

The Astronomy Picture of the Day Web Site: Behind the Scenes

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Editor's Introduction

One of the most popular astronomy web sites in the world is “Astronomy Picture of the Day,” which presents an astronomy-related image and a detailed, link-rich caption each day of the year (with April 1 being reserved for a joke image.) Many astronomers and astronomy enthusiasts like to start their work day by getting a quick look at the latest image of the day. We asked the site's co-creator, Robert Nemiroff, to tell us the story of how the web site came to be and to discuss how the two site authors select and maintain their amazing library of images. (We include a few sample images from the site which are in the public domain, together with excerpts from the original captions.)

The Astronomy Picture of the Day (APOD) started in 1995 during free-wheeling conversations between office mates at NASA's Goddard Space Flight Center. There was this new thing called “Mosaic” (the first web browser) going around, and we realized how fortunate we were to be at a place that had this whopping, high-bandwidth connection to it. Feeling an opportunity to contribute, Jerry Bonnell and I brainstormed several ideas, one of which was APOD. In the grand tradition of astronomers through the ages, we immediately shelved this idea and went back to working on our usual projects. Surprisingly, several lunches later, this APOD thing still seemed like a good

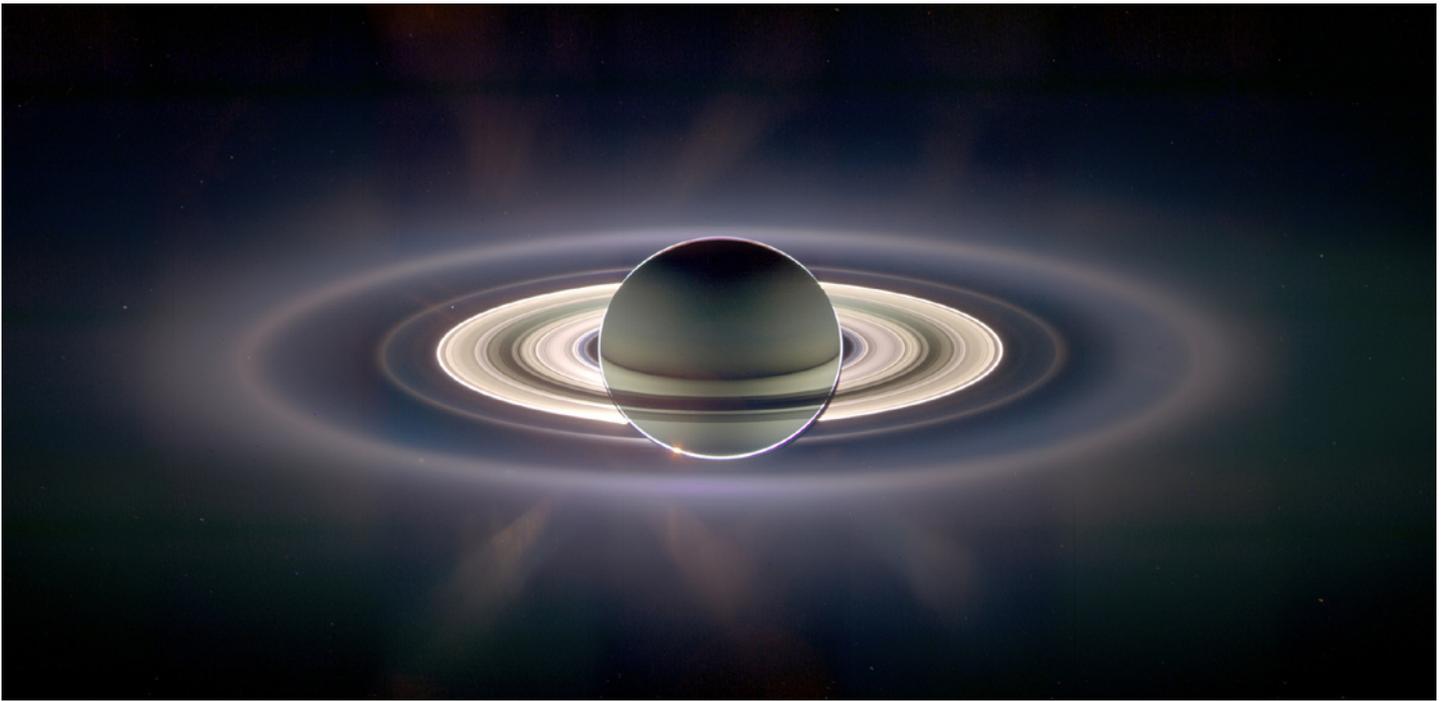


Robert Nemiroff and Jerry Bonnell at a meeting of the American Astronomical Society in 2007. (Photo courtesy of Robert Nemiroff)

idea. So we started “APODing”, half wondering if this sort of thing was legal.

The project has proven to be surprisingly resilient, so far lasting over 13 years. Although I have now left NASA Goddard for Michigan Technological University, Jerry Bonnell and I continue to remain good friends and divide the APODing duties nearly in half. Most typically, I will APOD Sunday, Monday, and Tuesday, while Jerry will APOD Thursday, Friday, and Saturday. Wednesdays are given to the person with the most time. We are both very grateful for the continued support that NASA and Goddard have given us.

Jerry and I continue to have fun choosing, writing, and linking APODs. We now have the privilege of being



The robotic Cassini spacecraft now orbiting Saturn recently drifted in giant planet's shadow for about 12 hours and looked back toward the eclipsed Sun. Cassini saw a view unlike any other. First, the night side of Saturn is seen partly lit by light reflected from its own majestic ring system. Next, the rings themselves appear dark when silhouetted against Saturn, but quite bright when viewed away from Saturn and slightly scattering sunlight. Visible in spectacular detail is Saturn's E ring, the ring created by the newly discovered ice-fountains of the moon Enceladus, and the outermost ring visible above. Far in the distance, visible on the image left just above the bright main rings, is the almost ignorable pale blue dot of Earth. (NASA)

increasingly selective about which images we choose. Many times, I will know that an image is "APOD-able" within the first two seconds of seeing it, mostly because I have this teenage-type gut reaction that what I am seeing is just really cool. After these many years, I now have built some astronomical perspective to tell whether the images are scientifically appealing as well. Besides that, one criterion we use in picking images is focusing on images that would be well placed in future textbooks on astronomy.

APOD has evolved to serve several audiences, including the professional astronomer, the amateur astronomer, the introductory astronomy student, and the intelligent professional with a casual interest in astronomy.



April Fools' Picture 2005: Water on Mars (Ellen Roper)

The last group is our largest demographic, and so we try to write on a level that is particularly understandable to them. APOD's



Near the outskirts of the Small Magellanic Cloud, a satellite galaxy some 200 thousand light-years distant, lies 5-million-year-old star cluster NGC 602. Surrounded by its natal gas and dust, NGC 602 is featured in this stunning Hubble image of the region. Fantastic ridges and swept back shapes strongly suggest that energetic radiation and shock waves from NGC 602's massive young stars have eroded the dusty material and triggered a progression of star formation moving away from the cluster's center. At the estimated distance of the Small Magellanic Cloud, the picture spans about 200 light-years, but a tantalizing assortment of background galaxies are also visible in the sharp Hubble view. (NASA/ESA/STScI)

audience has grown steadily through the years, and we now enjoy millions of page views each week.

There is no single way that APOD acquires images. Quite frequently, APOD gets images the same way that most others in the astronomical press do — from e-mailed press releases sent to the press by universities and observatories through the Press Office of the American Astronomical Society (AAS). Typically I receive automated emails from the AAS press office twice a day, and I check each of these for images. Second, APOD is now well known enough to have many images sent right to us, mostly by skilled amateur astro-photographers. I would say I get about 10 such images sent in through email every day. Last, Jerry and I browse the web sites of NASA missions, major astronomical observatories, and better-known astronomy blogs to see if any new and interesting images are being released or prominently discussed that were missed otherwise.

Although what we do is publicly displayed every day, there are some “secrets” to APOD! Here is one: the



This moon is doomed. Mars, the red planet named for the Roman god of war, has two tiny moons, Phobos and Deimos, whose names are derived from the Greek for Fear and Panic. These martian moons may well be captured asteroids originating in the main asteroid belt between Mars and Jupiter or perhaps from even more distant reaches of the Solar System. The larger moon, Phobos, is indeed seen to be a cratered, asteroid-like object in this stunning color image from the Mars Reconnaissance Orbiter, recorded at a resolution of about seven meters per pixel. But Phobos orbits so close to Mars - about 5,800 kilometers above the surface compared to 400,000 kilometers for our Moon - that gravitational tidal forces are dragging it down. In 100 million years or so Phobos will likely be shattered by stress caused by the relentless tidal forces, the debris forming a decaying ring around Mars.



The entire array of expansive solar panels is visible at the edges of the above image taken by the Shuttle Atlantis Crew after leaving the ISS to return to Earth. Also visible above are many different types of modules, a robotic arm, another impressive set of solar panels, and a supply ship. Construction began on the ISS in 1998. (NASA)

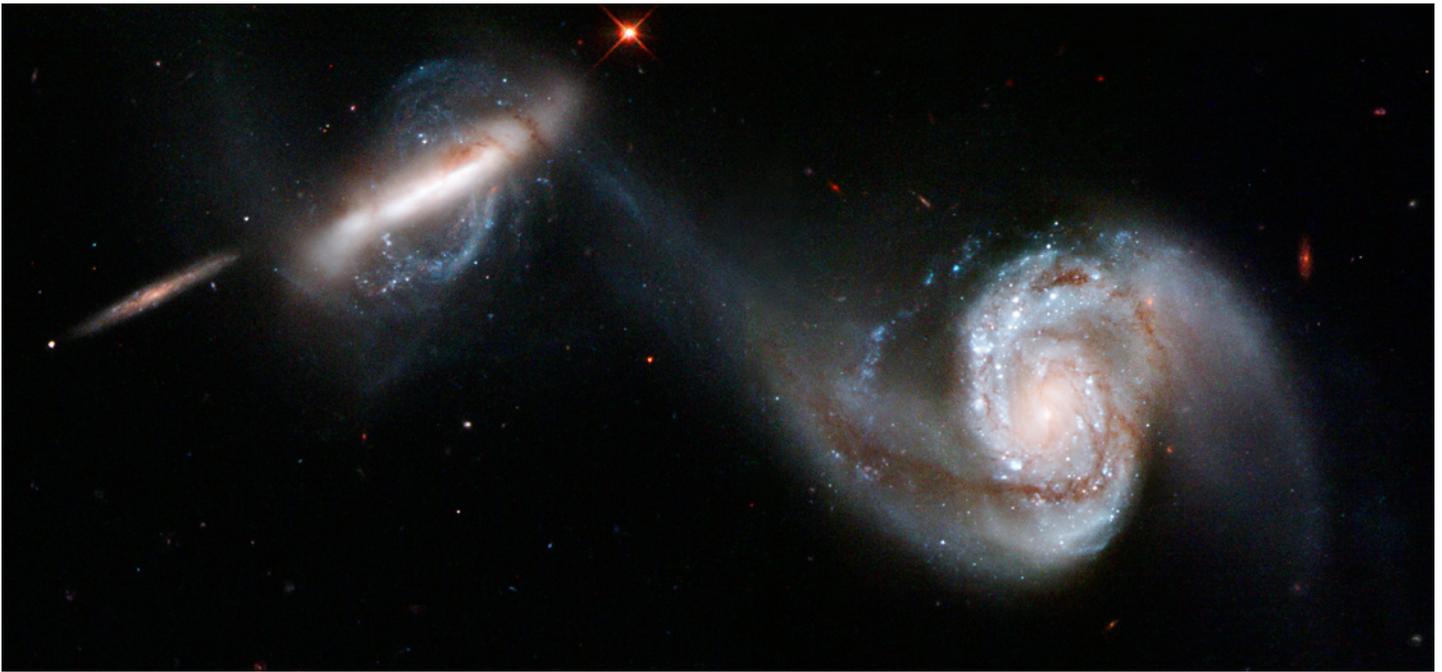
name “antwrp”, abbreviated from “Antwerp” in APOD’s original domain name antwrp.gsfc.nasa.gov, was originally assigned to us by co-worker Tom McGlynn. (In the past few years, NASA has given us the domain name apod.nasa.gov, and we are slowly migrating to that.) Tom informed us that “antwrp” ultimately derived from the novel “The Lathe of Heaven” by Ursula K. Le Guin. In that story, saying the word “antwerp” induced the protagonist to dream something that became reality. Upon hearing this, Jerry and I both read the book and liked it. Now, coincidentally, we strive to make APOD about reality, but realize that some of the images seem like they were dreamed up.

About the Author

Robert Nemiroff is a professor in the physics department at Michigan Technological University. In the early 1990s he was a USRA Research Scientist at NASA’s Goddard Space Flight Center, and has also worked at George Mason University and the Naval Research Lab. He is the author of over 60 scientific papers; his eclectic research interests include gravitational lenses, gamma-ray bursts, sky monitoring, and binary stars. Astronomy



Robert Nemiroff examines each APOD image closely.



A cosmic bridge of stars, gas, and dust stretches for over 75,000 light-years and joins this peculiar pair of galaxies cataloged as Arp 87. The bridge is strong evidence that these two immense star systems have passed close to each other and experienced violent tides induced by mutual gravity. As further evidence, the face-on spiral galaxy on the right, also known as NGC 3808A, exhibits many young blue star clusters produced in a burst of star formation. The twisted edge-on spiral on the left (NGC 3808B) seems to be wrapped in the material bridging the galaxies and surrounded by a curious polar ring. The Arp 87 pair are about 300 million light-years distant toward the constellation Leo.

Picture of the Day receives over 3.5 million page views per week on average.

Resources for Further Information:

Astronomy Picture of the Day Web Site:
<http://antwrp.gsfc.nasa.gov/apod/astropix.html>

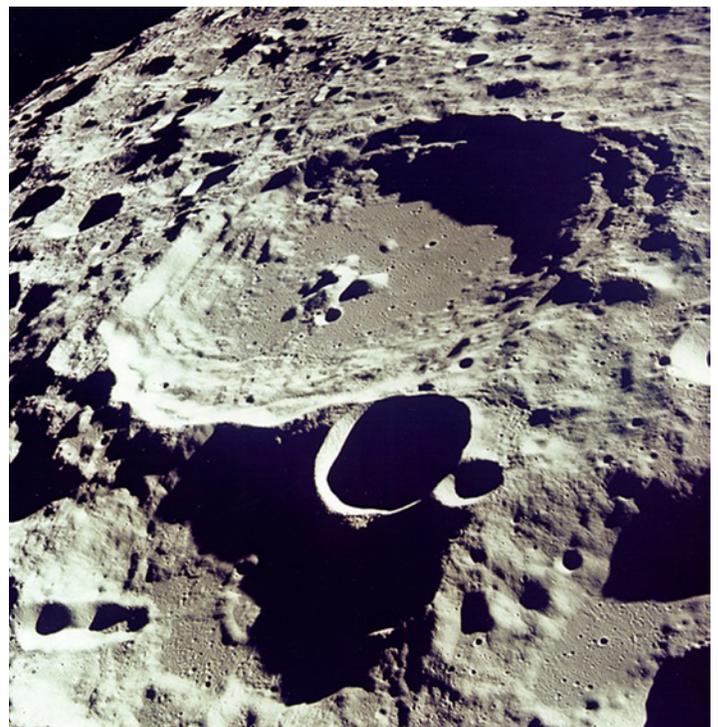
The APOD Archive Listing:
<http://antwrp.gsfc.nasa.gov/apod/archivepix.html>

Robert Nemiroff and Jerry Bonnell's favorite dozen images of 2007:
<http://antwrp.gsfc.nasa.gov/apod/apoys2007.html> ✦

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The Astronomical Society of the Pacific increases the understanding and appreciation of astronomy by engaging scientists, educators, enthusiasts and the public to advance science and science literacy.



The far side of the Moon is rough and filled with craters. By comparison, the near side of the Moon, the side we always see, is relatively smooth. Since the Moon is rotation locked to always point the same side toward Earth, humanity has only glimpsed the lunar farside recently -- last century. A thinner crust on the near side that allowed for more dark lava flows is thought to be the cause of differences between the two sides. The cause for the crust thickness differences is still being researched, however. The large impact basin pictured above is Crater 308. It spans about 30 kilometers and was photographed by the crew of Apollo 11 as they circled the Moon in 1969. (NASA)