



## Astrophotography and Digital Imaging

*Hi, my name is Chris Patel and I have been a club member for about 10 years now. I joined while living in Manteca and though I moved to Livermore almost 5 years ago, I stuck with the SAS for a variety of reasons, the main being a steady group of observers that I got to know over the years in Jeff Baldwin's garage, at Highway 4 and Peddler Hill. They shared their love and knowledge of the hobby with me.*

*I wanted to give something back to the club and the members for what I have been given so I approached Trevor Atkinson and volunteered to do a session or two at Peddler Hill this summer about Astrophotography to help encourage others to start into that aspect of the hobby and help those who have started to continue down their path. Of course it serves a selfish purpose also - I get to interact with other astrophotographers and see and learn from their work!*

*Trevor also asked if I could contribute some monthly columns for the newsletter that will cover the main facets of Astrophotography. With this article I intend to introduce myself, talk a bit about the evolution of imaging and preview some upcoming subjects.*

When I first started off in the hobby, it was purely visual. I attended club meetings, used binoculars, read everything about the hobby I could find and finally bought an 8 inch SCT mounted on a somewhat shaky German equatorial mount. I used that scope to knock off Messier objects and learn some of the technical knowledge one must have to find targets. After a couple of years I was losing some interest because I found my equipment was limiting my ability to find more obscure objects, so I upgraded to a computerized Meade LX-200. The scope was truly a step up from the shaky GEM mount and helped me continue my visual observing interests. It was during that time that I started seeing images coming from the ranks of amateur astronomers that had great detail, so I decided to try that aspect of the hobby.

My first efforts were with film, mounting my camera piggyback or just using a tripod to get star trails. After all, how hard could it be, right? Just point and shoot! Well, not that easy...but I kept at it, learned the technical and mechanical elements and limitations of the hobby and equipment and progressed from there.

Star trails around Polaris, taken at Peddler Hill.

As my eyes age, the ability to see new and familiar objects in color and with increased detail is the driving factor behind my work. Yes there is also the desire to have a pretty image but the ability to study an object in detail usually wins in the end. I call astrophotography the "dark side of the force". It has a significant allure and you can apply many of the sayings of Yoda to the things you do and learn about!

Let's talk a little about the evolution of astrophotography. If you consider the fact that people were taking images of the Moon and Sun almost as soon as they invented the process of photography, we can date astrophotography back to the early 1800's. As techniques, films, processing, lenses and equipment evolved so did the ability to image distant objects beyond the Sun and Moon. There is a lot of information available on the web for those of you interested in using film, film equipment and techniques but what is interesting is that the basics developed for film are still important and integral in



the digital age. What has changed is that most of us no longer use film. We still need a mount capable of tracking the stars and the ability to guide it. We still need a telescope/lens system, we still need a way to attach the camera to the telescope, we still need to focus, we need to determine exposure, frame our shot, and we still need to process our image afterward.

When I speak of the digital age of astrophotography, I speak of the invention of the CCD which has been used since the early 1990's for astrophotography. CCD's (charge-coupled devices) have a different response to light from film; they also are more sensitive allowing you to capture images under light polluted skies that would not be possible with film. They also have set backs - most are smaller when compared to a full size 35MM film frame, though we are seeing sensors on the market now which are just as large! They need to be cooled, and they generate random noise into the image.

There has been and will continue to be debate as to which method is better—film or digital—or there will be until film is no longer made. This is purely an economic issue. As more people use digital cameras, less use film, and I foresee a day when film will go the way of the LP record. However, it is the continued demand for digital cameras that has helped drive down the cost of CCD's, and made strides in how they are designed and built that benefits us as astrophotographers now. Just like the first DVD players, the first astro-specific CCD cameras were expensive and lacked features. Now you can get an inexpensive DVD player rich in features; the same thing is happening for CCD cameras.

Three inch Takahashi FS-78, EM-200 mount, on a AP pier with my SBIG ST-2000 camera mounted.



Before I purchased my first CCD camera, I did a lot of research into the hobby and equipment. My bible, and probably one for many starting into the hobby, is a book called the “New CCD Astronomy” by Rod Wodaski. It is a great book, very thorough, and I still refer to it today. My first camera was a SBIG (Santa Barbara Instruments Group) ST-6B. The camera, originally introduced in 1992, was purchased after being discontinued in 2003 for the princely sum of \$500 dollars. It was well matched to my scope, was cooled, sensitive and helped me cut my teeth on the hobby.

Today, the options to someone starting out are much more open, ranging from used webcams available in the under hundred dollar range, imaging-specific still and video cameras in the \$150 to under \$300 range and for \$500, you can get a complete cooled, dual-chip camera with filters for color imaging. If you already have a Digital SLR camera from Canon or Nikon with a 6 plus mega pixel chip you use for photography, it can also easily be adapted to imaging with minimal expense. Just take a look on the web at DSLR Astrophotography to see what others are doing in this evolving field.

The options to someone starting out are far more plentiful than just four years ago, at a better price point for entry and with more features that make for easier learning curves. It's a great time to try your hand at imaging. With greater interest within the SAS, we have the beginnings of creating an active group of imagers who can provide help and support to each other to enjoy a segment of the hobby that can be technically demanding and intimidating for a novice.

Over this series of articles I will cover mounts, camera selection criteria, scopes suitable for imaging, focusing, software selection, and basic processing. If you have specific topics you would like me to speak to, please email me directly at [cpatel823@sbcglobal.net](mailto:cpatel823@sbcglobal.net). If you would like to see some of my work, please view my flickr page at <http://www.flickr.com/photos/cpatelastrophotos/>. As summer approaches, I will work with the club leadership to plan and announce the hands-on workshops at Peddler Hill.

It's our club, let's continue to make it grow and diversify!

... *Chris Patel*