NASA/IPAC TEACHER RESEARCH PROGRAM
CALIFORNIA INSTITUTE OF TECHNOLOGY / JET PROPULSION LABORATORY
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
PASADENA, CALIFORNIA 91125

High school teachers and students continue doing real astronomy research.

Among the thousands of attendees at this year's 241st meeting of the American Astronomical Society (AAS) in Seattle, WA, held January 8-12, 2023, will be 17 astronomy educators and 12 of their students from the NASA/IPAC Teacher Archive Research Program (NITARP). For some, their presence at AAS concludes a one-year project of combing through science data archives to explore astronomy questions; for others, their work on a new research project is just getting started.

For over a decade, NITARP has partnered small groups of educators with a research astronomer for original, year-long, authentic research projects. At the AAS meeting, the educators from the 2022 class, along with some of their students, present the results of their work from the past year while the new 2023 cohort meet their teams and kick-start their own projects.

NITARP's unique approach to "teaching the teacher" enables NASA to reach thousands of students every year with information about how science really works, what NASA does, and the wealth of astronomy data that is freely available to the public. NITARP supports NASA's goals of inspiring and motivating students to pursue careers in science, technology, engineering, and mathematics as well as to engage the public in shaping and sharing the experience of exploration and discovery.

Since 2004 through 2023, a total of 140 educators from 42 states have participated or will participate; the 2022 class welcomed our first participant from Vermont and the 2023 class has our first participants from South Dakota, West Virginia, and Maryland. Educators are typically classroom teachers for grades 9-12, but some participants have hailed from middle schools and community colleges.

Two teams of educators and their students are presenting their research at the January 2023 AAS meeting.

The 2022 team working with Dr. Luisa Rebull (Caltech/IPAC):

- David Friedlander-Holm (The Bay School of San Francisco, San Francisco, CA) – mentor teacher for the team
- Rita Ciambra (Peoples Academy, Morristown, VT)
- Kathy Gustavson (GLAS Education, Walworth, WI)
- Mary Swigert (Jupiter Community High School, Jupiter, FL)
- Ethan Van Winkle (Southeast High School, Lincoln, NE)

This team looked for young stars in a cluster named for its most massive member, AFGL490. They started with about 520 possible young star members of the cluster, where they found candidate young stellar objects (YSOs) in the literature and selected new ones using Hα emission or infrared variability, and then weeded this list down to 500 young star candidates in which they are reasonably confident. They did this by constructing and using spectral energy distributions, color-color and color-magnitude diagrams, image inspections, and time series analysis. They found 22 YSO candidates that exhibit periodic variations in the mid-infrared.

The 2022 team working with Dr. Varoujan Gorjian (JPL/IPAC):

- Olivia Kuper (North Greene High School, Greeneville, TN) – mentor teacher for the team
- Jeff Benter (Tri-Valley CUSD #3, Downs, IL)
- Janine Bonham (Oley Valley School District, Oley, PA)
- Anna Karsten (Lincoln High School, Lake City, MN)

Detecting planets around stars is a very difficult task, so any way that increases the likelihood of success is much valued in current astronomy. This team looked for infrared excess around M-class stars, the most common type of star in our galaxy, in the Spitzer Enhanced Imaging Products catalog, which contains 42 million sources imaged by the Spitzer Space Telescope at five infrared wavelengths during its first 5.5 years of operation. Dust created from asteroid collisions and disintegrating comets are the remnants of planetary formation that will create infrared light in excess of that emitted from the M-class star alone. Looking for this proxy of planet formation is much easier to detect than individual planets, and our results provide a sample of sources for follow-up for potential Solar Systems like ours.

All NITARP participants' posters can be viewed on the NITARP website.
https://nitarp.ipac.caltech.edu/admin/event/58-AAS-2022

The 2022 educators will now go on to conduct at least 12 hours of professional development for their colleagues in their schools and communities at the local, regional, and national levels, both online and in-person.

NITARP's 2023 cohort of educators and their teams are announced today:

The 2023 team working with Dr. Varoujan Gorjian (JPL/IPAC):

- David Friedlander-Holm (The Bay School of San Francisco, San Francisco, CA) – mentor teacher for the team
- Donald Carpenetti (Craven Community College, New Bern, NC)
- Spencer Cody (Edmunds Central School District, Roscoe, SD)
- Justin Hickey (Episcopal High School, Bellaire, TX)
- Cea Fortarezzo (Strawberry Mansion High School, Philadelphia, PA)

The 2023 team working with Dr. Luisa Rebull (Caltech/IPAC):

- Olivia Kuper (North Greene High School, Greeneville, TN) – mentor teacher for the team
- Damian Baraty (Severn School, Severna Park, MD)
- Rosina Garcia (La Jolla High School, La Jolla, CA)
- Debbie McKay (HSTA at Wheeling Park High School, Wheeling, WV)
- Ace Schwarz (The Shipley School, Bryn Mawr, PA)

The 2023 teams are meeting each other for the first time at this month's AAS meeting in Seattle and are learning about their projects. They plan to present their results, with their students, at the 2024 AAS winter meeting to be held in New Orleans, LA.

IPAC, based at Caltech, in Pasadena, CA, is leading this program. These teams use archival data from the NASA/IPAC Infrared Science Archive (IRSA), the NASA/IPAC Extragalactic Database (NED), and the NASA Exoplanet Archive, all of which are based at IPAC, and other NASA archive holdings. Funding comes from the NASA Astrophysics Data Program.

More information NITARP can be found on its website at https://nitarp.ipac.caltech.edu/.

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