programs)	102 primary / 520 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

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

MENTORING, TEACHING, & OUTREACH

Students Mentored:
2022 S. Garner, USRA Intern, SOFIA/EXES Water Line Analysis of the Symbiotic Mira HM Sge
2022 N. Wolthuis, USRA Intern, HST/WFC3 Image Analysis of Nebular NII emission of HM Sge

Courses:
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)

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)

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

SELECTED TECHNICAL/FUNCTIONAL ACHIEVEMENTS

Tools for Increasing Scientific Productivity
(Independently Created, Developed, & Maintained)

- *SOFIA Data-Analysis Cookbooks*: Jupyter notebooks demonstrating a variety of techniques for analyzing infrared data from SOFIA using astropy, scipy, matplotlib, and numpy.
- *SOFIA FAQs*: A website where I identified common questions and misconceptions and provided simple, yet detailed explanations not in observatory documentation.

Software Development for 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

Sky at Night magazine interview about SOFIA New Zealand deployment
NASA press release, *SOFIA Watches a Binary Star System's Eclipse*

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., 2022, ApJS, 259, 41
   A Census of Thermally-Pulsing AGB stars in the Andromeda Galaxy and a First Estimate of their Contribution to the Global Dust Budget

2. Goldman S. R., 2020, JOSS, 5(54), 2554 citations: 5
   The Dusty Evolved Star Kit (DESK): A Python package for fitting the Spectral Energy Distribution of Evolved Stars. Journal of Open Source Software

3. Goldman S. R. et al., 2019, ApJ, 884, 152 citations: 4
   AGB Stars in the Nearby Galaxy: Leo P

4. Goldman S. R. et al., 2019, ApJ, 877, 49 citations: 24
   An Infrared Census Of Dust In Nearby Galaxies With Spitzer (DUSTiNGS): V. The Period-luminosity Relation For Dusty Metal-poor AGB Stars

5. Goldman S. R. et al., 2018, MNRAS, 473, 3835 citations: 18
   A dearth of OH/IR stars in the Small Magellanic Cloud

6. Goldman S. R. et al., 2017, MNRAS, 465, 403 citations: 116
   The wind speeds, dust content, and mass-loss rates of evolved AGB and RSG stars at varying metallicity

Co-Authored Peer-Reviewed Publications:

7. Mull et al. 2022, ApJ, 941, 206
   A Panchromatic Study of Massive Stars in the Extremely Metal-Poor Local Group Dwarf Galaxy Leo A

8. 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

9. Sankrit et al. 2022, ApJ, 926, 177
   SOFIA/FORCAST Monitoring of the Dust Emission from R Aqr: Start of the Eclipse

10. 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

11. Jones et al., 2021, MNRAS, 504, 565
    Infrared variable stars in the compact elliptical galaxy M32

12. Girardi et al., 2020, ApJ, 901, 19
    PHAT XX. AGB stars and other cool giants in M31 star clusters

13. Nanni A. et al., 2019, MNRAS, 487, 502
    The mass-loss, expansion velocities and dust production rates of carbon stars in the Magellanic Clouds

14. 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

15. Karambelkar V. R. et al., 2019, ApJ, 877, 110
SPIRITS Catalog of Infrared Variables: Identification of Extremely Luminous Long Period Variables

16. 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

17. 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

18. McDonald I. et al., 2015, MNRAS, 453, 4324
ALMA reveals sunburn: CO dissociation around AGB stars in the globular cluster 47 Tucanae

Other Publications:

19. Goldman et al. 2022, Research Notes of the AAS, 6, 159
Sudden Dimming of the Symbiotic Mira HM Sge

20. 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

21. Sloan et al. 2021, AAS Meeting, 237 proceedings, 541.16
Spitzer's Last Look at the Small Magellanic Cloud.

22. Scicluna et al. 2020, arXiv:2002.03100 (Decadal white paper)
Studies of Evolved Stars in the Next Decade: EAO Submillimetre Futures White Paper Series

23. Karambelkar et al. 2020, , AAS Meeting, 235 proceedings, 335.04
SPIRITS catalog of infrared variables : Identification of extremely luminous long period variables

24. 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

25. Goldman S. R. and Boyer M. L., 2019, AAS Meeting 233 proceedings, 33.06
Infrared light curves of dusty & metal-poor AGB stars