Name: _____

Image Processing Assignment

Note: All images need to be saved to your folder on the shared network drive.

Image Calibration

1. Launch Stellar Magic from the Astronomy folder.
2. Open the Horsehead nebula image (Horse001.FIT). It is located in the Sample Images folder.
3. Open the dark and the flat field images 0120-40drk.FIT and 0FLAT-36.FIT.
4. Open the Combine Images dialog and subtract the dark frame from the Horsehead image.
5. Take the result of the dark frame subtraction and apply the flat field image.
6. Save the result as Horse001_Calibrated.fts**. Be sure to add a comment in the save dialog.**
7. Return to the Image Processor screen by clicking the Stellar Magic button.

Histogram Adjustments with Stellar Magic

8. Apply a Linear Stretch as outlined in the handout.
9. Save the result as Horse001_Stretch.
10. Apply the Contrast and Brightness as outlined in the handout.
11. Save the results as Horse001_Contrast.
12. Reopen Horse_Calibrated.fts and apply the Digital Development tool as outlined in the handout.
13. Save the result as Horse001_DDP.fts

The Gimp: Levels and Curves

14. Open The Gimp from the shortcut in the Astronomy folder.
15. Open Horse001_DDP.fts with The Gimp. Apply the Levels tool as outlined in the handout.
16. Apply the Curves tool as outlined in the handout.
17. Save the result as Horse001_Final.bmp by choosing the bitmap option from the Save As dialog.

Color Processing

18. Open IC 434_09621_Red_Repaired.FIT, IC 434_09623_Green_Repaired.FIT, and IC 434_09627_Blue_Repaired.FIT with Stellar Magic. These images of the Horsehead nebula were taken through red, green, and blue filters. Most of the hot pixels have been removed using an alternate method, since dark frames were not available, hence the phrase “Repaired” appears as part of the file names. In order to make a color image we need to align the images.
19. Click on the “Align Images” button and click the “Mark Center button on the Align dialog. Mark the center of one of the stars on all three images. **Make sure that you mark the same star.** Next, click the **“**Align and Resize” button. When it has finished

click the “Save Later” button and return to the Image Processor screen by clicking the “Image Processor” button.

20. Click the “RGB Composite” button from the Image Processor screen and select the appropriate image as explained in the handout. Click the Combine button. You should now have a color image of the Horsehead nebula. Save the image as a Windows bitmap.

Sharpening Images

21. Open NGC4631.bmp with The Gimp and apply Levels and then apply Curves to the image so as to bring out the fine details. Next, select Filters>Enhance>Unsharp Mask. When the “Unsharp Mask” dialog comes up select a “Radius” of 1.0 and an “Amount” of 0.80. Resize the dialog so that you can see more of the image preview. Scroll the image if necessary. Try unchecking and then rechecking the “Preview” button. Notice the difference in the image. Try different settings to see how the image is affected. Click the “OK” button to apply the unsharp mask and save the image as NGC4631_UnsharpMask.bmp

Optional Activity

22. Load the three M13 images into Stellar Magic and combine them into a single image. The images have already been aligned. Use the “Combine Images” dialog to average the images together. First average images 1 and 2 and then average that result with image 3. Save the result as M13_Combined.bmp.
23. Open the combined image with The Gimp and apply Levels and Curves. Then apply an unsharp mask, using a radius of 0.5 and an amount of 0.5. Save the image as M13_Final.bmp.

Assessment

24. Print each of the final images with The Gimp. To print the images open them one at a time and select Image>Print Scale and set the width and/or height to 4 inches. We want to scale the images so that they fit onto a sheet of paper and minimize the use of toner. Hand in the printed images with this sheet.