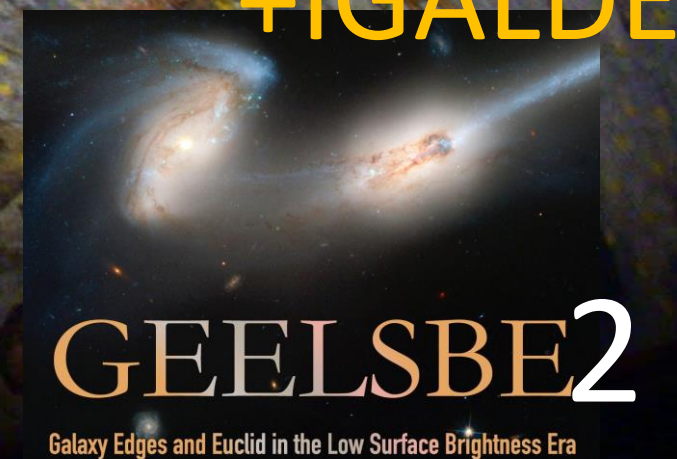


PROCESAMIENTO DE IMÁGENES

+IGALDE



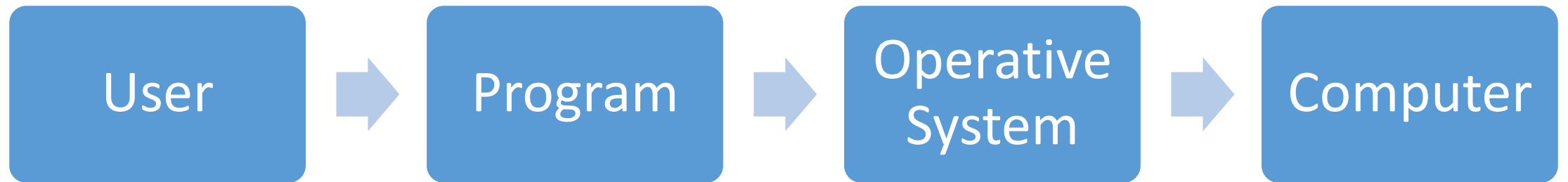
Fernando Buitrago
fbuitrago.astro@gmail.com



This activity is part of the grant PID2023-150393NB-I00 funded by MCIU/AEI/10.13039/501100011033 and the FSE+

- Do you have any questions from yesterday?
- What did we do yesterday?
- (<https://streamlit.io/gallery>)

WHAT'S AN OPERATIVE SYSTEM?



INTERESTING FEATURES IN AN OPERATIVE SYSTEM

- Local and global paths
- Processes
- Users and permissions
- Standard I/O
- Regular expressions
- Shell scripting



INTERESTING COMMANDS

- Autocomplete (tab) / Running in the background (&) / Paste (middle mouse button)
- ssh
- scp
- screen
- top
- pdfunite
- Poor man paralelization

SECUENCIAL PROGRAMING VS OBJECT ORIENTED PROGRAMMING



INTERESTING PROGRAMS

- Gimp
- Nomachine
- ds9 histogram and features that we did not explore yesterday
- Python:
 - Debugger → *“When you have eliminated the impossible, whatever remains, however improbable, must be the truth”* (Sherlock Holmes)
 - Filtering your data (and boolean arithmetics)
 - The art of dominating NaN
 - Pandas

CREATING COLOR IMAGES

- Create my own image

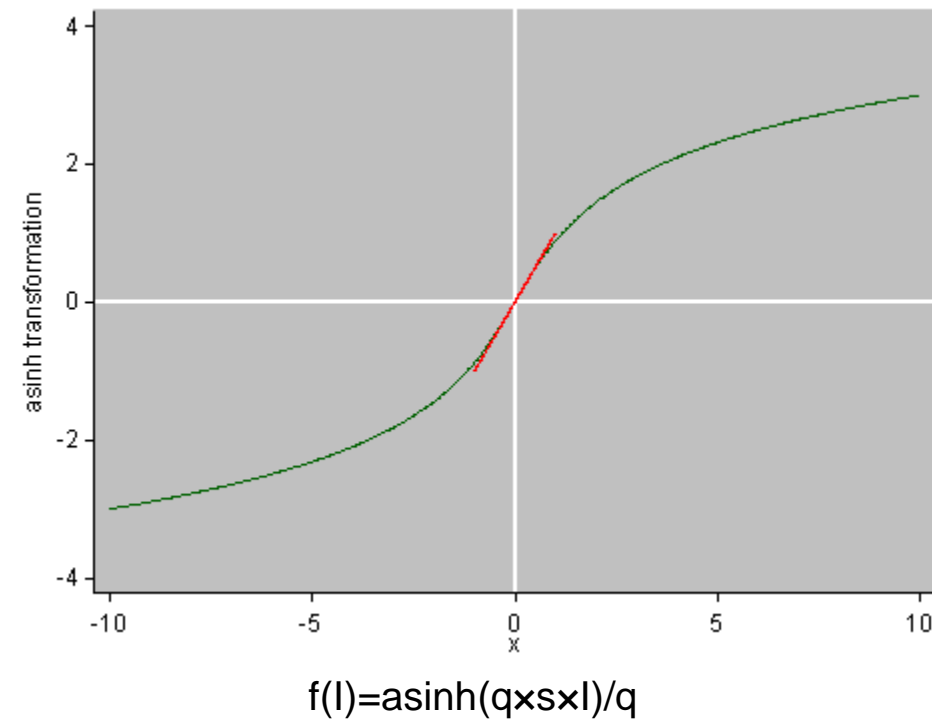
https://matplotlib.org/stable/api/as_gen/matplotlib.patches.Patch.html

- Usually we use an asinh transformation

- Lupton:

<https://docs.astropy.org/en/latest/visualization/rgb.html>

- Gnuastro: https://www.gnu.org/software/gnuastro/manual/html_node/Color-images-with-full-dynamic-range.html



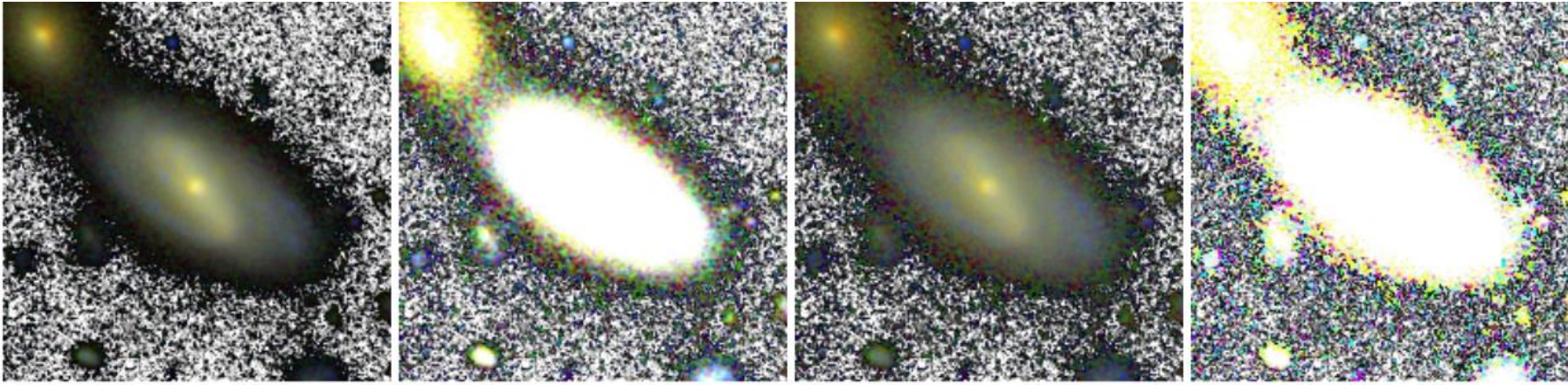
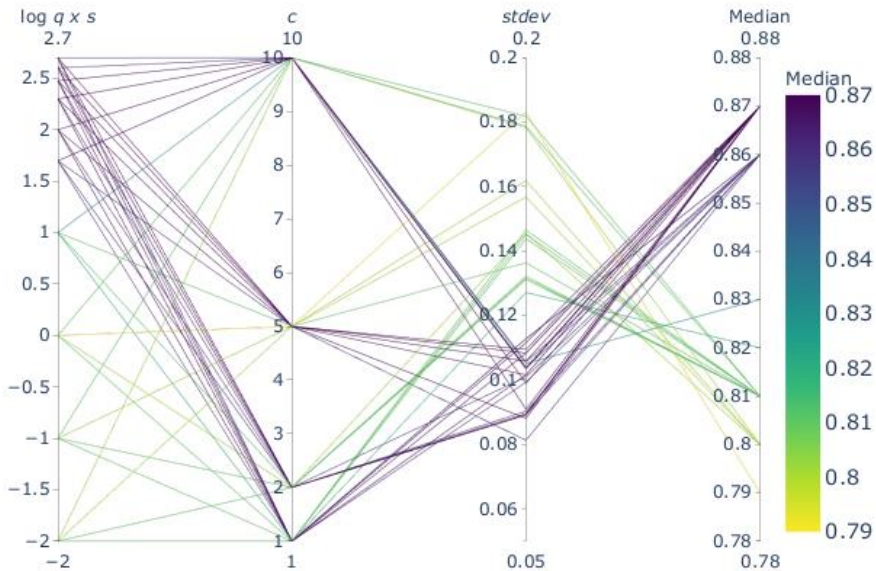


Fig. 1. Four RGB images of the DISK galaxy (ID = 1298 COSMOS, $M_* = 1.4 \times 10^{10} M_\odot$ at $z = 0.15$). The RGB channels correspond to J, and I+V HST filters, respectively. Images were produced with the Gnuastro script `astscript-color-faint-gray` for $q \times s = 50$ (first and second panels) and $q \times s = 400$ (third and fourth panels), and for $c = 1$ (first and third panels) and $c = 5$ (second and fourth panels). Stamps field of view of $12 \times 12 \text{ arcsec}^2$ ($200 \times 200 \text{ px}^2$).

From Vega-Ferrero et al. (2025)



and to quantify uncertain regions. We produced an average map with the 24 different configurations selected at the end of Sect. 3.2.1 and the three segmentation maps for each configuration that SAM infers. A total of 72 (24×3) segmentation maps were combined to obtain the average one. Segmentation maps are in a binary format: zeros for regions outside the truncation and ones for regions inside it. Therefore, the averaged segmentation map ranges from 0 to 1 values per pixel: 0 means none of the segmentation maps include that pixel as part of the truncation; 1 means all the segmentation maps consider that pixel as part of the truncation; and intermediate values between 0 and 1 represent different levels of agreement between the different segmentation maps for each configuration. By producing these averaged maps we can determine whether the models converge on a similar

OTHER INTERESTING RESOURCES

To learn different programming languages:

<https://www.w3schools.com/>

Many notebooks useful for different types of science:

<https://github.com/jupyter/jupyter/wiki/A-gallery-of-interesting-Jupyter-Notebooks#earth-science-and-geo-spatial-data>

To learn Deep Learning techniques (a specific kind of Artificial Intelligence:

- <http://neuralnetworksanddeeplearning.com/>
- fast.ai: <https://course.fast.ai/Resources/book.html>