UNA Planetarium Newsletter

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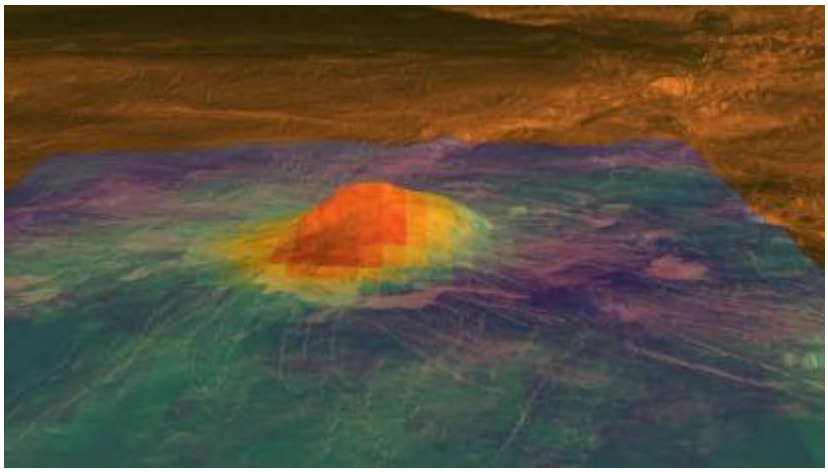
At the start of the school semester I asked my students in an on-line discussion forum "Why should we do astronomy?" I left it open to them to even disagree with the idea in the first place. Probably out of a sense of self-preservation that many new students unjustifiably have, no one thought we should not pursue the science of astronomy. It would have been good to have a discussion with someone advocating that we shouldn't just to force those who want it to happen to really think about it.

Typical justifications for astronomy are that it is cool, it tells about the universe and fluffy, non-practical stuff. A few students went so far as to say that if we don't then other countries will "take over space" or that we can get resources there. This mistakes astronomy for the space program. However, millions of dollars are spent every year on astronomy, and whether there are tough economic times or not we should be able to justify our money like anyone else.

I think the reason lies at the heart of what it means to be a successful civilization. Cultures that are healthy foster curiosity and support that with resources. The products of that inquisitiveness pay back society with great art, music, literature and a greater understanding of our interactions with the universe and how it impacts us. Without astronomy that would not be possible.

UNA Planetarium and Observatory, is operated by the Dept. of Physics and Earth Science

Image of the Month



As Venus shines in the western sky at sunset this month, we can consider the differences between Earth and our sister planet. Venus is thought to have resurfaced its entire globe sometime over the past 500 million years. The European Space Agency's Venus Express mission has been collecting data on hot spots on the surface of Venus using infrared spectrometers that analyze heat from the surface. Recent work has compared the location of hot spots with the location of volcanoes as found with the Magellan radar data that mapped Venus's surface in three-dimensions. Shown here is the location of a hot spot with the 2.5km high volcano Idunn Mons in the southern hemisphere of the planet. The image shows where the surface chemistry has been altered by lava flows. The data suggests relatively recent volcanic activity in the area sometime in the recent past, between a few thousand to a few tens of thousands of years ago. If correct, Venus is much more exciting than previously thought. **Image courtesy ESA.**

Astro Quote: ***Two things fill the mind with ever new and increasing wonder and awe – the starry heavens above me and the moral law within me.***

- Immanuel Kant, *Critique of Pure Reason*, Conclusion

Upcoming Events

May 25th. Planetarium Public Night
May 27th. Planetarium afternoon program
May. 27th. Shoals Astronomy Club Meeting 7:00PM. UNA Planetarium.
June 1st Planetarium Public Night
June 3rd Planetarium afternoon program
June 15th Planetarium Public Night
June 17th Planetarium afternoon program
June 22nd Planetarium Public Night
June 23rd **Bootid Meteors Peak** 6PM = 11PM
June 24th Planetarium afternoon program
June June 26th Partial Lunar eclipse.
June 29th Planetarium Public Night

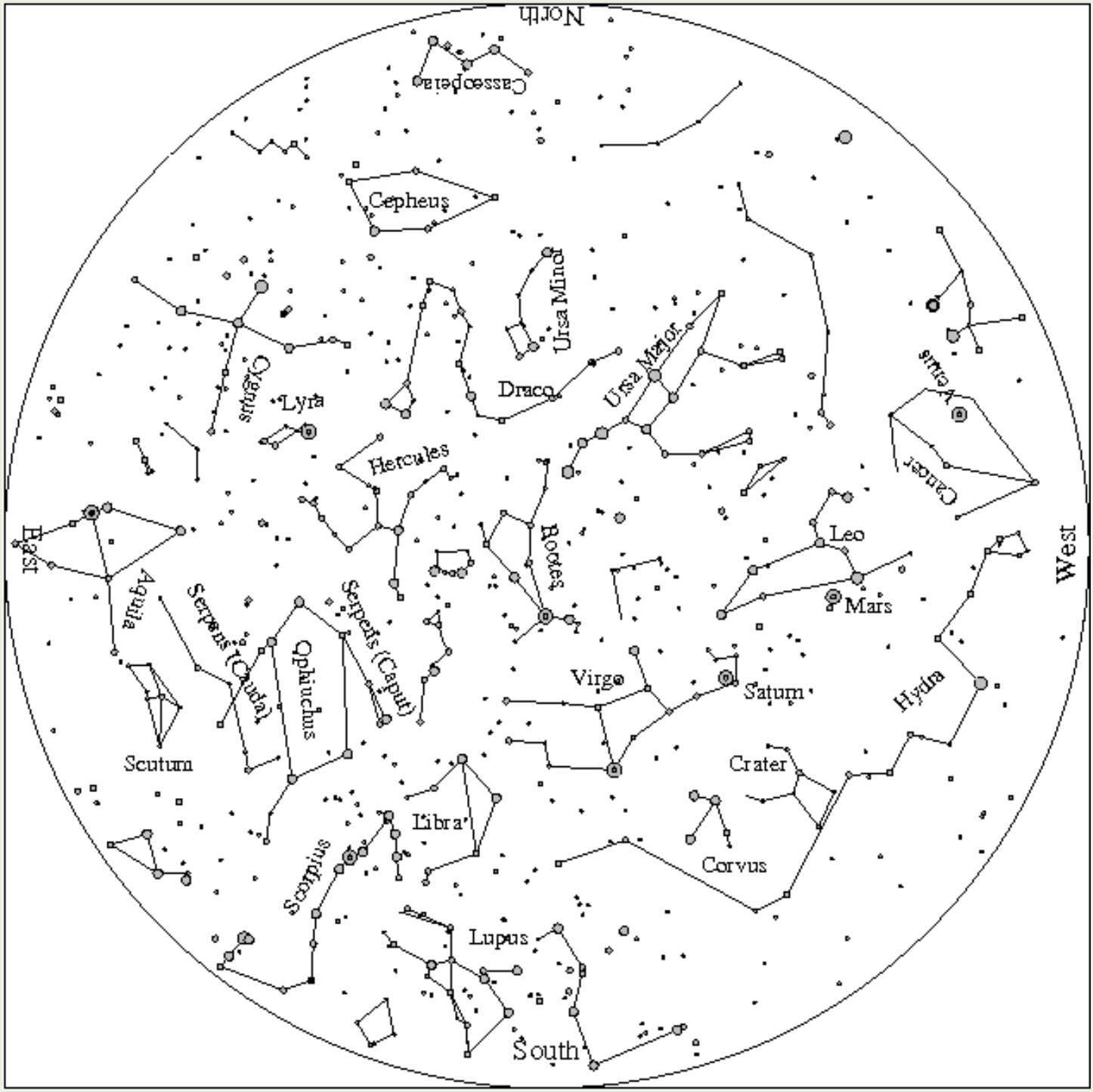
Tuesday tours start at 8PM in June due to the later time of sunset. Thursday tours start at 4PM. Tours consist of a "Stars Tonight" constellation discussion and either observing or a digital video presentation depending upon the weather. Tours are targeted towards a general audience. $3/person.

Observing Highlights

The Bootid meteors may show up to 100 meteors per hour June 23rd. This is an unpredictable shower.

The June 26th partial lunar eclipse will see the moon enter the shadow of the Earth at about **4:30AM** with partial eclipse beginning **5:17AM.** The moon will set before the eclipse is over. UNA Planetarium will have a special early morning program for viewing the eclipse.

The June 2010 Sky for North Alabama



How to use this Chart: The sky is shown for 9:00PM, June 15th for Florence, Alabama. It will appear this way one hour earlier for each week difference in time. The stars brightness's are represented by different sized dots. The faintest stars you can see are the small dots; the brightest ones are large dots. Hold the chart with the direction you are facing down. So if you are facing north, hold the chart with north down. The circle represents the horizon and the center of the chart the point directly over your head. So an object half-way between the center and edge of the chart is half-way up in the sky. This chart was prepared using the SkyNow software of R. M. Blake. This chart may be reproduced for non-commercial purposes with the following acknowledgement included: Courtesy UNA Planetarium and Observatory. http://www.una.edu/planetarium/.

Some Recent Visitors

We were busy in May with seven schools visiting for their end of term field trips. We had students from three states. Mississippi, Tennessee and Alabama visit!

Galaxies

By Deb Bailey

When we think about space, we typically think about the planets in our solar system, and occasionally about the Milky Way Galaxy. However, once we begin to look outside our own galaxy, we realize just how small we truly are in the vast expanse of the universe. There are billions of galaxies that are visible with advanced telescopes, and many more which are too faint for detection with current technology. The various shapes and sizes of galaxies are important for determining how they were formed and have evolved over billions of years.

A galaxy is a giant cloud of gas, dust, and stars, all of which are held together by the combined gravity of all the matter. Galaxies are classified by three shapes: spiral, elliptical, and irregular. Spiral galaxies, such as our Milky Way, contain an obvious disk component and spiral arms. They are plentiful in gas and dust, both of which are important for new star formation. Typically the stars that are produced in spiral galaxies are hot, bright, and luminous. Approximately two thirds of spiral galaxies are barred, meaning that the nucleus, or center, appears elongated. Elliptical galaxies appear to be much more common than spiral galaxies, but are fainter and harder to detect. They are round or elliptical in shape, but unlike spiral galaxies, they contain little gas and dust, making the formation of new stars difficult. Elliptical galaxies also lack a disk component and spiral arms, and only have a few hot, bright stars. Irregular galaxies are the least common, making up just 25 percent of all galaxies in the universe. They have no obvious shape and are chaotic in appearance, but they do have gas and dust and are able to support star formation.

Galaxies tend to occur in clusters, ranging from a few to thousands. Galaxy clusters are divided into two categories: rich and poor. Rich galaxy clusters contain over 1000 galaxies, most of which are elliptical with a few spiral galaxies. They are spherical in shape and at least 10^7 light years in diameter. The mass of rich clusters is concentrated in the center where there are usually one or more giant elliptical galaxies. Poor galaxy clusters contain less than 1000 galaxies, and the groupings within the clusters tend to be smaller. They are irregularly shaped, and there is no mass concentration in the center. Typically, poor clusters have more spiral galaxies. The local group of galaxies, the one which holds the Milky Way, is an example of a poor cluster. This local group of galaxies is approximately 3.26 million light years in diameter, and contains a few dozen galaxies that are irregularly scattered. Galaxies found outside of clusters tend to be spiral galaxies. This suggests that the environment of galaxies and their proximity to one another are important factors in determining structure.

Galaxies can collide, interact, and merge. Typically, separation between galaxies is about 20 times their diameter. When they interact or pass near each other, one galaxy can distort the other and form spiral arms or cause star formation. When galaxies collide or merge, it is possible that gas and dust is removed making star formation more difficult. A larger galaxy can also absorb a smaller one. The concept of a merger of galaxies is known as galactic cannibalism. Currently, our Milky Way is absorbing the Magellanic Clouds that orbit it, and pulling apart the Sagittarius Dwarf Galaxy. These interactions may give valuable insight to the shaping of galaxies, and perhaps the universe. A common misconception is that galaxies evolve from one type to the other. However, this is not likely. For example, an elliptical galaxy cannot become a spiral galaxy because it lacks the dust and gas needed to make new stars typical of spiral galaxies. Astronomers suspect that elliptical galaxies are formed when 2 or 3 galaxies merge. However, dwarf elliptical galaxies are too small to be formed by merging, and might be fragments left over from the mergers of larger galaxies. On the other hand, spiral galaxies seem to almost never experience any sort of collisions. They retain gas and dust and continue to make stars, especially along the arms. The Milky Way itself has never merged with another large galaxy, but it has absorbed and affected smaller ones. Irregular galaxies seem to be the results of collisions or near misses between galaxies. They may be caused by a smaller galaxy being distorted by a larger galaxy, or they may be fragments from collisions of larger galaxies.

With our most advanced telescopes, astronomers can study deep space. The look-back time, or the time equal to the distance of galaxies in light years, is so large, that the view is of the universe at the time when galaxies first began to form. We have found that in earlier times, there were more spiral galaxies and fewer elliptical galaxies. At the present, only about seven percent of galaxies are in close pairs, but about one third of all distant galaxies appeared in close pairs. This is evidence that galaxies have most likely evolved through mergers. By understanding the evolution of galaxies, we may eventually better understand the evolution of the universe, and maybe life.

Elliptical Galaxy M87. Image courtesy NASA.

Spiral Galaxy M100
Photo Courtesy of D. Hunter (Lowell Observatory) and Z. Levay (Space Telescope Science Institute)/NASA

Irregular Galaxy NGC 1569
Photo Courtesy of NASA, ESA, Hubble Heritage (STScI/AURA)