LOWELL OBSERVATORY’S LARI BGBF PROGRAM - Get your “Geek” on !!

Living in South Florida for most of my “Astronomical Life”, I have noted how our skies have become increasingly unsuitable for any serious type of observation work. An investment in expensive observing and imaging equipment is just not a realistic option. This is further verified by the fact that a majority of our local club’s observing sessions get cancelled due to the weather.

Our Local Astronomy Club, The Astronomical Society of The Palm Beaches, had the opportunity to visit Lowell Observatory back in the summer of 2011. It was a great experience for the dozen club members that attended. For 3 days we toured the facilities, learned about all of the fantastic work that was being done, and got to see the Discovery Channel Telescope being assembled.

What was even more thrilling was the opportunity to do some observing in very dark skies with the 24-inch Clarke Refractor at the observatory. It was a great experience to be using such a large telescope in clear skies - WITH NO MOSQUITOS !!

After we returned from the trip several of the attendees gave presentations on the visit at the next club meeting. Fast forward to 2012 and the announcement by Lowell of the LARI program. I happened to hear about it through other members and went to the website to check things out. I was a little apprehensive because I knew that other amateurs have much better observing conditions than we do here in Florida and I was not quite sure where I could fit in.

As I reviewed the pro-am collaborations that were available, there were several that it seemed I could participate in and make some kind of contribution to. Fortunately for me they did not involve observing and the acquisition of expensive equipment to participate. I decided to go for it and submitted my information including my education, a description of my interests, computer resources and experience with the hope of being assigned to one of the data teams.

It was my good fortune to be chosen for the BGBF program. This program involves data mining for photometric information. Then “fitting” this data using a spectral energy distribution software program to calculate the value of the estimated bolometric flux. This process is repeated for a list of program stars selected by our lead Lowell Astronomer, Dr. Gerard van Belle.

The program requires some computer knowledge in the following areas: using a Unix environment (linux in particular); some level of comfort running a virtual machine environment; and working at the command line. The information that is listed on the Wiki page for our group (http://lowell-lari-bgbf.wikispaces.com) provides detailed instructions on how to get started with the program.

Probably one of the greatest opportunities provided by the program is learning all of the background theory and details about the work that I am doing. I have learned quite a lot about photometry, photometric systems, stellar flux and how all of this ties into basic stellar properties, which is what we are trying to model.

If you are an amateur astronomer with a “geek” side, then this program is for you. If you are into number crunching and look forward to the graphical display of your results then you will find more than ample opportunities here.
When I first became involved I went about learning what needed to be done so I could actively contribute to the program. There was somewhat of a learning curve as I got things set up and began to collect the data. But after a while I began to ask myself questions such as: What happens if I do this? How accurate are my results? What can I do to make them more accurate?

It is at this point that the real fun begins, as I realized there is a whole lot more to the program than just running the “fitting” software. Like anything worthwhile, the more you get involved the more you learn. This is the point where I began “tinkering under the hood” to see what the program was doing, how it worked and what could possibly be done to make it better and make my results more accurate.

I began to expand my horizons even more by learning about the programming language, gnu octave, that the software is written in and trying to understand how all the pieces fit together. Dr van Belle has been great in that he is always there to provide insight as to why some things don’t look right and give some hints about what to try.

There are many more results and questions that you can explore. As some examples, I have begun to look at the data by stellar spectral class rather than as a long list of program stars. Sometimes it provides a different prospective to the problem and work involved. What data points can be safely eliminated to improve the fit? How do our calculations fit in with the theoretical models that are being explored?

We have recently been given some additional data provided by Lowell and Dr van Belle. I am now incorporating this new data into the “fitting” routine to improve our solutions. In addition I am working behind the scenes to try and bring the programming code up to current levels. The code we use runs under older versions of software and is in need of an update, so I am exploring the possibility of writing a custom program just for our LARI sedFit work.

I am also putting together a “manual” that incorporates all of the information from the Wiki page along with the updates, tips and helpful information in one place. I am including my own experiences and the things I have learned along the way that will be helpful to others and will include some basic background theory.

When we first started, our team consisted of 13 members. However as we began working, there were only 3 of us contributing to the project. Eventually the other two stopped contributing, but I am still active and can see lots of possibilities for the program.

I hope that others will become involved and join the team so it will become a true collaboration.

I have given two presentations on my work with the Lowell LARI program to our local club, and was a presenter at the 2014 Astronomical League Convention (ALCON 2014) in San Antonio, Texas. I really do enjoy the challenges and the learning the project provides. I look forward to my continued involvement with this program and any other where I can be of assistance.

My main “Equipment” includes:
Mac Pro with 12-Core 2.4 Ghz Westmere processors
32 GB System Ram
Dual Displays - Mac 27-inch and 24-inch
960 GB SSD as Primary Drive and 5 TB of additional storage

When I am traveling or at work (my other job) I have a macbook pro
with a 2.2 GHz i7 Quad-Core processor and 16 GB of System Ram

Below is a typical output plot of our “fitting” routine.

The key features are the chi-squared value and the Estimated Bolometric Flux value.

So come on and join us and - “GET YOUR GEEK ON”.

![](image-url)
My “Workstation”
Presenting at The Astronomical League 2014 Convention in San Antonio Texas

My “Other” Equipment and a VERY RARE Clear Florida Sky
The Alamo during ALCON 2014 and yes - that is the Full Moon over the Alamo!