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## ABSTRACT

The 2022 NITARP team of Luisa Rebull, consisting of seven students and five teachers, examined the literature and data concerning low mass, young stellar objects near AFGL 490, a high mass star with surrounding dust in Cam OB-1. The benefits for both students and teachers were extensive; including learning astrophysics, participating in real world science, analyzing data, and getting a glimpse into the world of professional astronomy. This poster will highlight the ways in which the teachers and their students brought this experience back to their communities.



2022 NITARP Members of Rebull's Team

## NITARP

NITARP, the NASA/IPAC Teacher Archive Research Program, involves students and teachers in authentic astronomical research. They participate in a 13 month program which ultimately ends with their scientific poster presentation at the AAS Conference. The specific components for us included:

- ❖ Attendance of AAS conference
- ❖ Using data from IRSA catalogs
- ❖ 4-day meeting in Pasadena, CA
- ❖ Weekly zoom meetings
- ❖ Literature research
- ❖ Using images, SEDs, light curves, etc to classify objects
- ❖ Final attendance of AAS

Weekly webchats answer specific questions. Dr. Luisa Rebull, IPAC, California Institute of Technology, Pasadena, CA, is renowned in her research with Spitzer and YouTube tutorials in the EM spectrum; yet, she does not hesitate to explain or clarify any topics.

## IMPLEMENTATION

**Classroom**

- ❖ Engage students to use IPAC catalogs during the unit on EM Spectrum of Astronomy, Earth/Space or Physics
- ❖ A 1-2 week introduction course can be adapted to fit into lesson plans

❖ Students can apply to attend NITARP workshop.

**Club**

- ❖ Students analyze data at home and discuss at meetings.

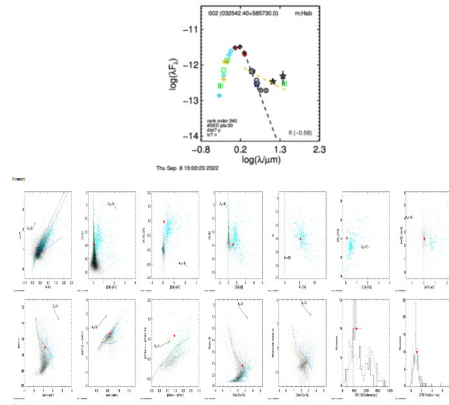
Recruiting: Former students help with recruiting new students!



## REAL WORLD DATA ANALYSIS

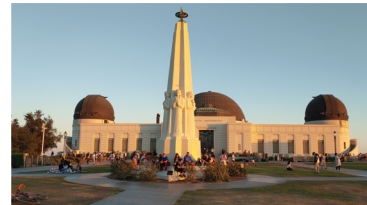
Our project worked toward the development of a complete membership list for the cluster of YSOs emerging from the dust cloud surrounding the high mass star AFGL 490.

Spectral energy distributions (SED) plots, optical and infrared images, color-magnitude diagrams, and color-color diagrams (CM/CC diagrams), were examined for evidence of young stellar objects (YSOs), ruling out any giant stars or background galaxies.



## PASADENA WORKSHOP

- ❖ 3-4 day training at Pasadena, CA
- ❖ All expense paid
- ❖ Tours of JPL, Griffith Observatory, Caltech campus



This workshop taught both students and teachers alike to work in teams. After instruction from Dr. Luisa Rebull, we analyzed and classified YSOs by using the target's spectral energy distribution (SED) and color-color/color-magnitude diagrams. The class also touched on light curves and time series variability. Students and teachers gained knowledge with a memorable experience.



## EXTENSION PROGRAMS

- ❖ Serving as NASA/NITARP ambassador
  - 12 hours of professional development workshops in their home school districts
  - 3 half day professional development workshops
  - 3 talks on projects
- ❖ Serving as mentors in the community of NITARP teachers
  - Expected to join teams as mentors to new teams
  - Additional alumni community opportunities



## ACKNOWLEDGEMENTS

We would like to thank our Mentor Astronomer: Dr. Luisa Rebull, IPAC, California Institute of Technology, Pasadena, CA and everyone else at the NITARP for providing us and our students with amazing opportunities throughout the past year.

