How Do Astronomers Know That?

Educating Teachers, Students & the Public on HOW You Discover Young Stars

Robert Bonadurer(1); Margaret (Peggy) Piper(2); Debbie French(3); Jacqueline Barge(4); Lauren Novatne(5); Luisa Rebull(6); Babar Ali(7); Russ Laher(7); James Armstrong(8)

1. Milwaukee Public Museum, Milwaukee, WI 2. Lincoln Way High School, New Lenox, IL 3. New Philadelphia High School, New Philadelphia, OH 4. Walter Payton College Prep High School, Chicago, IL 5. Reedley College, Reedley, CA 6. . Spitzer Science Center (SSC), Pasadena, CA, 7. Infrared Processing and Analysis Center (IPAC), Pasadena, CA 8. University of Hawaii and LCOGT, Maui, HI.

ABSTRACT

Every day amazing astronomical facts are taught to thousands of curious people. Students learn them in the classroom. Museum visitors hear them in a Planetarium show or lecture. When it's time for questions, many intuitively ask, "how do you know that?" NITARP helps close this gap in astronomy education. NITARP stands for NASA IPAC Teacher Archive Research Program. NITARP brings together an astronomer with a small group of teachers and students to do real astronomical research. After the year long program is completed, the education and experiences gained by the teachers are brought back to their classrooms and museums across America. Our NITARP group researched apparent infrared (IR) excesses to identify Young Stellar Objects (YSOs). We concentrated our search in the Bright Rimmed Cloud (BRC) 27, located in the constellation Canis Major. Our main focus was to use data from the Wide-field Infrared Survey Explorer (WISE), along with other archived infrared data such as Spitzer and 2MASS. Thus, our NITARP group was called C-WAYS—standing for Cool, WISE and Young Stars.

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TOP 10 EDUCATIONAL DISCOVERIES

10. Science is collaborative! Astronomers, teachers and students all work together.

9. One telescope never tells the whole story.

8. Frustration is a reality sometimes—but the journey is still worth it.

7. Looking at telescope images is still important to make key decisions!

6. Yes, units matter!

5. Science is a process—there are no answers at the back of the book.

4. Making mistakes can lead to greater understanding!

3. Students & teachers are motivated to do REAL research!

2. You have to read the literature—lots of literature.

1. It's confirmed—MATH is important in astronomy research.

WHAT?

Our NITARP Team discovered 60 new, likely YSOs-- Young Stellar Objects.

Please see our science poster: Novatne et al 256.22

HOW?

- **Telescopes:** WISE, Spitzer, 2MASS, & Palomar
- **Tools:** APT Photometry, IPAC, IRSA, Excel
- **Time:** Weekly telecons, assignments & Caltech

WHERE?

- **Location:** BRC 27 in CMa R1
- **Other Names:** Seagull Nebula, IC 2177
- **Constellation:** Canis Major—near star Sirius
- **Coordinates:** 07h 03m 39s -11d 23m 43s
- **Distance:** 4,000 light years away, or 1.2 kpc

WHO?

5 teachers, 20+ students & 3 astronomers!

Next Steps: Teach new students & the curious public on

WHY?

We came from the stars. When we look across the vast distance to BRC 27, we are discovering our origins.