

Opportunity Title: Astrophysics with WISE & NEOWISE

Opportunity Reference Code: 0159-NPP-NOV23-JPL-Astrophys

Organization National Aeronautics and Space Administration (NASA)

Reference Code 0159-NPP-NOV23-JPL-Astrophys

Application Deadline 11/1/2023 6:00:59 PM Eastern Time Zone

Description There are times in astronomy when a giant leap forward can be made simply by additional processing of existing data. Such a leap will be taken by CatWISE, which will generate a catalog from data combined across all phases of NASA's Wide-field Infrared Survey Explorer mission.

WISE has already revealed the closest and coolest brown dwarfs, one of the two most massive galaxy clusters known at $z > 1$, and the most luminous galaxy yet found in the Universe. These discoveries were made using two infrared sweeps over the entire sky obtained from Jan. 2010 to Jan. 2011. Reactivated as NEOWISE, the satellite resumed operation in Dec. 2013, and continues to survey the sky every six months.

CatWISE will adapt AllWISE software to generate a full sky WISE-selected catalog based on the ensemble of WISE and NEOWISE data. The catalog will include motion estimates, allowing exploration of the immediate solar neighborhood for cold objects with masses akin to the giant planets of our solar system, in a way that no current or planned mission can approach. CatWISE will also measure non-moving sources too faint for AllWISE, including galaxy clusters to $z \sim 2$ and quasars at $z > 7$. It will discover sources that cannot be found via forced WISE photometry on optically detected sources, because they emit primarily in the mid-infrared, and enable investigation of questions ranging from star vs. planet formation pathways to the reionization history of the Universe.

This opportunity is for a postdoctoral fellow to play a leading role over a two year period in delivering the CatWISE catalog and exploiting the scientific opportunities provided. Experience writing software and working with large datasets is essential, and a keen interest in astrometry and the solar neighborhood is highly desirable. The successful applicant will work with Dr. Peter Eisenhardt (Peter.R.Eisenhardt@jpl.nasa.gov) and Dr. Davy Kirkpatrick (davy@ipac.caltech.edu), and potential applicants are encouraged to contact them.

References:

Wright, Eisenhardt, Mainzer et al., The Wide-field Infrared Survey Explorer (WISE): Mission Description and Initial On-orbit Performance, *Astronomical Journal*, 140, 1868, 2010

Mainzer et al., Initial Performance of the NEOWISE Reactivation Mission, *Astrophysical Journal* 792, 30, 2014

Kirkpatrick et al., The AllWISE Motion Survey and the Quest for Cold Subdwarfs, *Astrophysical Journal* 783, 122, 2014.

Gonzalez et al., The Massive and Distant Clusters of WISE Survey: MOO J1142+1527, a 1015 M Galaxy Cluster at $z = 1.19$, *Astrophysical Journal Letters* 812, L40, 2015



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Location:

Jet Propulsion Laboratory
Pasadena, California

Field of Science: Astrophysics

Advisors:

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Applications with citizens from Designated Countries will not be accepted at this time, unless they are Legal Permanent Residents of the United States. A complete list of Designated Countries can be found at: <https://www.nasa.gov/oiiir/export-control>.

Eligibility is currently open to:

- U.S. Citizens;
- U.S. Lawful Permanent Residents (LPR);
- Foreign Nationals eligible for an Exchange Visitor J-1 visa status; and,
- Applicants for LPR, asylees, or refugees in the U.S. at the time of application with 1) a valid EAD card and 2) I-485 or I-589 forms in pending status

Eligibility Requirements

- **Degree:** Doctoral Degree.