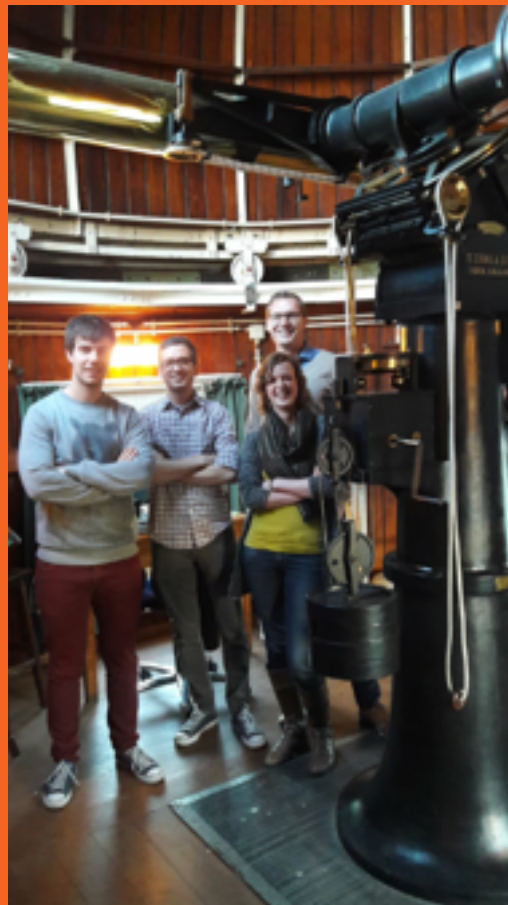# Astrohack April 2017
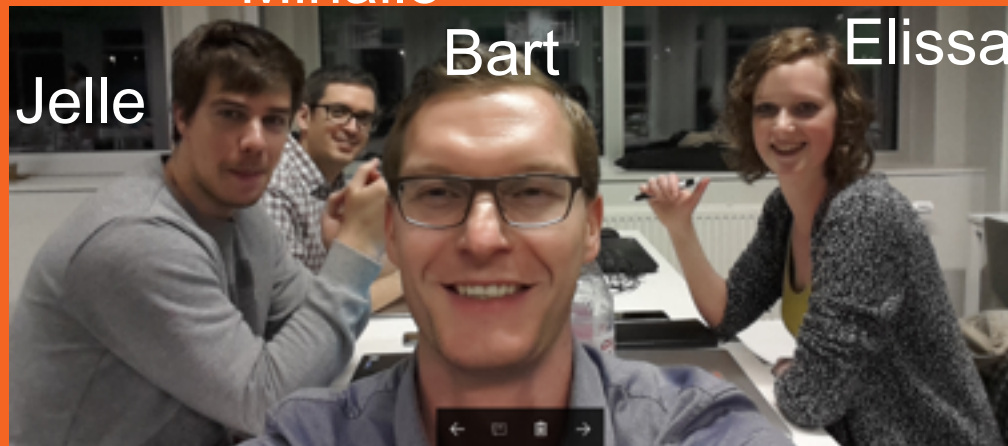
Mihailo

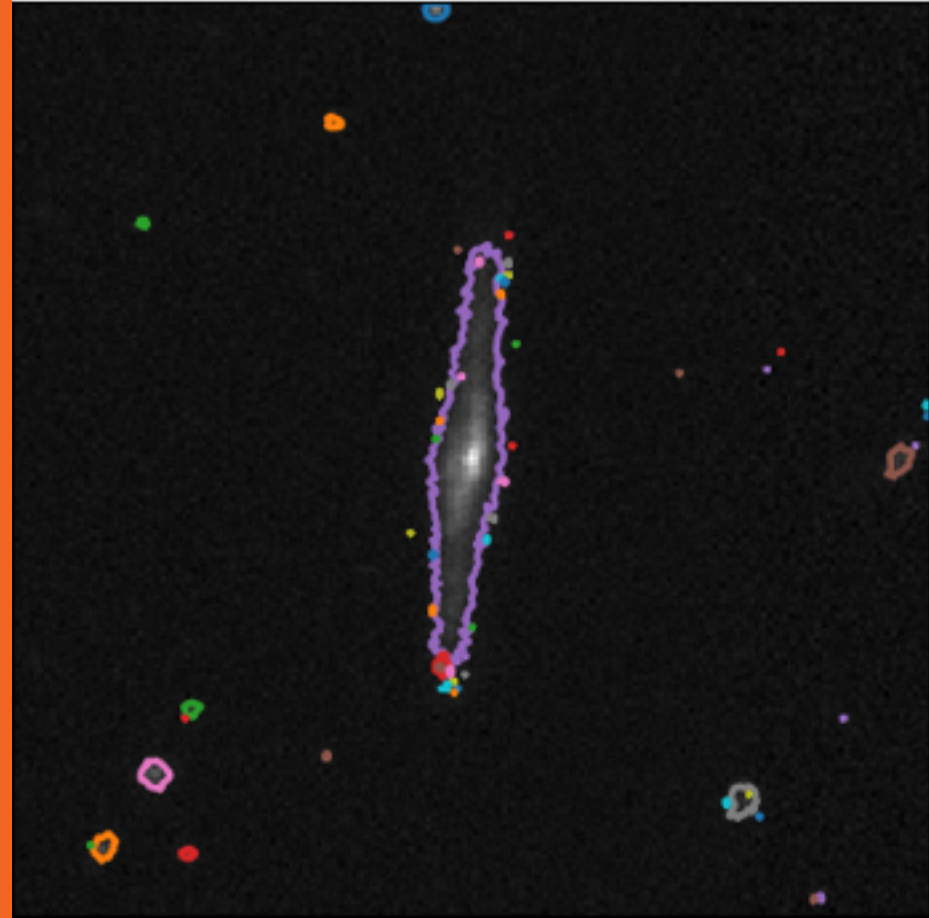Jelle

Bart

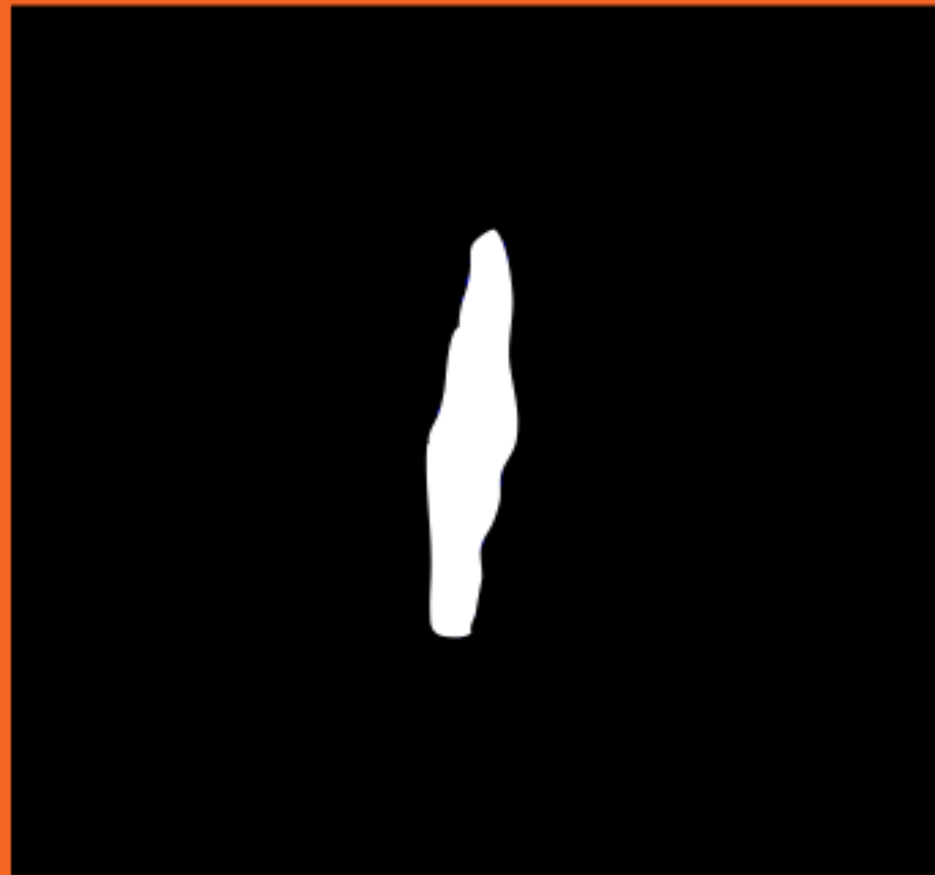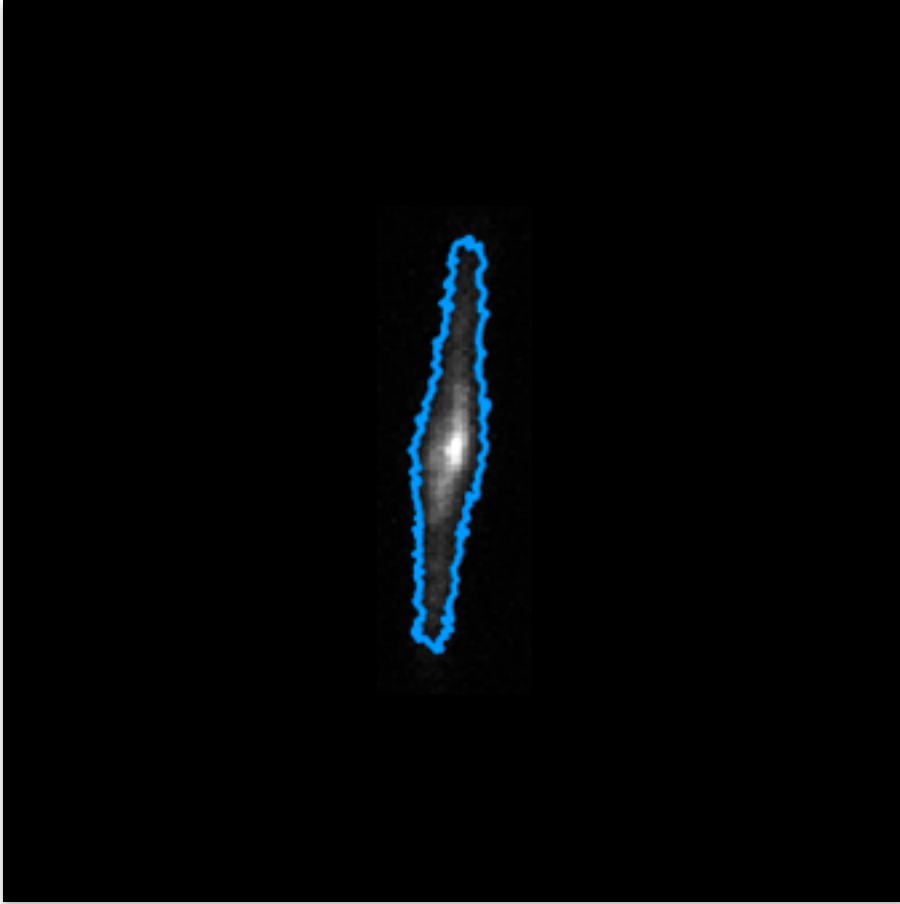Elissa

A guide by **GUARDIANS OF THE GALAXY**

Pre-processing

Find edge contours around all the features in an image of a galaxy

Take the contour fixed at the center of the image and turn it into a filter
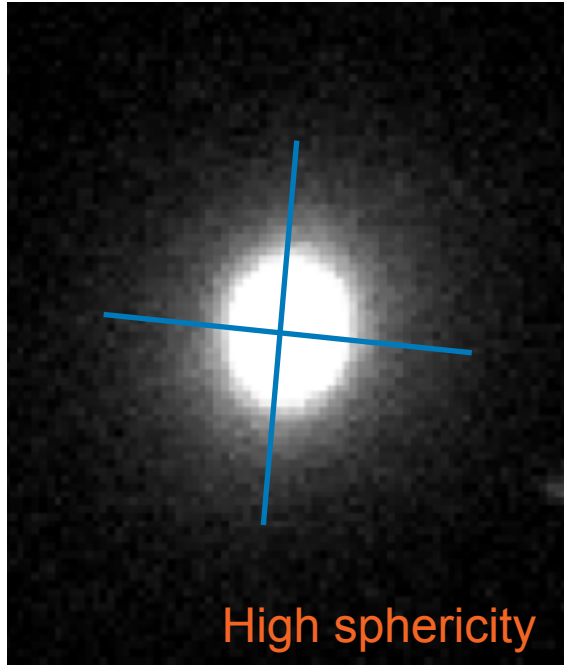
Convolve the filter with the galaxy image to
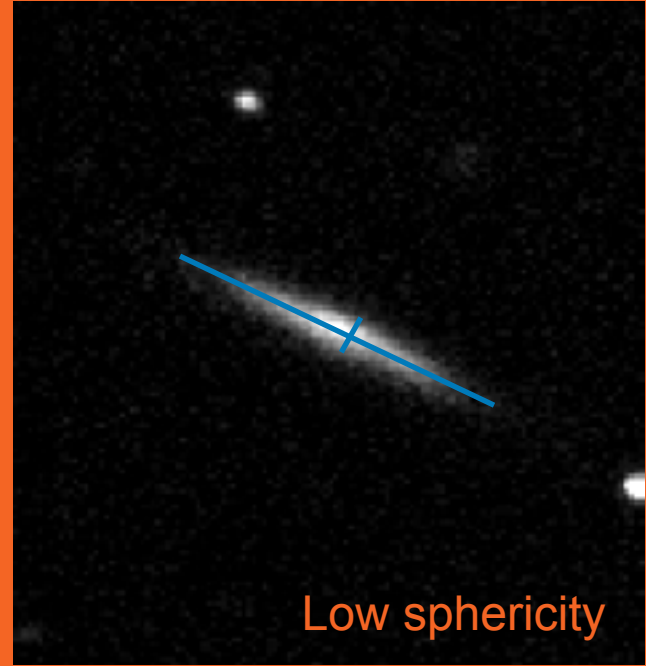
Isolate

the part of the image which is in the **center**

Eliminates noise, and reduces foreground

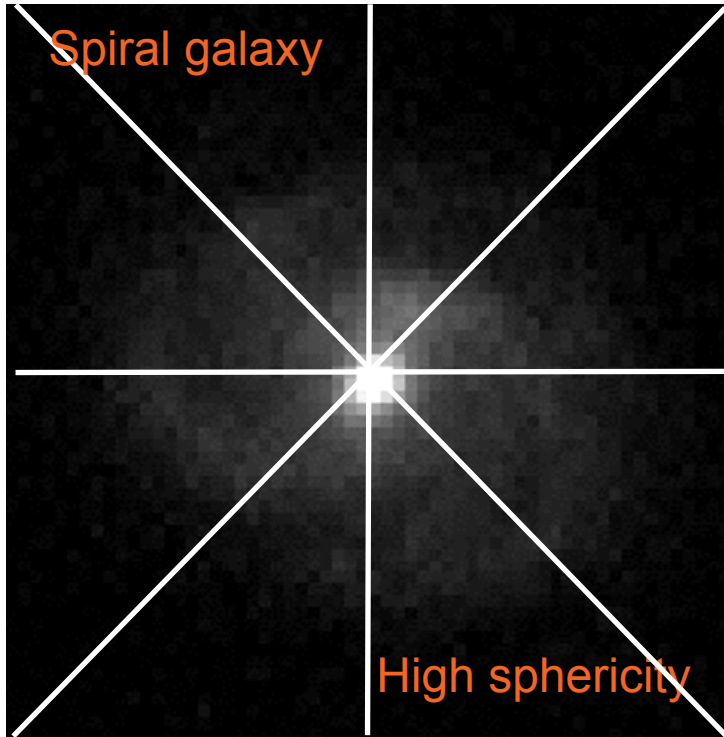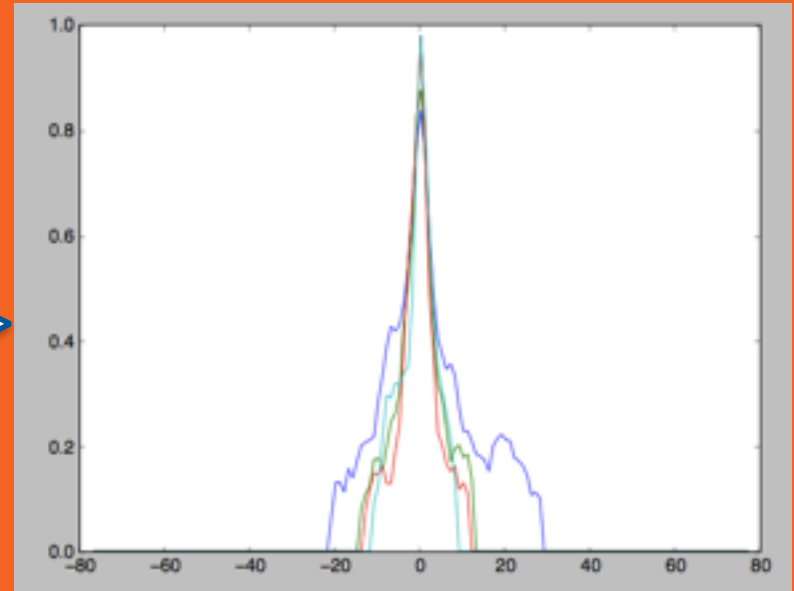# How to distinguish Spiral from Spherical?

High sphericity

1. Sphericity

Low sphericity

*** equivalent to finding moments of inertia in mechanics.

How to distinguish Spiral from Spherical?

Spiral galaxy

High sphericity

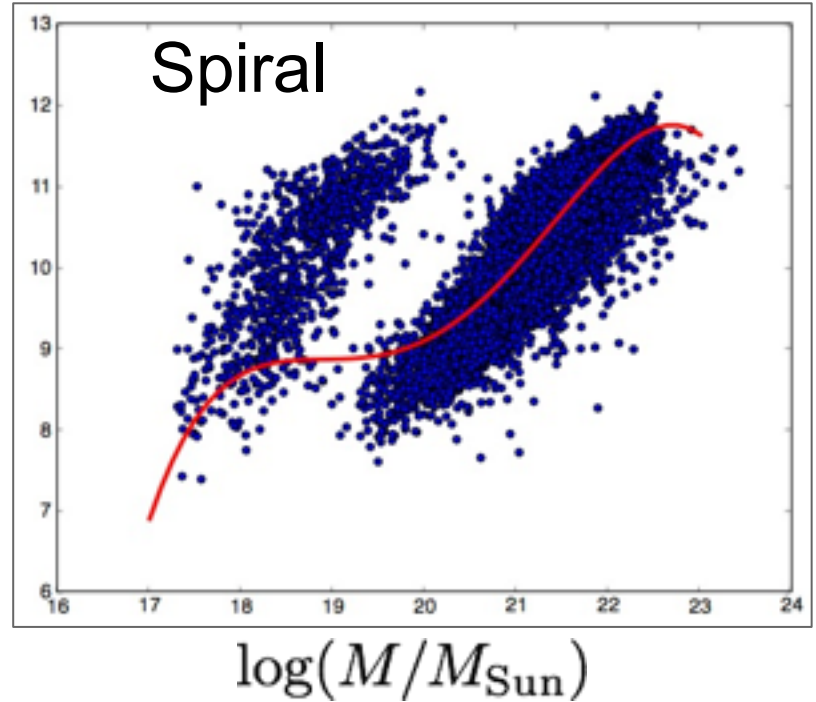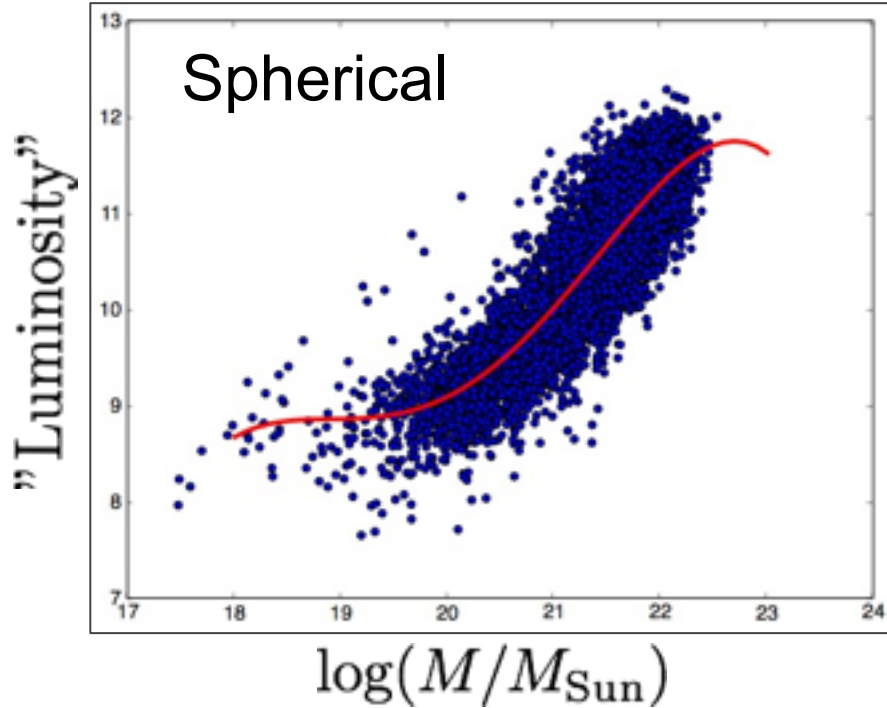# 2. Volatility

Look at the profiles along 6 directions

If the profile curves show a lot of "**substructure**" then it's likely a spiral

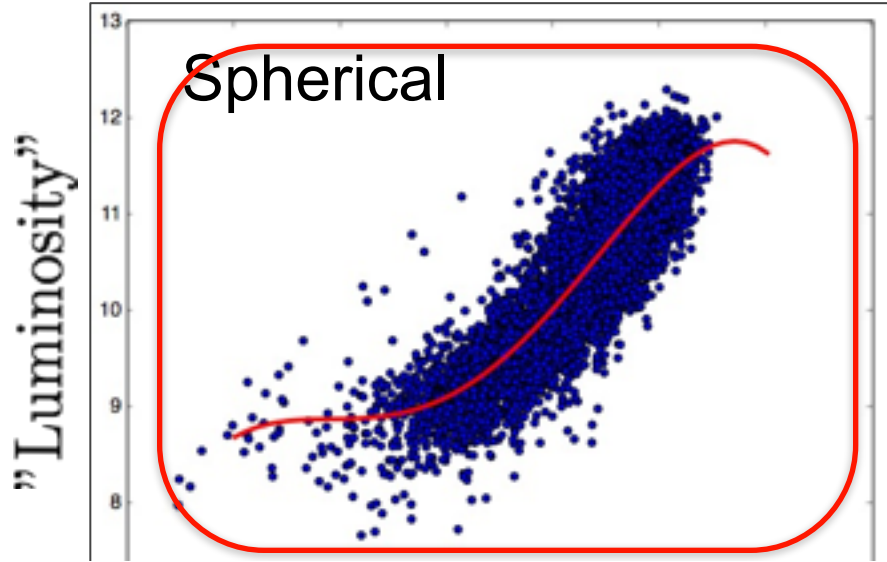If it's a smooth curve along all directions, it's likely a spherical galaxy.

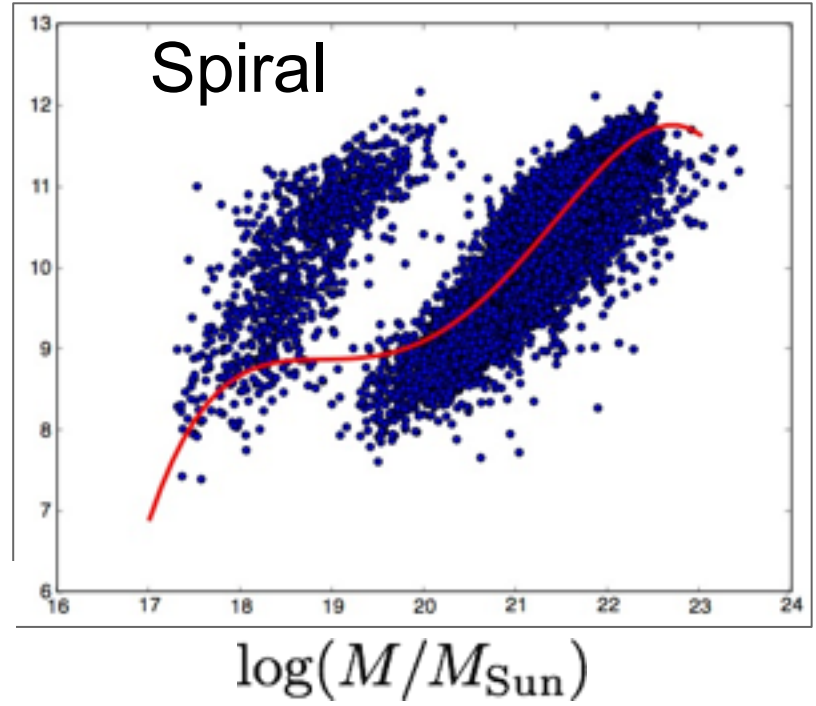# Polynomial regression
(done in the last 3.5 min of the AstroHack)

Polynomial regression
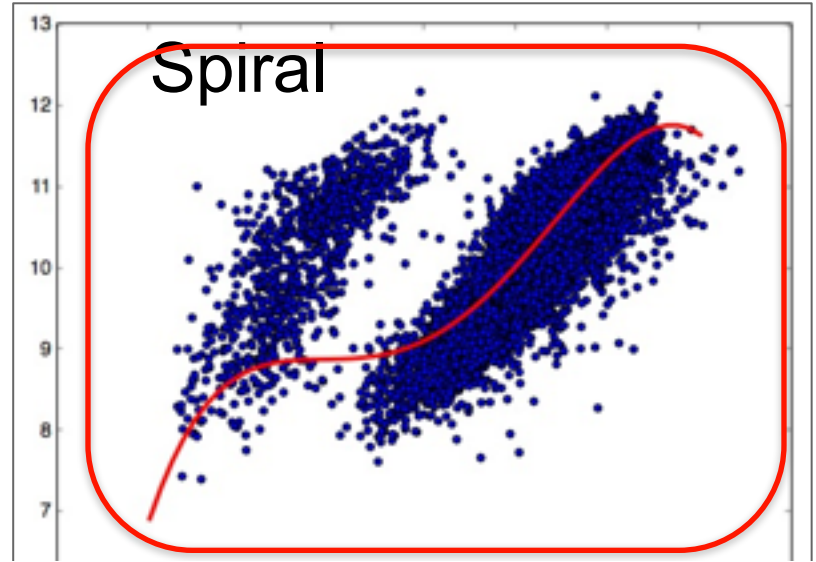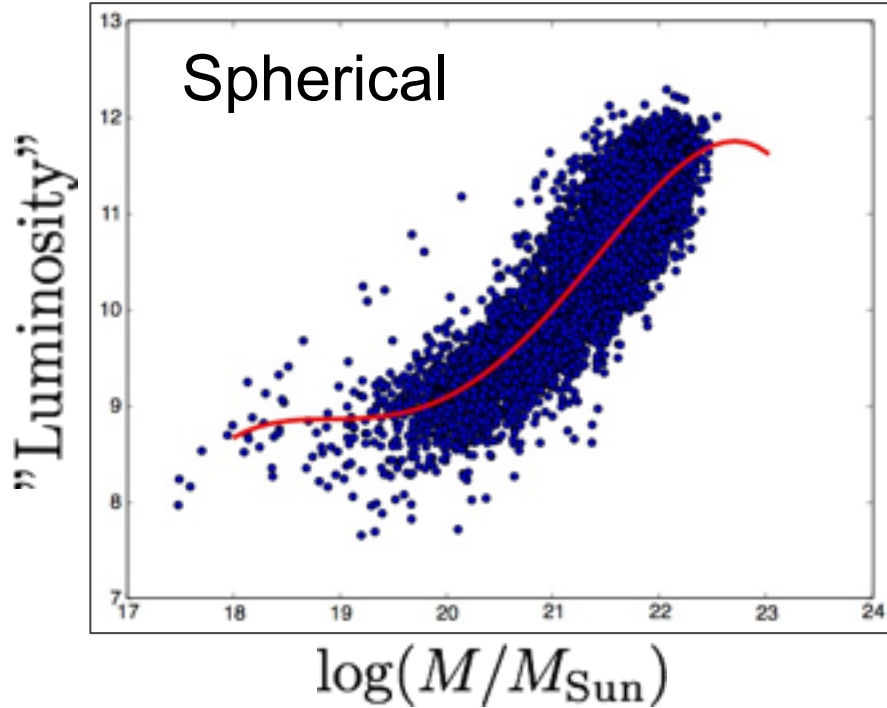**(done in the last 3.5 min of the AstroHack)**

Worked quite well on spherical galaxy class
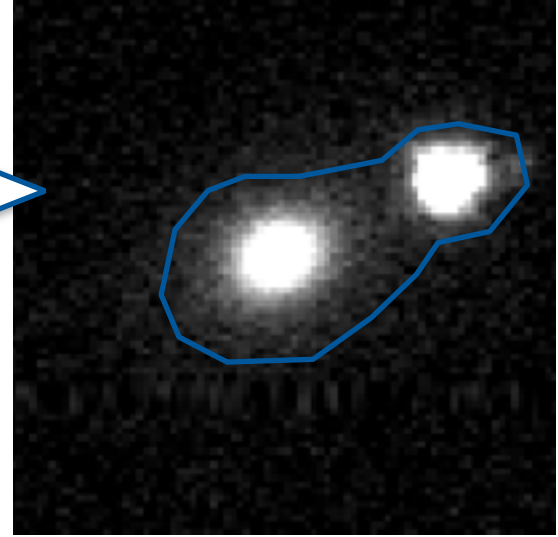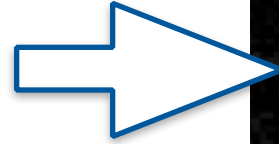
Polynomial regression
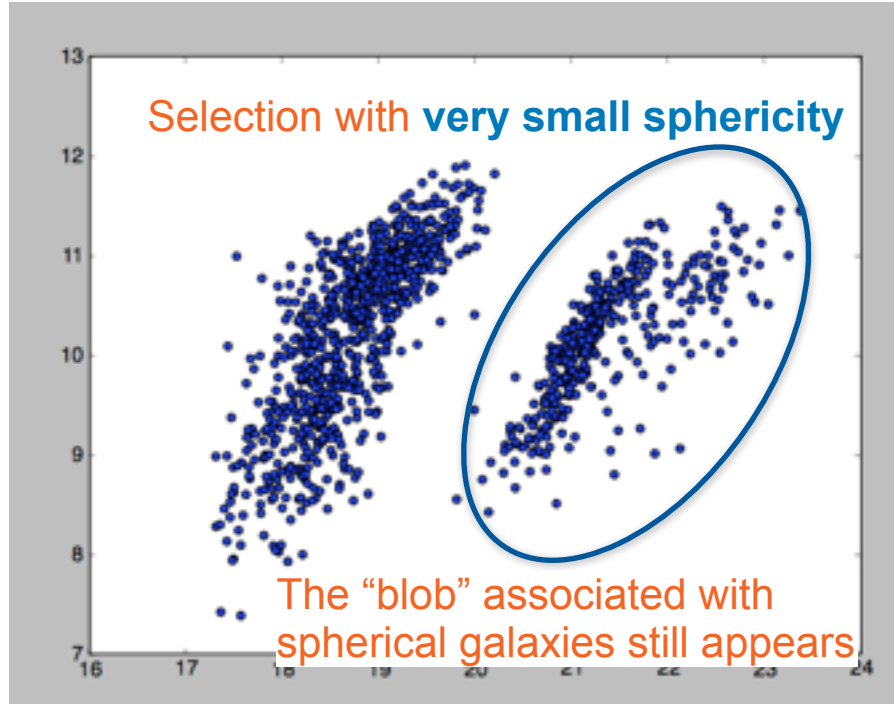**(done in the last 3.5 min of the AstroHack)**

Not so well on the spiral galaxy class! Why?

Polynomial regression
(done in the last 3.5 min of the AstroHack)

Selection with **very small sphericity**

The "blob" associated with spherical galaxies still appears

This occurs if you have a spherical galaxy with a **foreground star** nearby
(The contouring algorithm groups them together)

Make galaxies **great again!**

Advantages:
- Simplicity
- Ease of implementation
- Easy to parallelize and scale!
- **Control of the systematics!**

Disadvantages:
- Requires significant pre-processing.
- Sensitive to foreground/noise.
(but can be improved)

It's just great, believe me!"

GitHub: https://github.com/emnot/astrohack