

OBITUARIES

Judith Lynn Pipher

The “mother of infrared astronomy,” Judith Lynn Pipher, passed away in her hometown of Seneca Falls, New York, on 21 February 2022 from pancreatic cancer.

Born on 18 June 1940 in Toronto, Ontario, Canada, Judy received her BS in physics and astronomy from the University of Toronto in 1962 and her PhD in astronomy from Cornell University in 1971. She wrote her thesis, “Rocket submillimeter observations of the galaxy and background,” with Martin Harwit as her adviser. Judy became a faculty member in the physics and astronomy department at the University of Rochester in 1971.

Judy taught countless students at Rochester. Numerous undergraduates received their educational foundation from her, while many graduate students achieved their PhDs under her helpful, thoughtful, and inspiring tutelage. Judy instilled within all of her students and coworkers a desire to achieve more. She inspired colleagues and served as a powerful mentor and guide to many scientists throughout their careers.

Over the course of Judy’s academic career, she was an author on numerous papers covering various topics relevant to IR astrophysics. Her early contributions to the field included measurements of the galactic background and measurements of reddening—that is, extinction due to dust along the line of sight—for planetary nebulae and star-formation regions.

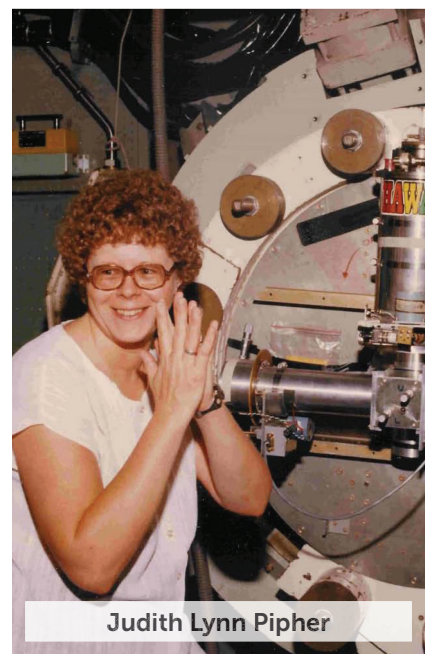
A pioneer in IR instrumentation, Judy, along with James Houck, designed a black paint that had three-dimensional structure, which made it suitable as an absorber for far-IR wavelengths. Judy built and operated a lamellar grating spectrometer for the far-IR that was then used on the Kuiper Airborne Observatory.

With fellow Rochester astronomer Stewart Sharpless, Judy studied many H II regions, most of which were originally cataloged by Sharpless, including S106, a particularly spectacular bipolar H II region that has been a target of virtually all ground- and space-based IR observatories since. Much of Judy’s career was spent using photometric and spectroscopic IR data to study and understand star-formation regions in the Milky Way and in starburst galaxies such as Messier 82.

In 1982, with the acquisition of an indium antimonide CCD, Judy and William Forrest, also at Rochester, were able to produce the first direct images of Saturn, Jupiter, and the Moon. (Previous images were assembled using raster scans from single-pixel detectors.) That enormous step forward for IR astronomy helped to propel the development of the *Spitzer Space Telescope*—originally called the *Space Infrared Telescope Facility*—which was launched in 2003 and decommissioned in 2020. It used a later version of the IR detector arrays, based on a 256×256 InSb array hybridized to a CMOS readout. Judy and Forrest’s development of IR detector arrays facilitated IR instruments used by astronomers around the world to produce many thousands of journal articles over the past four decades, and it revolutionized both ground- and space-based IR astronomy in the process.

In the mid 1990s, Judy and Forrest continued to develop new detector technologies, specifically long-wavelength-cutoff mercury cadmium telluride arrays. Those arrays targeted wavelengths out to $10 \mu\text{m}$ instead of the more traditional $2.5 \mu\text{m}$ cutoffs of the arrays in use at the time. The goal was similar to their effort in the 1980s—to produce detector arrays that could be used with astronomical space telescopes. By 2013 the effort was a success and the arrays were proposed for use in the *Near-Earth Object Surveyor* (formerly the *Near-Earth Object Camera*). The long-wavelength HgCdTe arrays have been matured into a 2048^2 format with low noise, low dark current, and high quantum efficiency suitable for space-based astronomy. Still longer-wavelength versions extending out to about $15 \mu\text{m}$ have been produced.

Judy’s broader impacts on the community are widely felt. Not only was she one of the original trailblazers in using array



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technology for IR astronomy, but she was one of a very small handful of women doing hands-on laboratory research in the area. That earned her the nickname the “mother of infrared astronomy.” She served as an editor of the *Astrophysical Journal*, and the asteroid 306128 Pipher is named in her honor.

Judy was inducted into the National Women’s Hall of Fame in Seneca Falls in 2007 and helped to recognize the achievements of women across a broad array of disciplines when she subsequently joined the hall’s board of directors. In addition, she served as a board member of the Cayuga Lake Watershed Network, an organization devoted to protecting critical natural resources, and of the Seneca Museum of Waterways and Industry, home of the Seneca Falls Visitor Center.

Judy was a pillar of the science community both personally and professionally. Her strength, intellect, courage, and kindness sustained us both through difficult times and continue to inspire us. Not only did Judy give us fabulous new views of the universe through her scientific work, she helped us see with clarity and humanity.

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