

Come See the Milky Way In the National Parks Summer Edition

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If you are one of the millions of visitors who live in ever growing urban areas then on a clear, moonless night in the park, you will probably see far more stars in the sky than you have ever seen before. For most visitors to the national parks, a truly dark starry sky is as rare today as the landscape or wildlife that's brought you to the park in the first place. Our dark skies are due to a number of factors, but the most important is the lack of light pollution caused by upward pointing lights common in more populated areas. Artificial light that's allowed to shine upward scatters off particles in the air until eventually some of it gets redirected back towards the ground. Eventually, it appears that the sky itself is the source of a uniform glow. This glow is just bright enough to mask the light of increasingly more stars every year, until soon the wonders of the night sky are lost behind artificial daylight of our own creation. The national park that protects the beauty of the landscape below for our enjoyment during the day, also protects the beauty of the night sky above when it's dark.

Once you find a safe, stable place to see the sky, turn off any lights you may have and let your eyes adjust for 10 to 15 minutes. On a clear moonless night about 90 minutes after sunset you will be able to see many more stars than you've ever seen before. Starting in June and continuing all summer, these stars are joined in the evening sky by the beauty of the Milky Way, the bright, luminous band of our home galaxy the Milky Way.

Every star you see in the sky is part of our galaxy, a collection of over a hundred billion stars. The stars you see sprinkled around the sky at night are simply those stars that are closest to us. The very brightest stars you see in the sky tonight tend to be anywhere from several dozen to several hundred light years away (where a light year is the distance light travels in a year). For comparison, the Earth is only 8 light minutes away from the nearest star, our Sun. Now while on that scale a few hundred light years may not seem too close, the faint splotchy band of the Milky Way, that rises higher and higher in the east in summer, is actually the light of far more distant stars that have begun to fade into one another, much like individual trees in a forest merge into a single green canopy when viewed from a great distance. What you see as the band of the Milky Way is thus the combined light of millions of stars several thousand light years away.

The reason the Milky Way looks like a band across the sky is that our galaxy is shaped like an enormous flat pinwheel in space. From one edge of the disk across to the other is a distance of somewhere around one hundred thousand light years across. The Sun and all its planets, including the Earth, sit around two thirds of the way out from the galactic center, and at this distance the disk is only about 1000 light years thick. Take an American quarter out of your pocket and if you could cut it in half down its edge making

it half as thick, you'd have a fairly good model of how thin our galaxy is. Since we sit within this very flat disk, we see the rest of our galaxy as a band, or ring, around us at night. At any one time, half of that band will usually be above the horizon. Because we sit out towards the edge of the galaxy, we see a different number of stars depending on which direction we look in the band. During the summer, look towards the part of the Milky Way low to the south. This is usually the brightest part of the Milky Way even though it is so low to the horizon that the thick air between us and it, dim the greatest part of its light (much like the sun is dimmed at sunset and sunrise). Look now to this part of the Milky Way and you are looking across the majority of the galaxy's disk towards our galactic center about 28,000 light years away.

Once you've been outside for a while, and your eyes have really adjusted to the darkness, you should begin to notice that the light of the Milky Way's band contains many dark holes and lanes. These are enormous clouds of interstellar dust blotting out the light of more distant stars behind them. From inside these dark clouds new stars will eventually form. If it is a really dark night you will see these dark lanes against the bright heart of the galactic center. Let your eyes move up and to the east along the Milky Way's band and you will see the dark dust clouds appear to make the Milky Way's stars split into two parallel bands by the time you are looking nearly exactly eastwards. At this point you will be looking towards another bright part of the band. Here you are looking almost exactly down one of our Galaxy's spiral arms. It is this direction that our Sun is heading in its 230 million year trip around the Galaxy. Since the Sun first formed, we have made about 20 orbits of the galactic center. Dinosaurs ruled the Earth the last time we were in this location in the Galaxy.

As summer comes to an end, if you should stay up late notice how the part of the Milky Way rising in the north east before dawn looks like nothing more than a pale shadow of the galactic center visible at the beginning of the night. At this point you are now seeing the part of our galaxy pointing directly away from the heart of our galaxy. From beginning to end of summer, and beginning to end of the night the changing sight of the Milky Way's band betrays our position here in the Galaxy. Only here in the darkness of the parks can we see the light of our home Galaxy, the Milky Way. For the University of Redlands and the National Parks, I'm Dr. Tyler Nordgren.