

Field Museum to study composition of stardust

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Song lyrics aside, even when you catch a bit of stardust, it may take years to sort out what you've got.

Field Museum researchers have joined with scientists and amateur volunteers around the globe to isolate and analyze interstellar dust gathered by NASA's [Stardust space mission](#) launched more than a decade ago.

A piece of aluminum foil that was part of the Stardust apparatus used to gather dust will be placed in the Field Museum's [scanning electron microscope](#) to produce images scientists hope will lead them to tiny craters where grains of stardust have embedded themselves.

The quest, set to start in early November, "is a once in a lifetime opportunity," said Philipp R. Heck, assistant curator-in-charge at the recently established Robert A. Pritzker Center of Meteoritics and Polar Studies at the museum. "It's a dream come true."

With one of the world's largest meteorite collections, the Field is also home to abundant material from outside the solar system, but all of it is billions of years old, presolar stardust, having been formed before the birth of our solar system, Heck said. Analyzing contemporary stardust will provide a unique opportunity to learn how such materials have evolved over geologic time.

Nearly every element that makes life possible, including carbon and

oxygen, was formed by stars, so this inquiry is central to understanding how we came to be, he said. Using light absorption and other information gained from astronomy, scientists have some understanding about interstellar dust composition. Getting actual bits of dust to study in earthly labs using advance technology will raise the accuracy and precision of their knowledge significantly. Isotopes of interstellar dust can be only measured in the laboratory, and they are crucial to study the evolution and origin of the dust.

The main obstacle now is finding bits of stardust in the apparatus used to collect them. That instrument consisted of an extremely low density substance called aerogel encased in an aluminum foil lattice. Scientists have made millions of images from the aerogel and put them on the Internet at <http://stardustathome.ssl.berkeley.edu/>

Finding grains of interstellar dust encased in aerogel is akin to finding 40 or 50 particular ants on a football field, researchers estimate.

Pieces of aluminum foil from the Stardust mission also likely contain some [interstellar dust](#). They are being imaged at a few selected scientific institutions such as the Field Museum where great care is taken to avoid contamination with earthly dust.

Unlike the aerogel, aluminum foil provided a harder landing for each bit of dust, resulting in tiny craters that are larger than a grain of stardust, which Heck hopes will make it easier to find his quarry.

The project adheres to strict protocols agreed to by an international group of scientists in an effort to preserve the grains of stardust.

"It's a very cautious approach," said Heck. "Every step we take is discussed."

Making images of the aluminum foil, which measures 2 by 30 millimeters, with the Field's scanning electron microscope will take several days, Heck said. He will invite university undergraduate students to come to the museum and help scrutinize the images for signs of stardust.

"It's a great way to introduce undergraduates to planetary science," he said.

Provided by Field Museum

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