



Using NITARP Research to Guide Education in Our Communities

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Abstract

The 2019 NITARP (NASA/ IPAC Teacher Archive Research Program) group spent a year investigating images to find YSOs (Young Stellar Objects) in the M8 Nebula, under the tutelage of Dr. Luisa Rebull. In turn, each instructor, some with the collaboration of their students, used their newfound knowledge and practiced skill sets to expand the knowledge and interest in their own communities.

- Creation of a series of labs (Optical → IR → Stellar Spectra)**
- Classification key of 11 stars
 - Different spectral classifications and temperatures
 - Deeper understanding EM wavelengths and color
 - **GOAL:** Observe optical spectrum to determine star color
- Tutorial to use the IRSA Finder Chart**
- View images at IR wavelengths
 - Explore instruments used in data collection
 - Examples are Spitzer, WISE, 2MASS, etc.
 - **GOAL:** Use and Understand the tools used by astronomers

- Creation of two lessons for elementary students**
- Pre-test and Post-test showing academic growth
 - Taught upon request, reached 200+ elementary students
 - Used an IR camera to explain and show wavelengths
 - **GOAL:** Support and Grow interest in astronomy
- Present NITARP research to peers, colleagues & students**
- Presented at the Iowa Academy of Sciences
 - Presented undergraduate research at Science Symposium
 - Presented at EWALU
 - **GOAL:** Show astronomy is for everyone

Kansas

Iowa

Mississippi

Massachusetts

Lab Activity: IRSA Finder Chart
 Background information from <http://chaime.astro.caltech.edu/>

ABOUT IRSA

IRSA is charged to create the science products of NASA's infrared and submillimeter missions, including those large area and all sky surveys. It costs \$600 million a year to operate a billion-epoch-of-observations, including all sky coverage in 24 bands. Approximately 10% of all infrared astronomical ground-based data sets are created by IRSA.

IRSA offers access to digital archives through powerful query engines including VO-compliant interfaces and offers unique data analysis and visualization tools. IRSA enables a wide range of applications to explore cross-mission datasets, including 2MASS, Spitzer, WISE, WISE, and a large number of higher-resolution data products from a diverse set of astrophysics programs.

IRSA is one of several projects at the NASA Infrared Processing and Analysis Center (IPAC) located on the campus of the California Institute of Technology (Caltech). Read more about the history of IRSA.

Optical Images and Stellar Spectra Lab

Match the star according to its image in the star "box".

Star	Color	Temp	Filter
Altair	Orange	5000	Blue
Antares	Red	3500	Green
Arcturus	Orange	4000	Red
Aldebaran	Orange	3900	Blue
Proxima Centauri	Red	3000	Green

Match the star to the color key.

Star	Color	Temp	Filter
Altair	Orange	5000	Blue
Antares	Red	3500	Green
Arcturus	Orange	4000	Red
Aldebaran	Orange	3900	Blue
Proxima Centauri	Red	3000	Green

Capella

Star	Color	Temp	Filter
Altair	Orange	5000	Blue
Antares	Red	3500	Green
Arcturus	Orange	4000	Red
Aldebaran	Orange	3900	Blue
Proxima Centauri	Red	3000	Green

Spitzer

Star	Color	Temp	Filter
Altair	Orange	5000	Blue
Antares	Red	3500	Green
Arcturus	Orange	4000	Red
Aldebaran	Orange	3900	Blue
Proxima Centauri	Red	3000	Green

WISE

Star	Color	Temp	Filter
Altair	Orange	5000	Blue
Antares	Red	3500	Green
Arcturus	Orange	4000	Red
Aldebaran	Orange	3900	Blue
Proxima Centauri	Red	3000	Green

2MASS

Star	Color	Temp	Filter
Altair	Orange	5000	Blue
Antares	Red	3500	Green
Arcturus	Orange	4000	Red
Aldebaran	Orange	3900	Blue
Proxima Centauri	Red	3000	Green

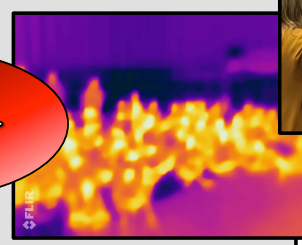
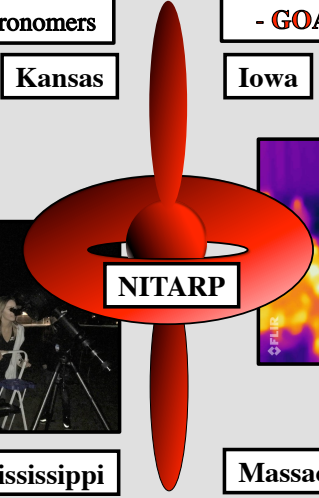
IRAS

Star	Color	Temp	Filter
Altair	Orange	5000	Blue
Antares	Red	3500	Green
Arcturus	Orange	4000	Red
Aldebaran	Orange	3900	Blue
Proxima Centauri	Red	3000	Green

AKARI

Star	Color	Temp	Filter
Altair	Orange	5000	Blue
Antares	Red	3500	Green
Arcturus	Orange	4000	Red
Aldebaran	Orange	3900	Blue
Proxima Centauri	Red	3000	Green

Match the image of the star to the color key.



Which of the following is true for stellar formation?

1. Most stars form in the protoplanetary disk.
2. Most stars form in the protoplanetary disk.
3. Most stars form in the protoplanetary disk.
4. Most stars form in the protoplanetary disk.

Which of the following is true for stellar formation?

1. Most stars form in the protoplanetary disk.
2. Most stars form in the protoplanetary disk.
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- Presentations about NITARP experience (Spring 2020)**
- Science Club at Itawamba Community College
 - the Astronomy Club at Mississippi State University
 - Rainwater Observatory in French Camp, MS
 - **GOAL:** Communicate with and to general audiences
- Public outreach opportunities**
- NITARP & Infrared Astronomy
 - Undergraduate perspective of astronomy research
 - Information about experiences and work
 - **GOAL:** Exemplify academic and professional goals

- Present IDYL project to local astronomy classes**
- Help students understand facets of astronomy research
 - Doing science ≠ learning science in textbook
 - Provide expertise in assisting NITARP cohorts
 - **GOAL:** nonprofit to support sustainable student research
- Present NITARP work at AAPT/ NES**
- Doing science actively engages students in lessons
 - Collaboration builds positive student-teacher relations
 - Forge relationships with professional astronomers
 - **GOAL:** research opportunities through collaboration

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