

Steven Mathis SILVERBERG

PERSONAL DATA

POSITION: Graduate Student, University of Oklahoma
DEPARTMENT: Homer L. Dodge Department of Physics and Astronomy
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POSITION: Graduate Research Collaborator, NASA Goddard Space Flight Center
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RESEARCH INTERESTS

- **Disk Detective:** I serve as the current project lead on **Disk Detective**, a citizen science project to identify new protoplanetary and debris disks in the AllWISE catalog. My work focuses on identifying new disk candidates around likely M dwarfs.
- **“Peter Pan” Disks:** Disk Detective has identified a set of disk candidates around late-type stars exhibiting infrared excess indicative of a protoplanetary disk at ages > 9 times the e -folding timescale for protoplanetary disk dissipation around solar-type stars. I use optical and near-IR photometry and spectroscopy to characterize the hosts of these “Peter Pan” disks (protoplanetary disks that seem to never grow up), as a means of understanding how they formed, and their implications on exoplanet formation around M dwarfs.
- **M dwarf flares:** I use high-cadence space- and ground-based optical photometry and high-cadence optical spectroscopy to identify flares on M dwarfs, characterizing their overall flare activity over extended periods. Flare activity can be a key indicator of stellar youth, and is a key input for discussion of potential life on planets around M dwarfs.

EDUCATION

EXP. SPRING 2019 **Ph.D., Physics**, University of Oklahoma
 Advisor: John P. Wisniewski

SPRING 2016 **M.S., Physics**, University of Oklahoma

SPRING 2013 **B.S., Astrophysics**, Rice University

EMPLOYMENT HISTORY

AUGUST 2015 - CURRENT JUNE 2014-JULY 2014	Graduate Research Collaborator, NASA GODDARD SPACE FLIGHT CENTER Advisor: Marc J. Kuchner
JUNE 2014 - CURRENT	Graduate Research Assistant, UNIVERSITY OF OKLAHOMA Advisor: John P. Wisniewski
AUGUST 2013 - MAY 2014	Graduate Teaching Assistant, UNIVERSITY OF OKLAHOMA
MAY 2012-AUGUST 2012	Undergraduate Research Collaborator, RICE UNIVERSITY Advisor: Christopher M. Johns-Krull
AUGUST 2011 - MAY 2012	Undergraduate Teaching Assistant, RICE UNIVERSITY Lab Assistant, Introduction to Astronomy

GRANTS AND AWARDS

- PI, GS-2018B-FT-106, Gemini-S/GMOS-S – 1.4 hours awarded, 2018
- PI, 2018A-088, NASA IRTF/SpeX – 1 night + 4 hours, 2018
- PI, 2018A-0292, CTIO Blanco/ARCoIRIS, 1.5 nights, 2018
- PI, 2017B-0229, CTIO Blanco/ARCoIRIS, 3 × half-nights, 2017
- PI, 2017Q4-DD03, Apache Point Observatory ARC 3.5m/DIS, 3 × half-nights, 2017
- PI, 2017Q3-OU01, Apache Point Observatory ARC 3.5m/DIS, 2 × half-nights + 2 hours, 2017
- Robert H. Goddard Award for Exceptional Achievement in Outreach by a Team. Presented to the Disk Detective team, May 2017.
- PI, 2017A-0259 CTIO 0.9m (9 nights), Blanco/COSMOS (1/2 night), 2017
- Co-I, SOFIA Cycle 5, Do If Time, 3 flights, 2017
- Co-I, Director's Discretionary Fund Grant, Space Telescope Science Institute, \$101k
- Co-I, NASA XRP Grant "The Disk Detective Follow-up Program," 2016, \$500k

ADDITIONAL OBSERVING EXPERIENCE

2010Q2	0.9 meter Telescope, McDonald Observatory – 3 nights
2014Q4	ARC 3.5m Telescope, Apache Point Observatory (PI) – 1 half-night
2015Q2	APO/ARC 3.5m – 3 nights. Observational Astrophysics course
2015B	du Pont Telescope (2.5m), Las Campanas Observatory (Co-I, observer) – 3 nights

Software Experience:

IRAF, Python (PyRAF, astropy), IDL, C, Java, MATLAB

TEACHING EXPERIENCE

AUGUST 2013 - MAY 2014	Graduate Teaching Assistant, UNIVERSITY OF OKLAHOMA Introduction to Astronomy Discussion Instructor Physics I for Engineers (non-calculus) Discussion Instructor Introduction to Astronomy Lab Instructor Physics I for Life Science Majors (non-calculus) Discussion Instructor
AUGUST 2012 - MAY 2012	Undergraduate Teaching Assistant, RICE UNIVERSITY Grader and lab assistant, non-science major astronomy course

PROFESSIONAL TALKS

- August 2018, Goddard Space Flight Center, Exoplanet Club Seminar
- July 2018, Harvard-Smithsonian Center for Astrophysics, Seminar
- July 2018, American Museum of Natural History, Seminar
- May 2018, Goddard Space Flight Center, Star Formation Seminar
- November 2017, Gemini Observatory + CTIO, Astronomy Colloquium
- July 2017, University of Colorado-Boulder, JILA Astrophysics Seminar
- April 2017, Carnegie Institution for Science, DTM Seminar
- March 2016, Goddard Space Flight Center, Exoplanet Club Seminar

CONFERENCE ORGANIZATION AND INVITED PARTICIPATION

- Scientific Organizing Committee, National Capital Area Disks meeting, September 2018
- Invited participant, Crowdsourcing Expo, NASA HQ, May 2018
- Invited participant, Citizen Science Expo, National Academies of Sciences, Engineering, and Medicine, November 2017
- Chair, Scientific Organizing Committee, National Capital Area Disks meeting, July 2016

REFEREED PUBLICATIONS

1. **Silverberg, S.M.**, Kuchner, M.J., Wisniewski, J.P., Bans, A.S., Debes, John H., Kenyon, S.J., Baranec, C., Riddle, R., Law, N., Teske, J.K., Burns-Kaurin, E., Bosch, M.K.D., Cernohous, T., Doll, K., Durantini Luca, H.A., Hyogo, M., Hamilton, J., Finnemann, J.J.S., Lau, L. 2018, "Follow-Up

Imaging of Disk Candidates from the Disk Detective Citizen Science Project: New Discoveries and False Positives in WISE Circumstellar Disk Surveys,” *ApJ*, accepted

2. Kuchner, M.J., Faherty, J.K., Schneider, A.C., Meisner, A.M., Filippazzo, J.C., Gagné, J., Trouille, L., **Silverberg, S.M.**, Castro, R., Fletcher, B., Mokaev, K., Stajic, T. 2017, “The First Brown Dwarf Discovered by the Backyard Worlds: Planet 9 Citizen Science Project,” *ApJL*, 841, L19
3. **Silverberg, S.M.**, Kuchner, M.J., Wisniewski, J.P., Gagné, J., Bans, A.S., Bhattacharjee, S., Currie, T.R., Debes, J.H., Biggs, J.R., Bosch, M., Doll, K., Durantini-Luca, H.A., Enachioaie, A., Griffith, Sr., P., Hyogo, M., Piniero, F, Disk Detective Collaboration. 2016, “A New M Dwarf Debris Disk Candidate in a Young Moving Group Discovered with Disk Detective,” *ApJL*, 830, L28
4. Kuchner, M.J., **Silverberg, S.M.**, Bans, A.S., Bhattacharjee, S., Kenyon, S.J., Debes, J.H., Currie, T., García, L., Jung, D., Lintott, C., McElwain, M., Padgett, D.L., Rebull, L.M., Wisniewski, J.P., Nesvold, E., Schawinski, K., Thaller, M.L., Grady, C.A., Biggs, J., Bosch, M., Cernohous, T., Durantini-Luca, H.A., Hyogo, M., Lau Wan Wah, L., Piipuu, A., Piniero, F. 2016, “Disk Detective: Discovery of New Circumstellar Disk Candidates through Citizen Science.”
5. **Silverberg, S.M.**, Kowalski, A.F., Davenport, J.R.A., Wisniewski, J.P., Hawley, S.L., Hilton, E.J. 2016, “Kepler Flares. IV. A Comprehensive Analysis of the Activity of the dM4e Star GJ 1243,” *ApJ*, 829, 129
6. Davenport, J.R.A., Hawley, S.L., Hebb, L., Wisniewski, J.P., Kowalski, A.F., Johnson, E.C., Malatesta, M., Peraza, J., Keil, M., **Silverberg, S.M.**, Jansen, T.C., Scheffler, M.S., Berdis, J.R., Larsen, D.M., Hilton, E.J. 2014, “Kepler Flares. II. The Temporal Morphology of White-light Flares on GJ 1243,” *ApJ*, 797, 122

PAPERS SUBMITTED OR IN PREP

- **Silverberg, S.M.**, Wisniewski, J.P., Kuchner, M.J., Bans, A.S., Debes, J.H., and the Disk Detective Collaboration. “ “Peter Pan” Disks: Long-lived Gas-Rich Disks Around Pre-Main Sequence M Stars,” in prep

NON-REFEREED ABSTRACTS

- **Silverberg, S.M.**, Kuchner, M.J., Wisniewski, J.P., Disk Detective Collaboration. 2018, *Cool Stars XX*, poster 283
- **Silverberg, S.M.**, Wisniewski, J.P., Kuchner, M.J., Disk Detective Collaboration. 2018, *AAS*, 231, 428.03
- **Silverberg, S.M.**, Kuchner, M.J., Wisniewski, J.P., Gagné, J., Bans, A.S., Bhattacharjee, S., Currie, T.M., Debes, J.H., Biggs, J.R., Bosch, M., Doll, K., Durantini Luca, H.A., Enachioaie, A., Griffith, P., Hyogo, M., Piniero, F, Disk Detective Collaboration. 2017, *AAS*, 229, 420.01
- Kuchner, M.J., **Silverberg, S.M.**, Bans, A., Disk Detective Team. 2015, *AAS*, 225, 330.01

PRESS

- Quoted in "Found: Oldest Known Planet-forming Disk" press release, Carnegie Science, October 2016
- Profiled in "OU Graduate Student, Team Discover Oldest Known Planet-forming Disk," OU Daily, October 2016
- Quoted in "Oldest Planetary Disk Discovered With Help from Citizen Scientists," IFLScience, October 2016

EDUCATION AND PUBLIC OUTREACH

- **Lunar Sooners** Presented star parties and lectures as part of OU astronomy outreach group.
- **Soonertarium** Organized and presented mobile planetarium shows for local schools.
- **OKC Astronomy Club** Guest lecturer on citizen science.
- **OU Star Parties** Frequent host of weekly viewings at OU on-campus observatory.

PROFESSIONAL REFERENCES

1. Dr. John. P. Wisniewski
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