

## Microscopy, Meet Astronomy

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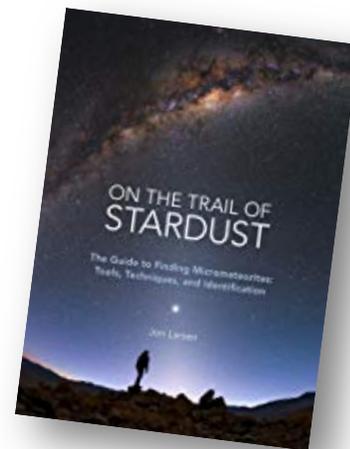
There's an old joke about the psychiatrist who shows his patient a square and asks what it looks like. "Oh, that's a window and you should see what those people are doing in there!" The doc shows him a triangle and the answer is similar, "That's a keyhole and you should see what those people are doing in there!" Same response when shown a circle, "That's a porthole and you should see what those people are doing in there!" "You're obviously obsessed with sex," concludes the doctor. "Me?", cries the patient, "You're the one showing me the dirty pictures!"

Freud might have seen some significance in the fact that a lot of us are obsessed with peeping through tiny holes. After all, a surprising number of people who enjoy peering through the eyepiece of a microscope also enjoy stargazing through telescopes. Happily, there is a socially acceptable way to combine both obsessions—searching for micrometeorites.

If you're interested, Jon Larsen's *In Search of Stardust* and his new guide *On the Trail of Stardust* are the best sources you'll find.



*In Search of Stardust: Amazing Micrometeorites and Their Terrestrial Imposters* is extensively and beautifully illustrated with light and electron micrographs that make it worth buying, even if you only have a casual interest.



But if you want to become a micrometeorite hunter, then *On the Trail of Stardust: The Guide to Finding Micrometeorites: Tools, Techniques, and Identification* is the book you need. It's an indispensable step-by-step guide to searching for

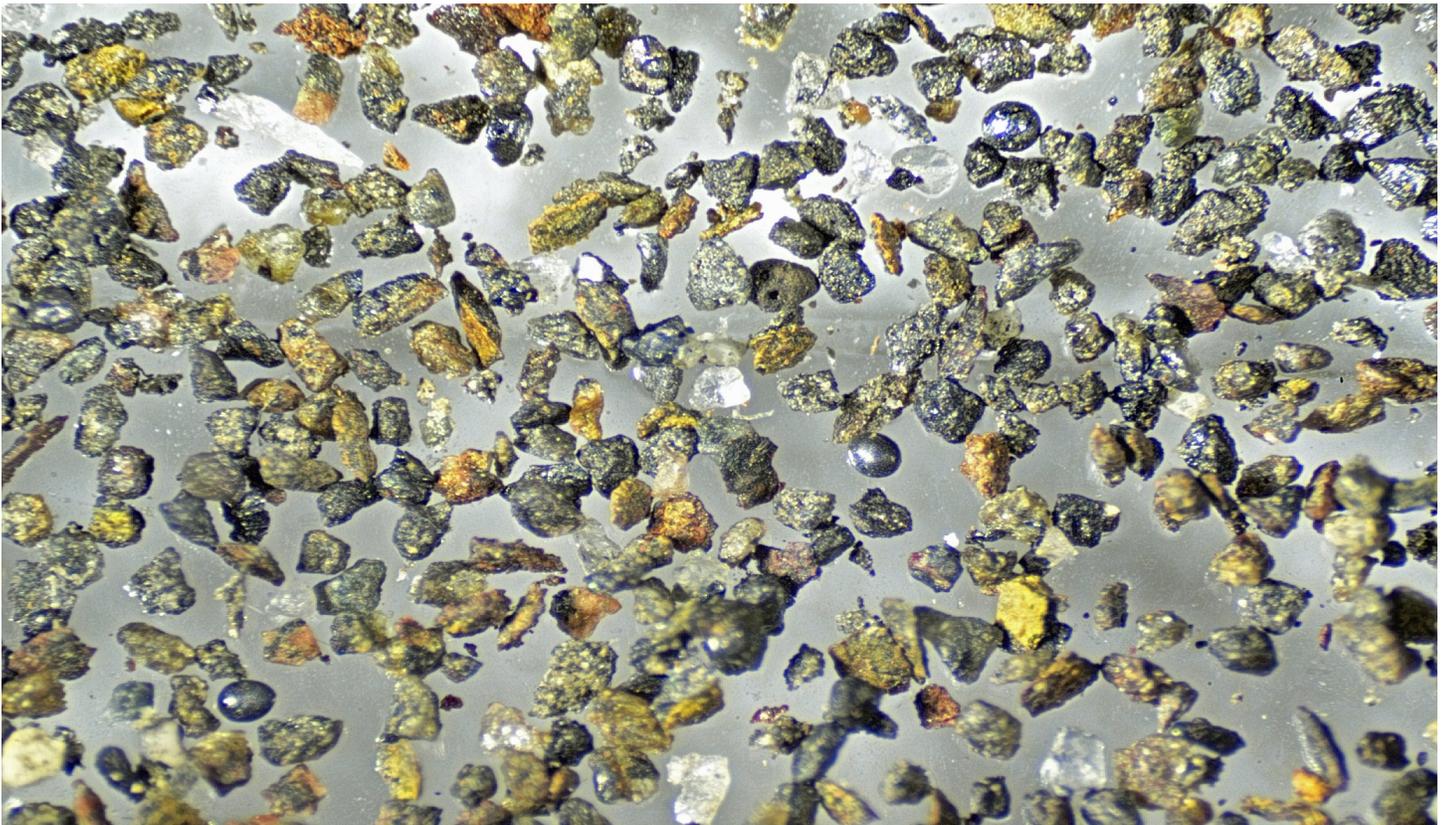


Figure 1 – Two micrometeorites and an imposter hiding in plain sight. Spherical shape and luster are clues. Credit: Scötte Petersön

and identifying tiny bits delivered from space, some older than our Sun.

Serious or just curious, the [Project Stardust Facebook group](#) created by Larsen is a great place to start. In fact, over 11,000 people have joined the group because of their interest in this challenging pursuit.

Interest in “cosmic dust” goes back as far as 1883 and the scientific expedition of HMS Challenger. Researchers onboard reported finding metallic spherules and siliceous particles in ocean sediments and concluded they were of extraterrestrial origin. In 1949, astronomer Fred Whipple coined the word ‘micrometeorite’ for particles that reached the surface (which, unfortunately, is often used interchangeably but incorrectly with the word ‘micrometeoroid’ for a particle found in space).

Then, a [1940 study](#) assumed all tiny black spherical particles were micrometeorites. But it turned out any collection process, such as from roof drain

pipes, produces an abundance of man-made material. However, in 2017—thanks to a [research by Genge and Larsen](#)—we learned that citizen scientists *could* find micrometeorites in urban settings if we’re willing to literally sift through false-positives.

About 40,000 tons of micrometeorites reach the surface of the Earth every year which might seem to make your chances of bagging a prize easy. But they’re so widely spread that a 50 m<sup>2</sup> area will only produce about two a year *and* most are only about 0.3mm in diameter. Fortunately, they’re magnetic which makes finding them easier to find but a lot of human detritus is too.

Don’t let that scare you off. A big roof or a rain barrel can aid you in your hunt. Follow Larsen’s instructions for processing what you collect and then put what you’ve found under a microscope. You’ll find that nature has provided all manner of interesting tiny crystals, mineral grains, and even volcanic specks for your viewing pleasure. And

you'll find humans have created delightful distractions, too, that range from road dust crystals to welding shards—you may even find spherules that are, in a sense, fossils from the age of steam locomotives. But capturing a real speck of stardust will give you a rewarding eco-friendly trophy.

Freud might have suggested that our penchant for looking into small holes has something to do with returning to the womb. But it's more likely that evolution has given us an inclination to hunt. Regardless, can there be a better way to combine an interest in astronomy and microscopy than a search for tiny specks of stardust?



Figure 2 – Micrometeorites come in many shapes, with sizes ranging from 50 $\mu$ m to 2mm, and weighing from 10<sup>-9</sup> to 10<sup>-4</sup> grams. Credit: Jon Larsen

Comments to the author are welcomed, email: tdharnish AT gmail DOT com

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