

Heaven's Gate

This mountain astronomical center offers vistas measured not in miles but in light-years. *By R. Kelly Coffey*

Pisgah National Forest, that sprawling stretch of federal government land between Boone and Brevard, is hard to miss as one travels around western North Carolina. Less visible is the Pisgah Astronomical Research Institute (PARI), located on the site of a former NASA tracking facility deep within the national forest near Rosman. Although somewhat isolated, the PARI site has an extraordinary past and promises to become a leading astronomical center for both scientists and the public.

Driving through the Transylvania County forest into the open PARI campus is startling, like stumbling upon an ancient temple complex recently exposed after centuries of forest growth. In addition to a variety of low-standing, 1960s-era buildings, the site's landscape is dominated by

the yawning bowls of two towering radio telescopes. In keeping with its name, PARI supports studies of the cosmos by offering astronomers use of telescopes, support facilities, and a remote location where light pollution and other earthly interference are minimal.

Totally accessible

Despite the impressive equipment and serious studies, PARI is not the image most people have of a research establishment. "We operate like a three-legged stool," says Dr. David Clavier, vice president of administration and development. The three objectives of PARI, he says, are education, research, and public outreach. Although scientific research is a major component of the work at PARI, the education and public outreach aspects seem to be the

primary motivation for PARI staff.

While other scientific research facilities tack on public tours as a postscript, volunteers and visitors to PARI immediately realize that they're just as important to the PARI mission as the scientists. "They make us feel like we're the stars," says frequent visitor and volunteer Sherry Austin. Austin describes herself as "a complete science illiterate" but nevertheless feels right at home at PARI and enthusiastically supports the organization's mission. "We need a public educated in science so we can all make more educated decisions about our world, and so we can enjoy what scientists are discovering," she says. "PARI is making this possible for everyone."

Tuning In

Although the Pisgah Astronomical Research Institute utilizes a variety of astronomical instruments, the defining feature of the site is the two immense 85-foot-diameter radio telescopes used to capture electromagnetic waves from deep space.

Astronomical objects (including our sun) emit a broad spectrum of electromagnetic waves – radio waves, gamma rays, visible light, and ultraviolet light to name a few. The human eye can detect only a portion of this spectrum. The value of radio telescopes is that they enable us to "see how the sky would appear if we had radio eyes," says Dr. Mike Castelaz, PARI's director of astronomical studies and education.

An added benefit of radio astronomy is that foul weather doesn't impede the effectiveness of the telescopes: They can detect radio waves anytime – daytime, nighttime, and even through clouds.



PARI's radio telescopes detect electromagnetic waves from deep space.

Such public engagement is ironic given the site's history. The story behind this high-tech facility in the middle of an extensive forest is an intriguing tale of space exploration, espionage, wilderness isolation, Cold War history, and astronomical discovery. In the early days of the space program, NASA constructed more than 20 radio antennae around the globe to track spacecraft, with

Well Equipped

- PARI has 15 full-time employees and 200 volunteers.
- In addition to the two enormous radio telescopes, PARI's 200-acre campus includes eight optical telescopes, two smaller radio telescopes, 30 assorted buildings including classrooms and a cafeteria, and various scientific monitoring equipment like weather stations and a seismometer.
- During the Cold War, operators at the site humorously painted a smiley face on one of the smaller radio antennae (below), knowing that the image would be captured by orbiting Soviet spy satellites. The Smiley radio telescope is still in use at PARI.
- Many features at PARI can be accessed remotely, including the Smiley radio telescope, which is used by high-school students as far away as Australia.
- A portable planetarium called StarLab is operated by PARI, traveling to many schools throughout the year.
- Although it's in a remote location, PARI has direct contact with approximately 20,000 people per year, including those off-site who visit StarLab.

the Rosman station being one of the first assembled. As more communication satellites were shot into orbit, however, the need for earthbound radio antennae diminished. So, in 1981, NASA turned the Rosman site over to the Department of Defense. The National Security Agency utilized the site to intercept security-related satellite communications from the Soviet Union, although these activities were concealed at the time. But with the end of the Cold War, this federal agency pulled out as well, taking most everything that wasn't fastened to the earth. "They even took the shadows," PARI President Don Cline dryly notes, alluding to the secrecy of the agency's activities. Nevertheless, the most significant equipment and buildings were left behind.

Mission possible

The story of PARI itself begins with Don Cline, a Statesville native who now lives in Greensboro. After a stint on the technical staff of Bell Telephone Laboratories, Cline developed his own business manufacturing electronic testing equipment.

Cline was assisting Appalachian State University in a search for a radio telescope when he came across the ones at the former NASA facility. The federal government planned to permanently dismantle the entire site and return the location to national forest. Cline wanted the radio equipment for ASU but soon realized that the cost of moving one of the giant telescopes to Boone would be, well, astronomical — not to mention that the task would be extremely difficult. That's when he began thinking more broadly about the possibilities for the campus as a whole.

"It was an opportunity about to pass," Cline recalls, and it was an opportunity unlikely to happen ever again. After selling his business, Cline invested his own time, energy, and resources to making his idea a reality. The acquisition of the site involved a land-swap

arrangement with the U.S. Forest Service. By 1999, the endeavor that started as a telescope search had developed into a one-of-a-kind, not-for-profit research and education center widely available to a broad spectrum of users — from grade-school children to the general public to cutting-edge astronomical scientists.

"No single university could build a facility like this," says Dr. Mike Castelaz, PARI's director of astronomical studies and education.

Night life

Every month the organization sponsors an "Evening at PARI" public program. Visitors, varying in age from children to senior adults, arrive just before sundown. The activities begin with an outdoor walking tour of the PARI campus led by Science Educator Christi Whitworth. As darkness descends, the group moves inside for a presentation on lunar eclipses by Dr. Bob Hayward, who worked for 30 years with the Fernbank Science Center in Atlanta, Georgia. Presentation topics vary from month to month, depending on upcoming astronomical events. Hayward's lecture, although comprehensive and technical, is also lively and interesting. He sustains the

if you're going

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The Evening at PARI program is scheduled for the third Friday of each month, beginning about 30 minutes before sundown. Reservations are required. Admission is \$20 for adults, \$15 for seniors and military personnel, and \$10 for children younger than 14. For reservations, contact Christi Whitworth at (828) 862-5554.



attention of even the youngest children in the audience, while challenging the adults as well.

After the lecture, PARI staff leads the group back outside into the darkness for stargazing. Everyone has an opportunity to look at the sky through a couple of small telescopes. While we wait our turn, PARI staff point out various constellations, planets, and stars visible with the naked eye. "My goal is to make it interactive," Whitworth says. "Nobody is ever bored; sometimes the

adults are more eager than the children."

The Orion constellation, Saturn, and the Pleiades are prominent on this night as Whitworth recounts ancient legends regarding these groups of stars. Through the telescopes, the points of light in Orion are magnified to reveal the Orion nebula, a gaseous and glowing cloud of stardust. The amorphous twinkle of Saturn becomes the crisp, familiar image of the ringed planet, with one of its moons visible as a bonus. Exclamations of "Wow!" and

"Let me see" punctuate the night air. Like the Biblical namesake Mount Pisgah climbed by Moses to view the Promised Land, the Pisgah Astronomical Research Institute allows us to view places in the universe we will never visit — but that nonetheless inspire our curiosity and stimulate our sense of discovery. ☞

R. Kelly Coffey writes from his home in Watauga County.

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Costume from Niles, Janis Morris as Carla. Photo by Amanda S. Hughes

Just Friends

The Friends of PARI volunteer program encourages interested individuals to use their skills and resources in a variety of ways. Sherry Austin and her husband, Rick, recently sponsored a graduate student who came from Seattle to PARI to study two star clusters, with Sherry providing non-academic but essential "time-off" support like lunch and shopping.

Retired professional astronomer Dr. Paul Janiczek has found his niche at PARI by helping build its library. "I was fortunate to have longtime friends who donated valuable publications," he says, "and fortunate in finding well-connected sources that are happy to make PARI's library needs a priority."

Volunteer Thurburn Barker works with PARI's astronomical plate collection. This collection contains photos of stars used for specific projects years ago at various universities and astronomical facilities. The photos were stored away after the projects were complete, seemingly unneeded. PARI is the only facility that collects the plates, thus saving them from being discarded. The scientific community now has a renewed interest in these photos in order to study how celestial objects have changed.

Barker also has been mentoring local high-school student Mike Aubrey, who is using the plates for a senior research project on symbiotic stars 700 light-years away.