Basic Astro Processing Workflow

Based on "10 golden rules of Pixinsight" by
'ViewIntoSpace YT'

1). Cosmetic correction

- Removes hot & cold pixels, bad columns
- Automatic detection
- Can be automated in WBPP

Before

After

2). Crop

- Removes uneven edges after aligning/stacking
- Makes edges look nice
- Prevents issues w/ stretching
- Can be automated in WBPP

3). Gradient Removal

- Removes unwanted light gradients caused by moon, light pollution etc
- Auto / Dynamic background extraction
- GraXpert (free, AI) (www.graxpert.com)

Master   -   gradient   =   clean image

4). Color Calibration

- Color calibration -> PhotometricColorCalibration -> SpectroPhotoMetricColorCalibration
- Requires linear, platesolved image
- Requires the Gaia SPC database (12gb)
- Color calibrates image based on camera and filters used as well as star photometry

Before

After

5). Background Neutralization

- Create preview of empty background
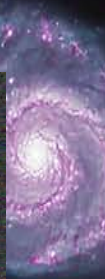- Apply background neutralization to further even out background

6). BlurXtermnator (sharpening)

- Uses AI trained on Hubble data and image point-spread function to reduce stars & sharpen detail
- Pixinsight exclusive, $100 license (rc-astro.com)

Before

After

7). NoiseXterminator (noise reduction)

- AI-powered background smoothing; avoids nebulosity/ structure
- Similar results can be achieved via EZ-noise reducer, or custom masking + TGVDenoise (RGB/K mode), etc

Before   After

8). StarXterminator (star removal)

- Removes stars from image
- Allows processing of structure data without affecting stars and vice versa
- Pixelmath to re-add stars when ready
- StarNet/StarNet2 as alternatives

9). Stretch

- Information is buried in the left side of histogram
- Takes data from linear state to stretched state by "stretching" the histogram
- Be aware of black and white points (don't clip/blow out data)
- Once stretched, do color work with curves to taste
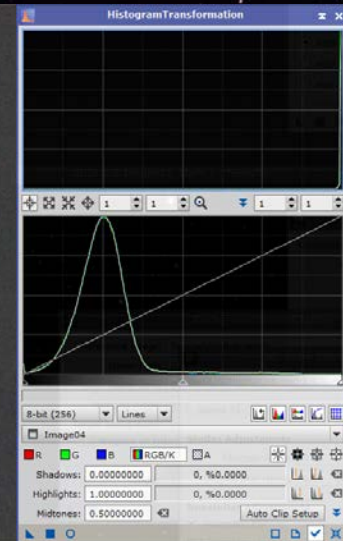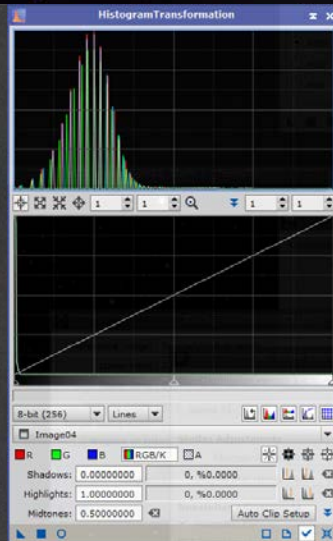
10). Star Recombination

- Recombines stars and structure channels to create color image
- Pixelmath expression for "rescreening":
  $\sim((\sim$starless$)*(\sim$stars$))$

Bonus: Clean up / touch up

After combining luminance, the following can be done:

- TGVDenoise (CIE L*a*b* mode) to background (invert luminance mask). Smooths any remaining background nose while protecting highlights
- Unsharp mask to structures (luminance mask). Further sharpening to details, protects background
- Dark Structure Enhance Script (Pixinsight). Sharpens/boosts contrast around dark nebulae and dust lanes in galaxies
- Further tweaks to black point. Histogram has likely changed after all the curves work in prior steps. Resetting black point can boost contrast and yield a much more dramatic final image. Don't clip!!
- Save in lossless format (.tif ideally). 16-bit, INCLUDE ICC PROFILE!!!