

Joe Shields researches quasars, black holes in galaxy nuclei and other nebular astrophysics. He earned his doctorate from the University of California at Berkeley. Before joining Ohio University, he held positions at Ohio State University and the University of Arizona. He is currently serving as the chair of the Department of Physics and Astronomy.

Dark Sky at Night: Athens Delight

By Joe Shields

Athens is a relatively small town, and consequently many people upon first arrival are more cognizant of what it lacks rather than what it has to offer. But with time many people who live here come to appreciate the community's attractive natural setting and the ready access it provides to outdoor beauty and recreation. Topology, flora, and fauna are the distinctive elements during the day, but another aspect emerges at night when these features fade and the night sky takes center stage. The darker parts of the city and other venues a short drive away provide good views of the Milky Way and the star-studded night sky. Contemplating these sights provides a way for us to connect with something far larger than Athens, or even this planet. A sense of wonder is something we experience too rarely in this media-saturated life; but the night sky can still be an endless source of awe for those who take note of it. To my mind, proximity to the viewable cosmos is a part of the distinctive character of Athens.

The Milky Way is our cosmic home. Our sun is one of 100 billion stars that make up our galaxy, a flattened cloud of stars held together by gravity. Since we reside in the midst of this sea of stars, our galaxy appears as a luminous band stretching across the sky – hence, the Milky Way. But beyond the glowing stars, there is, quite literally, more than meets the eye in our galaxy and others. Scientists at Ohio University are deeply engaged in the study of neutron stars, objects the size of Cleveland with the density of an atomic nucleus; of black holes with the mass of 10 million suns, which reside in the centers of galaxies; of mysterious *dark matter*, which provides the gravitational glue that keeps galaxies from flying to pieces. The same researchers collaborate with members of the community in introducing the public to naked-eye wonders of the universe. Astronomy can be enjoyed at many levels, and in this regard the connection between campus and community is fostered by our dark skies.

Students at Ohio University have studied astronomy from the institution's earliest days. Trustees minutes from 1815 quoted in Thomas Hoover's *History of Ohio University* indicate that the first bachelors degree recipients were examined in "grammar, Rhetoric, the Languages, Natural and Moral Philosophy, Logic, Geography, Astronomy and the various branches of mathematics." In the 19th century, the absence of significant artificial light meant that dark skies were the norm and most people had greater first-hand recognition of astronomical features. The academic study of astronomy in that era, however, was limited in scope with a focus on stellar positions, and orbits of bodies in the solar system and in binary stars. The Milky Way and the Universe were considered the same and by all appearances we were at its center. Today our students learn that

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our galaxy is only one of a hundred billion in the observable universe, and that we reside in the suburbs of the Milky Way rather than its center. To study other galaxies, our students make use of a major observatory in Arizona supported in part by Ohio University, and NASA facilities in space. Since Ohio University's birth the tools for studying the night sky and our understanding of what it holds have changed dramatically, and our students are part of the ongoing discovery process.

On and off campus, there are many people in the Athens area who feel a connection to the night sky. A visible subset of these individuals is associated with the Southeast Ohio Astronomical Society, whose members share news about celestial events and organize stargazing sessions in collaboration with University faculty and students. But in repeated instances, I have learned to my surprise that individuals I have met through other connections count astronomy as one of their avocations. Some of these individuals own remarkably sophisticated telescopes, while others rely on binoculars or simply the naked eye. They speak of the beauty of the night sky and sometimes the awe they sense while pondering the extent of what they see. In the urban settings where I lived before moving to Athens, it was rare to encounter individuals with such passions.

Many people have never seen the night sky under conditions where light from human activity is negligible. Light from outdoor fixtures that is directed upward scatters off of molecules and dust particles in the air, resulting in skyglow that overwhelms many of the features of the natural sky. As an astronomer I am particularly sensitive to this issue, and I find it disconcerting that a large fraction of our undergraduates, most of whom come from large metropolitan areas, have never seen the Milky Way as a result. While I have seen many constellations, meteors, and occasionally even the Aurora Borealis – the Northern Lights – from my backyard in the middle of town, Athens itself has nontrivial light pollution. But it is relatively easy to escape to darker locales where the sky's celestial glory is available for view.

Light pollution is not inevitable. Light that is directed upward is light that is not serving its intended purpose of aiding visibility for streets, public spaces, signs, and buildings. Light pollution can be minimized by using directional fixtures that restrict light output to where it is needed, and by avoiding excessive lighting. Using appropriate amounts of light and putting it only where it is useful has the added benefit of maximizing energy efficiency and minimizing operating costs for lighting. In Athens we have had some success in educating the public about this issue, as well as convincing the city to adopt an outdoor lighting ordinance that has eliminated the worst forms of light pollution in new commercial development. Recognition of the need for such measures is moving into the mainstream; *The New Yorker* magazine recently contained a feature story about the vanishing night sky and what can be done about it.

My experience in working on light pollution has introduced me to another distinctive aspect of Athens, which is that it is a community where the actions of a concerned individual can bring about positive change. Many people in Athens feel strongly about quality-of-life issues; if you live here for any length of time, you will get to know residents who feel strongly about their community. Because Athens is a small city, its public officials are relatively accessible. With this combination in place, individuals who are committed to improving the community and are willing to invest some time have a genuine opportunity to make headway.

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The dark skies accessible from southeast Ohio thus foster connection at multiple levels to the people who live here. The nighttime sky invites attention to our place in the Universe; it inspires awe that links us to our fellow humans; and recognition of its value connects us to our neighbors in working to preserve dark skies for future generations. This connectedness is a distinctive part of living in Athens.