The Big Eye

The Newsletter of the Friends of Palomar Observatory Vol. 2, No. 2

The Big Picture

Caltech scientists have produced the largest astronomical image ever in order to inspire the public with the wonders of space exploration. The image has been reproduced as a giant mural in the new exhibit hall of the landmark Griffith Observatory, which reopened last fall after several years of renovation.

A team led by Caltech Professor of Astronomy George Djorgovski used data from the Palomar-Quest digital sky survey, an ongoing project at the Samuel Oschin Telescope at Palomar Observatory, which is owned and operated by Caltech. The survey is a joint venture between groups at Caltech and Yale University.

The great cosmic panorama, named The Big Picture, is 152 feet long by 20 feet high, and it covers the entire wall of the Richard and Lois Gunther Depths of Space exhibit hall at Griffith Observatory. It is displayed on 114 steel-backed porcelain enamel plates, expected to last many decades, and it will be viewed by millions of visitors annually.

"We wanted to inspire the public and convey the richness of the deep universe and its understanding, and to do it with a real scientific data set," says Djorgovski. "We are doing research with these data, but there is also a sense of beauty and awe, which is important to communicate, especially to young people."

The image covers only a sliver of the visible sky, less than a thousandth of the celestial sphere, roughly an area your index finger would cover if held about a foot away from your eyes. The entire Palomar-Quest sky survey covers an area about 500 times greater.

The part of the sky covered by The Big Picture is in the constellation of Virgo, and it spans the core of the Virgo cluster of galaxies, about 60 million light years away; the light from the brightest galaxies seen in the picture started its journey when dinosaurs ruled the Earth.

"What is perhaps most striking about the image is the wealth of the information in it, and the remarkable diversity of cosmic objects it shows," says Ashish Mahabal, the project scientist for the survey. Aside from the prominent bright galaxies in the Virgo cluster, which dominate the view, the image contains nearly a million much fainter and more distant galaxies; hundreds of thousands of stars in our own galaxy (the Milky Way); a thousand quasars (luminous objects believed to be powered by massive black holes) with distances up to 12 billion light-years away, hundreds of asteroids in our own solar system; and at least one comet.

Continued in next column

Continued on page 3

A segment of the "Big Picture", showing the core of the Virgo cluster. The "Markarian's Chain" of galaxies dominates the picture, with the giant elliptical galaxy M87 in the bottom left. This image represents an area of 20 ft square on the Griffith mural.

Oh, The Things You Will See, The Things You Will Do, and the People You Will Meet

by Susan Vergara

This past year has been an extraordinary trip for my husband Mike and me. In the year 2005 we were two of the people who stood in line for hours at the Palomar Open House, waiting for our turn to get a tour of the Hale Telescope. We attended a tour once before, with our astronomy club but this time was different. Scott Kardel was our tour guide and he made the experience so exciting that we rushed home to look at the Palomar Observatory web site. We read about all the telescopes, the Interferometer, the history of Palomar and how George Ellery Hale had been the driving force behind getting the world's largest telescope built 3 times prior to the one on Palomar Mountain. We learned about the Friends of Palomar and became members right away; we attended every event. I also discovered on the web site that the observatory was looking for docents. I told Mike that he should send in his application, after all, he's the one in Toastmasters and would be great at giving tours. The web site says: Potential docents don't need to be an astronomer or a Palomar expert to apply. A willingness to learn and an interest in speaking to people is all that is needed. Heck, even I could do that and after all, I was really the one who wanted to do it. We sent in our applications and Scott invited us to come up to Palomar and talk with him. He showed us all kinds of interesting things that day. He gave us a tour of the observatory and showed us some of the other telescopes and the place where the new 24" telescope and dome would soon be located. Mike and I both agreed that being a docent is something we would really like to do and Scott accepted both of us into the program.

That was the beginning of our extraordinary year. We spent many Saturdays shadowing Scott while he gave tours and learning everything we could about Palomar. We bought books and read about George Ellery Hale and Palomar Observatory. He told us we could give part of the tour if we wanted to. I thought to myself, No Sir, Not Me! I was perfectly happy to just assist for the rest of my life. I don't think I could ever stand in front of the crowd and be the tour guide. My husband, on the other hand, was more confident in his abilities. He took on the challenge of giving a tour to a group of Boy Scouts by himself one day when Scott's tour was running behind. He did pretty darn well and I was really impressed.

One of my favorite things that I had seen on the Palomar web site was the web page and QuickTime movie about how a new coat of aluminum is applied to the 200-inch mirror about every year and a half. So one day, to my own surprise, I asked if I could explain the process of re-aluminizing the mirror to a group of people on the tour. It was so much fun that I started giving more and more pieces of the tours. A couple weeks later, Scott's tour was running behind and he asked me to get the Girl Scouts who were waiting at the back door of the dome, start the tour and he would join me as soon as he was done with his tour. You guessed it, I not only started the tour but don't remember seeing Scott till the tour was over. I asked him why he didn't rescue me. He said, "You were doing fine so I just let you go." I did it! I really did it! I felt like I could fly I was so happy! I never thought I'd be able to give a tour.

The following April of 2006 was the beginning of the first ever public tour program to be led by docents. My first public tour as the tour guide consisted of one person taking the tour. It was probably a good thing. I was a little nervous even though Mike and Scott were there for support, if needed. The second tour that day was about 7 people and I was starting to feel a little more confident and with every tour it got easier. We were really starting to enjoy working with the visitors and they were really enjoying the tours. Eventually the tours were virtually always sell outs. We also got an opportunity to help with the evening tours and events at the 60-inch telescope. Occasionally, we would set up a solar exhibit outside during the day and show the visitors how to safely view the Sun using a solar telescope. When we weren't scheduled to give tours, we would often spend a few hours answering

continued on page 3

Oh, The Things . . . *, continued from page 2*

questions in the Visitors Gallery. We also found that we really enjoyed working with the kids during the educational tours once a month. They always helped us look at things a little differently. For instance, the little Girl Scout that thought New Jersey was one of the planets in our solar system or the Cub Scout who knew that the reason the dome was kept cold during the day was of course, to keep the telescope fresh.

By the time the season was over, we looked back at all the great times we had and all the interesting and fun people we had met and all the new friends we'd made. Now I was feeling like Docent Extraordinaire. I had been asked for my autograph, gotten a tip, had my picture taken with tour groups, gotten a standing ovation, (and as I am always reminded by my fellow docents, the visitors are already standing) and I even received some fan mail.

I feel like the time I've spent at Palomar has made a difference, not only for us but for the visitors who hear the incredible story of George Ellery Hale and Palomar. If you come to visit on a Saturday during the winter, you may find us in the Visitors Gallery talking with the visitors. If you come during the tour season, we just might be YOUR tour guides. See you there.

The observatory is looking for additional docents. Potential docents don't need to be an astronomer or a Palomar expert to apply. A willingness to learn and an interest in speaking to people is all that is needed. Applicants chosen for the docent program will receive the training which will include information on the current research and history of the observatory, basic astronomy, working with the public and more. For more information contact:

Scott Kardel
P.O. Box 200, Palomar Mountain, CA 92060-0200
(760) 742-2111 Email: wsk@astro.caltech.edu

The Big Picture*, continued from page 1*

The data used to construct the image were obtained by the Caltech-Yale team in the course of over 20 nights at the Samuel Oschin Telescope at Palomar in 2004 and 2005. The data were then transferred to Caltech, Yale, and other locations via the High Performance Wireless Research and Education Network. Several hundred gigabytes of raw data were then distilled to produce a 7.4-gigabyte color image, using cutting-edge technology at Caltech's Center for Advanced Computing Research.

"This project illustrates a powerful synergy between modern astronomy and advanced computing, which is increasingly becoming a driving force for both research and education," says Roy Williams, a scientist on the team, and one of the leaders of the U.S. National Virtual Observatory effort. "We plan to use The Big Picture as a magnet and a gateway to learning, not only about the universe, but also about the computing and information technology used to create the mural."

Sky surveys are a large part of the scientific history and legacy of Palomar Observatory starting with the pioneering work of Caltech professor Fritz Zwicky in the 1930s. He used the first such survey to discover numerous supernova explosions, large-scale structures in the universe, and other wonders. A major photographic sky survey conducted in the 1950s at the 48-inch telescope provided the first modern atlas of the sky, guiding many astronomical inquiries. The telescope was later named in honor of Samuel Oschin, the late Los Angeles business leader and philanthropist. Successive surveys at the same telescope, including the current Palomar-Quest project, continue to provide fundamental data sets for astronomy. They have led to numerous important discoveries, ranging from the outer reaches of the solar system to the very distant universe.

In addition to The Big Picture, several exhibits at Griffith have strong connections to Caltech and Palomar, including a model of the Hale 200-inch Telescope, which was a major engineering feat at the time of its construction and has been at the center of many groundbreaking astronomical discoveries for nearly half a century.

The Big Picture's education/public outreach website can be found at http://bigpicture.caltech.edu.

Friends of Palomar Observatory
P.O. Box 200
Palomar Mountain, CA 92060-0200

Friends of Palomar Observatory Annual Membership Application

G Student/Senior Citizen Member $30 G Individual Member $45 G Family Membership $75

Name _____ **Address** _____

City _____ **State** ___ **Zip** _____ **Phone** _____

Email _____

Check Visa Mastercard (circle one) **Credit Card #** _____

Expiration Date _____ **Signature** _____

For questions call (760) 742-2111, e-mail friendsofpalomar@astro.caltech.edu, or visit
www.friendsofpalomarobservatory.org