

# **A Night in the Life of a Goldendale Photonhead**

*An essay on astronomical observing at a dark sky site.*

by Christopher Smythies

My afternoon nap is over. I poke my head out of my sleeping bag and crank open an eyelid. The interior of my off-grid, 120 square-foot cedar shelter swims into focus. Tongue in groove walls and a hefty crossbeam support a slanted ceiling. A woodstove stands in one corner, a portable air-conditioner in another. Tall windows offer views of distant mountains by day, and of stars by night. When I remember where I am, a wave of satisfaction washes through me. Building the L-HOP (Little House on the Prairie) was hard, and getting the job done in the remote wilderness of eastern Washington was even harder. But now I'm reaping the benefits of all that work; the place is comfortable, safe, and shelters me nicely from the elements. I climb off my cot, stand up stiffly, and stretch in front of the window. Outside, I have a deck, a shower heated by propane, and a storage shed in the back with a refrigerator to keep my drinks cold. An array of solar panels on the roof generates abundant electricity, and StarLink provides high-speed internet. A double vault toilet is less than a hundred yards away. Aside from food and water which comes from a grocery store ten miles to the southwest, I have everything I need within reach. But now is not the time to revel in the L-HOP's amenities. It's getting late, and this evening there's a new moon potluck dinner at the Red Light Lounge. I've been asked to make a salad, so I'd better get started or I'll be late.

Visiting a dark sky site can cause 'astrodisia' - a love for stars that's highly contagious. Before I first stepped foot on the land that would one day become Goldendale Sky Village - long before I built the L-HOP there - I was a casual stargazer. After only a few minutes under its spectacular dark skies, however, I was shocked and awed into contracting astrodisia and morphed into a photonhead. 'Photonheads' are what I call people who are passionate about astronomy and the pursuit of elementary particles called photons. The idea came from 'parrotheads', which was what fans of the late singer-songwriter Jimmy Buffett were called when they wore parrot hats to his concerts. I expect that if I had the faintest notion of what a photon looked like, I would be sporting a photon hat by now. All I know is that the little fellows are smaller than an atom, have no mass, and exhibit wave-particle duality. They travel through space at 186,000 miles per second for millions of years without getting tired - a level of fitness and stamina unequalled in nature. Whenever I can, I drive the three hours between my home near Seattle and Goldendale to squeeze the electromagnetic juice out of the photons that fall from the cosmic tree. I add sugar, stir, and then chug it down to quench my thirst. Liquid energy flows into my inner space, multiplies my connections, and helps me understand the world around me.

I use a telescope and specialized camera to harvest photons. Astro-imaging, as this method is called, is technically challenging and has a steep learning curve. Consequently, it's governed by Murphy's Law: if anything can go wrong, it will. When it does, imagers are at risk for blowing a cerebral fuse. Stephanie is the co-owner of Cloud Break Optics, a telescope store located in the Seattle suburb of Ballard and the hub of the local astronomical community. When she's not selling merchandise, she offers therapy to imagers at risk for suffering a stroke. They are deeply grateful for her help and regard her as a 'dark sky guru' – an inspirational mentor who knows how to nurture the astrodissia in their hearts. Mark is a former firefighter with the Bellevue Fire Department and serves as the village's fire marshal. When he first started imaging, he didn't know much and struggled. After Stephanie stepped in, however, he suddenly made good progress. Now he mentors too and has become another dark sky guru. I am one of his most ardent disciples and observe with him as often as possible. Imaging may be difficult, but the final photographs can be breathtakingly beautiful, filled with detail and color. Whenever I admire mine, I quickly forget any difficulties I might have had creating them.

If they're not astro-imagers, photonheads are visual observers who slip eyepieces into the ends of their telescopes and peer through with one eyeball or the other. The later the hour, the more bloodshot the eyeball. They are searching for planets, comets, nebulae, galaxies, star clusters – objects often only the faintest smudge against the blackness of space. At the village, visual observing is very popular, especially on Dob Alley, an area named after the gigantic Dobsonian telescopes located there. Bhavesh, the owner of two UPS stores in Portland, is very experienced. Teetering precariously on the top of a tall ladder so he can reach the eyepiece, he can spot galaxies 600 million light years away. NGC clusters - random groupings of stars – excite him so much, he published a 4-volume field guide that lists more than 7000 of them. When I flip through its pages, they all look the same to me. To him, they are old friends, each one with a unique personality. Alan is a collector of antique telescopes. He often takes them to heavily light-polluted parks in downtown Seattle, sets them up, and invites members of the public who happen to be walking past to look through. Their reactions are priceless, and lines quickly form. To be a visual observer, one doesn't necessarily need a telescope. Margo, an accountant, spends long hours studying spreadsheets and tax forms. On weekends, however, she breaks free and can usually be found at the village, basking in her deck chair all night long as if she's hoping starlight will give her a tan. When there's a full moon, I half expect her to put on dark glasses and rub in sunscreen. One of these nights, I'll dump a truckload of sand onto the ground, call it Oumuamua Beach after the interstellar object that passed through our solar system in 2017, and invite her to join me for a Margo-rita.

Harvesting photons is most productive when photonheads organize themselves into packs. 'Star parties', as these packs are called, take place around the new moon when the sky is darkest. Visual observers and astro-imagers alike carefully gather a crop of precious photons that have reached the end of their long, lonely journeys through space and are ripened to perfection. Contrary to what the name suggests, star parties do not have music, alcohol, or revelry. Just dim red lights jiggling about in the gloom as barely discernible figures consult their star charts, select the best eyepieces, and check equipment. The preservation of night vision is critically important and white light of any kind, even from a dimmed-down cell phone, provokes cries of protest. People find their way around by following small glow stones placed about a yard apart down the middle of roads. Talking is hushed and purposeful. Also heard is the whirring of cogwheels

inside motor drives as telescopes slew from one sector of the sky to another. They are searching for the richest sources of photons like bumble bees exploring a flower bed for the sweetest nectar. Star parties can be very large. The annual Washington State Star Party is one example. Hundreds of amateur astronomers come from all over the Pacific Northwest with their tents and RV's and stay for several days. Inevitably, outbreaks of astrodisia sweep through their encampment, transforming many into photonheads.

For years, I attended the Seattle Astronomical Society's semiannual star party at Brooks Memorial State Park on Highway 97. Conditions were challenging. At night, huge 18-wheelers barreled past at top speed with their headlights wreaking havoc across my retinas. A light bulb at a Greek Orthodox convent half a mile away added insult to injury. We asked the nuns to turn it off, but they never did. The surrounding hills obstructed any celestial target close to the horizon, and a tall tree in the middle of the telescope field turned tracking stars into a game of peek-a-boo. By 2016, I'd had enough. I was desperate for an astrodisiac - a high-quality dark sky site to stoke my love for stars. For two years, I spent my weekends wandering through the deserts of eastern Washington, searching for the land of milk and honey, visiting and evaluating more than a hundred listings. I found what I was looking for on Munson Prairie, about ten miles northeast of the town of Goldendale in Klickitat County. This was the sweet zone between the heavily forested Simcoe Mountains where the pines are too dense for observing and the scrublands above the Columbia River where the winds are too strong. In May 2018, a potentially astrodisiacal dark sky site on the prairie was offered for sale. Stephanie, Alan, a clinical psychologist named Peter, and I went to investigate. When we arrived, we found a 30-acre parcel with topography that resembled a giant theater. As we stood at the front gate, we imagined rows of stall seats in front of us, dress and upper circles above them, and a stage at our backs. Clearly, this was a place where the greatest show on earth - the galactic core along with its rich cache of treasures - could be performed almost every summer night. We followed a deer trail as it twisted and turned through countless rocks left behind by the cataclysmic Missoula floods 15,000 years ago. When we finished exploring, Peter looked at me with a wistful smile, and quietly said from the corner of his mouth, "I hope you know this is going to be one helluva lot of work." The next day, refusing to be discouraged, I fired off emails to my fellow photonheads, proposing to sell shares in an LLC in exchange for the use of small observing lots within the future village. Were they interested? Stephanie immediately stepped forward and bought some. Once everybody saw what their venerated dark sky guru had done, they stampeded to join her, and within six weeks we had enough cash to purchase the land. Closing was in the morning of September 7th. We went to the village later that day, christened it Goldendale Sky Village, and celebrated with a bottle of champagne.

Now that we owned the land, our next task was to transform an impenetrable wilderness into a community for observing. Access was the immediate problem. The rocks were so dense, we couldn't fit more than three cars past the front gate. We didn't have much time either; the most fanatical members would soon be showing up in their RV's, drooling with excitement. Without delay, we cleared the rocks away with an excavator, leveled the ground, and created The Portal, a 1.7-acre grassy field that serves as our gateway to the universe. We encircled The Portal with Portal Rim Road, then built a network of gravel roads, using names with double meanings: Dust Lane, Milky Way, Lunar Crescent, Declination Drive, Star Trail, Kuiper Beltway, Ophiuchi Row, Right Ascension Drive, and Barnard's Loop. We also created neighborhoods: Supercluster,

Galaxy Cluster, Tycho, Setting Circle, and Mount Altaz, each designed to maximize contact between neighbors and promote camaraderie. We named other infrastructure too: Black Hole Toilets for the restrooms, White Dwarf for the shipping container, Quasar Power Station for the solar panels and batteries, and the Red Light Lounge for eating, drinking, and relaxing. As the village gradually took shape, its membership grew. It turned out that there's a diaspora of photonheads in the Pacific Northwest; they were scattered across the region, dreaming of a dark sky home from where they could observe in peace. We were meant for them, and they for us. By the summer of 2024, all but one of the 78 lots on the property were occupied.

The photonheads of Goldendale Sky Village are aware how fortunate we are to have such a special dark sky site. To share it with others as much as possible, we launched a program of public outreach and education by establishing an independent nonprofit organization, StarTrak Academy. After a lot of hard work, StarTrak became affiliated with Seattle's Mountaineers club, another nonprofit that was founded in 1906 and offers outdoor adventures for its 10,000 members. During the summer, Alan and a former Boeing employee named Keith teach classes in astronomical observing at the club's headquarters. Once the students have mastered the basics, they come out to the village where they are shown what stars look like from a dark sky site. Mark the firefighter, Peter, and a nuclear scientist named Bob help out. Stephanie teaches an introductory class in astro-imaging, and - no surprise - has inspired many to pick up the hobby. Overall, StarTrak's work has been very successful, with full classes and long waiting lists.

In 2021, an unrelenting astrodisiagenic storm drove me to form another LLC, Chiricahua Sky Village, in Cochise County, Arizona, where there are 95 more sunny days per year than Goldendale and an extra three and a half hours of darkness on the summer solstice. What appealed to me most, however, was the idea that the new village could be the dark sky home for the photonhead diaspora throughout North America, not just the Pacific Northwest. Anybody languishing under wintry skies, juiceless and useless, can catch a plane and binge on stars within a few hours. In retrospect, forming another LLC in Arizona was a risky enterprise and could have crashed and burned. Enthusiasm amongst my fellow photonheads in Goldendale wasn't the issue. The night sky over Cochise County is deliciously dark, and half of them piled into Chiricahua Sky Village as if it was Walmart on Black Friday. One of them, Blaine, is a brilliant research scientist who invented the Personal Remote Observatory (PRO) with Arizona in mind. The PRO promises affordable remote imaging and enables photonheads to satisfy their astrodisia without ever having to leave home. Some of the Goldendale crowd even admitted they were unlikely to ever visit the place but wanted to support it anyway. There was also an encouraging level of interest from people in California, Texas, and Oklahoma. What I needed the most, however, were boots on the ground - photonheads who lived within driving distance and were willing to do the grunt work necessary to get the new village up and running. That's when I got lucky and met Andrew on Cloudy Nights, the online forum for amateur astronomers, and Mark at the Advanced Imaging Conference in San Jose, California. Both are from southern Arizona. Their passion for astronomy and the pursuit of photons burns so intensely, it generates its own weather systems. When I told them about the village, they immediately became members and did everything required to ensure that the project was successful. All of a sudden, we had decent access to the site, a gate, an internal road system, a shipping container, WiFi, and a perimeter fence that prevented open range cows from burying everything in manure. Thanks to Blaine,

Andrew, Mark, and many others, Chiricahua Sky Village is now firmly established and has an exciting future.

The new moon potluck dinner at the Red Light Lounge is ending. This month, there were about 50 photonheads in attendance. Nik, a high school science teacher, invited his entire senior class for the weekend, so they were at the dinner too, chatting excitedly about the night ahead. Another twelve members of the Mountaineers, recently graduates of their introductory classes in Seattle, were there too. The food was good, and even my sorry-looking salad received a compliment. Now the twilight is darkening, and the stars are beginning to appear. There's much to be done before the harvest can begin. The photonheads are returning to their lots, and the students along with the Mountaineers go back to the Portal. I walk with Casey, a rocket engineer, and John, a master brewer. They are worrying about the 20,000-acre wildfire that's burning ten miles to the east. Fortunately, the winds are very light from the west, so the flames and smoke are not likely to reach us. I cheerfully point out that in the worst-case scenario, even if our village burned and was reduced to smoldering ruins, the sky itself would be unaffected. That seems to make them feel better. When we reach my lot, I peel away from my friends, lift the cover off my telescope, and run a visual check. I have a Williams Optics refractor, a ZWO monochrome camera, a filter wheel, a tripod, a focuser, a guide camera, a Rainbow Astro harmonic mount, and an ASI AIR computer about the size of a packet of cigarettes. A jungle of cables links the various electronic components, enabling them to talk to each other and coordinate their complex functions. On the menu tonight is NGC 3972, a galaxy 65 million light-years away. This means the photons I'll be harvesting departed on their journeys when the dinosaurs were busy becoming extinct. I pull out my iPad, enter instructions, and the telescope slews towards my target. When it's pointing in the right direction, I take a 60-second snapshot and spot a fuzzy blur in the middle of the screen. I cool the camera to -20 degrees Celsius to maximize the signal-to-noise ratio, run an autofocus, then start guiding so my tracking is perfect. Lastly, I program a sequence shooting through clear, red, green, and blue filters, 20 subs each, with 5-minute exposures for a total of 6 hours and 40 minutes of open shutter time. Assuming the imaging is successful tonight, I'll file the data for processing another time, most likely in the winter. That's when I'll meet regularly with Mark the firefighter and Calvin, a software engineer who knows a lot about processing data. We'll work together in each other's homes, turning reams of digital information into photos that teach us something about the universe. Producing the NGC 3972 photo will lift me out of the off-season doldrums. When I show it to my family and friends, they'll ooh and aah at it, especially when I mention the bit about dinosaurs.

I look up at the sky. It's maximum darkness now and that means . . . *showtime!* I pull out my cell phone, open Spotify, and find the music for 2001: a Space Odyssey. I tap the screen and a pair of powerful speakers I've hidden behind some bushes hum into life. An organ plays a solitary note - low, long, and rumbling. On a still night like this one, the acoustics in the village's natural theater are perfect, and I know I'm getting everybody's attention, even as far away as the highest circle seats. Right on cue, a huge stage curtain along the southern edge of the village lifts into the air. The organ pauses for a moment, and then begins again, this time accompanied by trumpets. Their clarion call rises, and then rises again, steadily growing ever more insistent. Sagittarius and Scorpio are center stage, beautiful constellations whose stars hang like brilliant diamonds in the sky. An orchestra blasts out two dramatic chords in quick succession - *TUH-DUUUUUUUH*. Then, kettledrums: *Boom-Bam-Boom-Bam-Boom-Bam-Boom-Bam-Boom-Bam-Boom-Bam-*

*Boom.* I laugh as I imagine villagers everywhere rolling their eyes and shaking their heads. The sound of trumpets returns, and the curtain keeps going up. Now the core of the Milky Way galaxy comes into view, rich in nebulae, globular clusters, and tightly packed star fields. Befitting such an impressive sight, the entire orchestra crescendos and then explodes in an all-encompassing climax of sound. Richard Strauss' fanfare, *Also sprach Zarathustra*, is the best space music ever composed, and I play it at the beginning of every show to set the mood. After hearing it so often, I am inspired to build a full-sized monolith at the village and go there to think. In the movie, an ape picks up a bone and smashes the skull of a tapir with it. I hope I don't provoke my fellow villagers badly enough that they pick up a rock one of these nights and smash my cell phone to pieces.

I press the 'Go' button on my iPad screen and my camera's shutter opens, admitting a flood of photons. As they pour into the sensor, my spirit becomes buoyant, and floats out to space. Planets pass me by, the sun diminishes into a point of light, and the Milky Way's glittering spiral arms embrace me, infusing me with inner peace. I become a pilgrim in a cathedral of infinite height, freed from my world and granted sanctuary amongst the stars. My thoughts know no bounds and I ask the big questions. Who am I? What is my place in the universe? And what does it all mean? As I listen for answers, the vacuum silence of deep space resonates throughout my mind. Although I hear nothing, a powerful presence makes itself known, and I am mysteriously enlightened. Love is the sole purpose of the universe, beginning with the Big Bang more than 13 billion years ago. Fusion reactions within stars turn hydrogen into carbon, nitrogen, oxygen, and all the other elements. Supernovae dispatch these into space like plants dispersing their seeds into the wind. When they reach fertile planets, they take root and sprout into molecules, proteins, and DNA. Unicellular organisms evolve into complex animals. Sea creatures grow legs and crawl onto land. Apes learn to walk on their feet and use their hands. Humanity is the universe's crowning achievement. Along with our consciousness and power of reasoning comes our capacity to love, which brings us happiness and fulfillment. Different cultures around the world have their own pathways to this blissful state of transcendence. A few have been followed for thousands of years and are well worn, while others were established more recently and are still being explored. We, the photonheads of Goldendale Sky Village, have one too. Astrodisia is our starting point. From there, we use astro-imaging and visual observing to harvest as many photons as possible for their electromagnetic juice - the elixir of the heavens. Like the rocky trail we followed when we first walked this land, our pathway has obstacles that test our determination. If a friend warns us about the hard work ahead, we refuse to be discouraged. If a dark sky guru offers help, we gladly accept it. No matter what happens, we persevere, through absolute darkness, if necessary, with glow stones leading the way. The juice we drink unlocks secrets of the universe that have the power to transform us. Whatever we discover must be kept alive in our hearts, shared with others, and passed on to future generations.

Suddenly, a fireball streaks through the sky, followed by a trail of smoke and debris. Shouts of delight erupt from the north end of the Portal where Nik's students and the Mountaineers are. I snap out of my thoughts and check my iPad. The imaging is on autopilot, so I'm free to mingle. Following glow stones on the road, I walk through the darkness towards our guests. Nik, Peter, Bob, Mark, and Alan are with them, showing them sights through their telescopes: the rings of Saturn, the moons of Jupiter, the Andromeda galaxy 2.5 million light-years away, and many more. As they take turns at the eyepieces, they gasp in wonder and disbelief. "This is what it's all

about,” I muse into the darkness, assuming I’m alone and not expecting anybody to hear me. A woman a few feet away replies, slowly and deliberately, “It sure is.” I can’t see anybody but recognize the voice. It’s Margo the accountant, starbathing in her deck chair.

Hours later, not long after the students and the Mountaineers retired exhausted to their tents, dawn’s gentle light arrives. My computer completes its run of imaging and returns the telescope to its home position. Observers around me are straining the last dregs of intergalactic photons from the brightening sky. The show is over, and the stage curtain is finally falling. I hear applause and shouts of “Bravo!” and “Encore!” coming from Dob Alley, and I know Bhavesh and his friends over there must have had a good night. Casey and John the Brewer are not far away, giving each other high fives. I clap my own hands together, showing heartfelt gratitude for such a fine production. Once again, my astrodisia is satiated, and now I’m ready to make the most of another day.

I switch off my computer and cover the telescope. I ought to collect some calibration data, but that can wait until later. Right now, there’s something much more important to do. I head back to the L-HOP, crawl into my sleeping bag, and fall asleep before my head hits the pillow.