

Visit the captured moons of the giant planets p. 30

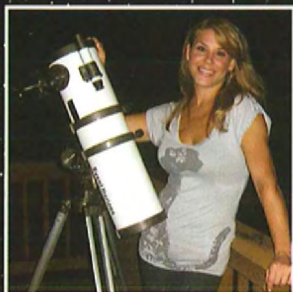
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Astronomy®

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What are galaxies trying to tell us?

The latest techniques are uncovering galaxy shapes, what governs their interactions, and how they evolve p. 24



Writer Erin Reynolds

Why Gen X and Y should care about astronomy p. 54

AND MORE!

Hunt galaxies from the 'burbs p. 52

Bob Berman on astronomy's dimensionless constant p. 12

How the equatorial mount changed astronomy p. 58



Where has the universe's lithium gone?

p. 44

Distant galaxies, including the Andromeda Galaxy (M31), are more than just beautiful sights; they're also valuable sources of information for astronomers who know how to listen.



Just do it

Why Gen X and Y should care about astronomy



It doesn't take a genius to see the lack of young adults in our hobby. Yet an appreciation of the universe should be right up their alley. **by Karen Jennings**

One of the defining moments in my astronomical awareness came while reading Carl Sagan's 1994 bestseller, *Pale Blue Dot*. When describing the Voyager 1 spacecraft's look back at Earth from afar, he wrote: "Our planet would be just a point of light, a lonely pixel, hardly distinguishable from the many other points of light Voyager could see, nearby planets and far-off suns. But precisely because of the obscurity of our world thus revealed, such a picture might be worth having."

Sagan articulated what Voyager's camera could reveal about Earth's place in the cosmos. It's a perspective lost in

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a world where information constantly bombards us and where flash and sizzle dominate substance and reality by the time kids are old enough to hold an Xbox controller.

What our society needs is perspective. And I don't see that often among those in Generations X and Y. It saddens me when I go to a star party and see many of the same people year after year but few younger folks who want to observe and appreciate the universe.

As a Gen Y person myself — and one who really loves astronomy — I don't see why others don't get it. Sagan also said that 95 percent of people on this planet are born, live their lives, and die without knowing their place in the scheme of things. Those of us in the younger generations shouldn't accept this fate, but rather embrace a broader perspective. Here's why we should.

▲ **Karen Jennings** gets ready for some backyard stargazing with her Celestron NexStar telescope. The target: Jupiter and its moons. Charles Jennings

A universal green movement

Apollo 8 astronauts captured the first photos of Earth floating in space on their way to the Moon in December 1968. Not long after, in April 1970, Wisconsin senator Gaylord Nelson launched Earth Day. Anti-pollution advertisements inundated us during Saturday morning cartoons.

Thanks to the environmental movement, Gen Xers and Gen Yers are keenly aware of the impact our actions have on the planet. We know why it's important to recycle, conserve, and reduce pollution. This green movement drives a global awareness that can and should translate directly into a universal awareness because events beyond Earth affect us as well. Changes on the Sun can influ-



The 2010 Cherry Springs Star Party near Coudersport, Pennsylvania, brought hundreds of amateur astronomers together for 4 days of observing and other outdoor activities. Charles Jennings



Young astronomers Gabriel Jennings (left) and Oscar Balan await a night of observing at the 2010 Cherry Springs Star Party. Charles Jennings

ence climate, for example, and a rogue asteroid or comet could destroy civilization — or worse.

Yet how can we begin to think in universal terms when we can't even see most of it? Light pollution intrudes on the night sky and washes out the Milky Way, stars, and galaxies. If you are a child of the 1970s and '80s, you may not have seen more than the Moon, some bright planets, and a few recognizable star patterns such as the Big Dipper and Orion. If the universe is out of sight, it's likely out of mind as well.

When I first heard about light pollution a few years ago (before my interest in astronomy grew), I thought: "I recycle and reuse, and I even created a wildlife habitat

in my backyard. Now I have to worry about light pollution?" I didn't understand light pollution's impact until I attended my first star party at a dark-sky site. There, I looked up and saw the Milky Way for the first time — it was breathtaking.

When I returned home, I did some research and learned that nighttime lighting has a dark side. Of course, it consumes natural resources, drives up energy costs, and often ends up lighting the sky as much as the ground it's intended to. But light pollution also suppresses melatonin in humans, and some researchers think this may be linked to higher rates of breast and colorectal cancer in the developed world. In some cases, brightly lit streets actually increase crime by creating glare and giving criminals shadows to hide in.

It's easy to get started

You don't need an inky black sky to observe, however; you just need a desire. At age 5, my son got a 50mm refractor for Christmas. It ended up in the basement because I didn't have time to read the manual to set it up. Like many others of my generation, my husband and I constantly search for ways to balance hectic school, practice, and work schedules. But we wanted to make a change to dig out from the stress and bring our family closer together. So, a few months after Christmas, we dug out the telescope, turned off the TV and video games, and made stargazing part of our routine. That first night, we started with the Moon and ended with Jupiter and its four bright moons. We were amazed at what the small scope showed.



Charles Jennings collimates his 16-inch Dobsonian at Blackbird State Forest near Smyrna, Delaware. Gabriel Jennings

Since then, we have found that stargazing is a great way to unwind. Viewing the cosmos and discovering your place in it helps redefine priorities and change perspectives. It's harder to sweat the small stuff, engage in office politics, or work nonstop when you know that the universe contains more stars than there are grains of sand on all of Earth's beaches.

An affordable pursuit

In the current economic climate, buying a telescope doesn't rank high on the list of financial priorities for most families. But amateur astronomy doesn't have to cost a lot. Either 7x50 or 10x50 binoculars will get you started — you may even own some already. If you prefer a telescope,



The night sky's allure

I've felt a strong connection with astronomy ever since I was a little girl. One of my first words was "Moon." My mother told me I was always staring at our satellite, and, when I couldn't see it, I would scan the sky asking where it was. I loved the night sky, and I took any chance I had to gaze at the stars.

Although astronomy has always fascinated me, one event changed my thinking about the universe. I was probably 24, and a group was holding a star party in the field of the elementary school across the street from my parents' house. I walked over and casually asked a gentleman if I could look through his telescope. "Help yourself," he replied.

I stepped up and looked through the eyepiece. Saturn and its beautiful rings were staring back. Then I had the pleasure of viewing Jupiter. I thought the colorful bands in its atmosphere and four aligned moons were the most amazing things I had ever laid my eyes on. Something came over me at that moment that made me feel whole, and astronomy became my passion. I may not have been a scientist (my focus in school was always on art and theater), but that didn't mean I couldn't enjoy the universe's beauty.

Of course, not all cosmic wonders lie in the solar system. The bright blue and pink swirls of glowing gas in the Orion Nebula are astonishing through a telescope. Even without a scope, you can view the nebula through binoculars or with naked eyes — it appears as a fuzzy "star" in the middle of Orion's Sword. The Pleiades star cluster in Taurus actually looks better through binoculars than a telescope because its bright stars spread out so much.

A couple of years ago, when I lived on Manhattan's Upper West Side, I had a wonderful neighbor: the Hayden Planetarium at the American Museum of Natural History. When I moved to the city, my mother bought me a membership to the museum, and I visited it and the Hayden often. One of the planetarium shows was called "Cosmic Collisions," which described how violent impacts helped change the course of life on Earth. I saw it three times in a single month.

I also discovered the Galaxy Zoo website while living in Manhattan. On this site, members of the public help classify galaxies by examining images taken by the Sloan Digital Sky Survey. The project hopes to classify a million spiral, elliptical, merging, and oddball galaxies. The Galaxy Zoo is a fun way to contribute to science, and I've spent



Erin Reynolds

Author Erin Reynolds stands next to her 6-inch Newtonian reflector, anticipating a night of observing under a reasonably dark sky.

countless nights at the computer joining in. So far, more than 250,000 people have taken part in this project. (See "Welcome to the Galaxy Zoo" in the September 2010 issue for details about the project.)

There are many ways to explore and learn about astronomy. You can observe through a telescope, go to a planetarium, or discover galaxies in the comfort of your own home. The one dearest to my heart has always been to find a dark sky, sit back, and take in the night's beauty. So, the next time you notice someone with a telescope, don't pass up the opportunity to look through it — it just might change your life. — *Erin Reynolds*

Erin Reynolds is a stay-at-home mom who lives in New Haven, Connecticut. Her son, Jake, will turn 2 in June.



It's a family affair for the Jennings clan, as Karen, Gabriel, and Nathaniel (background) pose with a 24-inch Dob at a star party. Charles Jennings

several manufacturers offer entry-level instruments for less than \$100. These typically have apertures between 2 and 4 inches (50 and 100mm) and yield good views of the Moon, planets, and bright deep-sky objects. And for those addicted to high-tech gadgets, amateur astronomy offers all the goodies you could crave.

You also should consider joining an astronomy club, where you'll meet knowledgeable people and make great friends. My local club, the Delmarva Stargazers in Smyrna, Delaware, has annual dues of just \$15. The club meets once a month and hosts monthly observing sessions and semiannual star parties.

My family had a blast spending our vacation at the 2010 Cherry Springs Star Party, hosted by the Astronomical Soci-

ety of Harrisburg, Pennsylvania. For the \$55 registration fee, we enjoyed 4 days of camping with other amateur astronomers, amazing mountain views, wildlife, swimming, and hiking.

But the best part of the star party had to be the nighttime views under a dark sky. When light pollution threatens to rob us of the opportunity to introduce our children to the night sky, moments like these are precious. It's time for those of us in Generations X and Y to make sure we don't lose any more ground. We are the future of amateur astronomy, and we can pave the way toward a universal movement. ☛



Learn more about getting started in astronomy at www.Astronomy.com.