



# Classifying the Morphology of galaxies in Abell2744

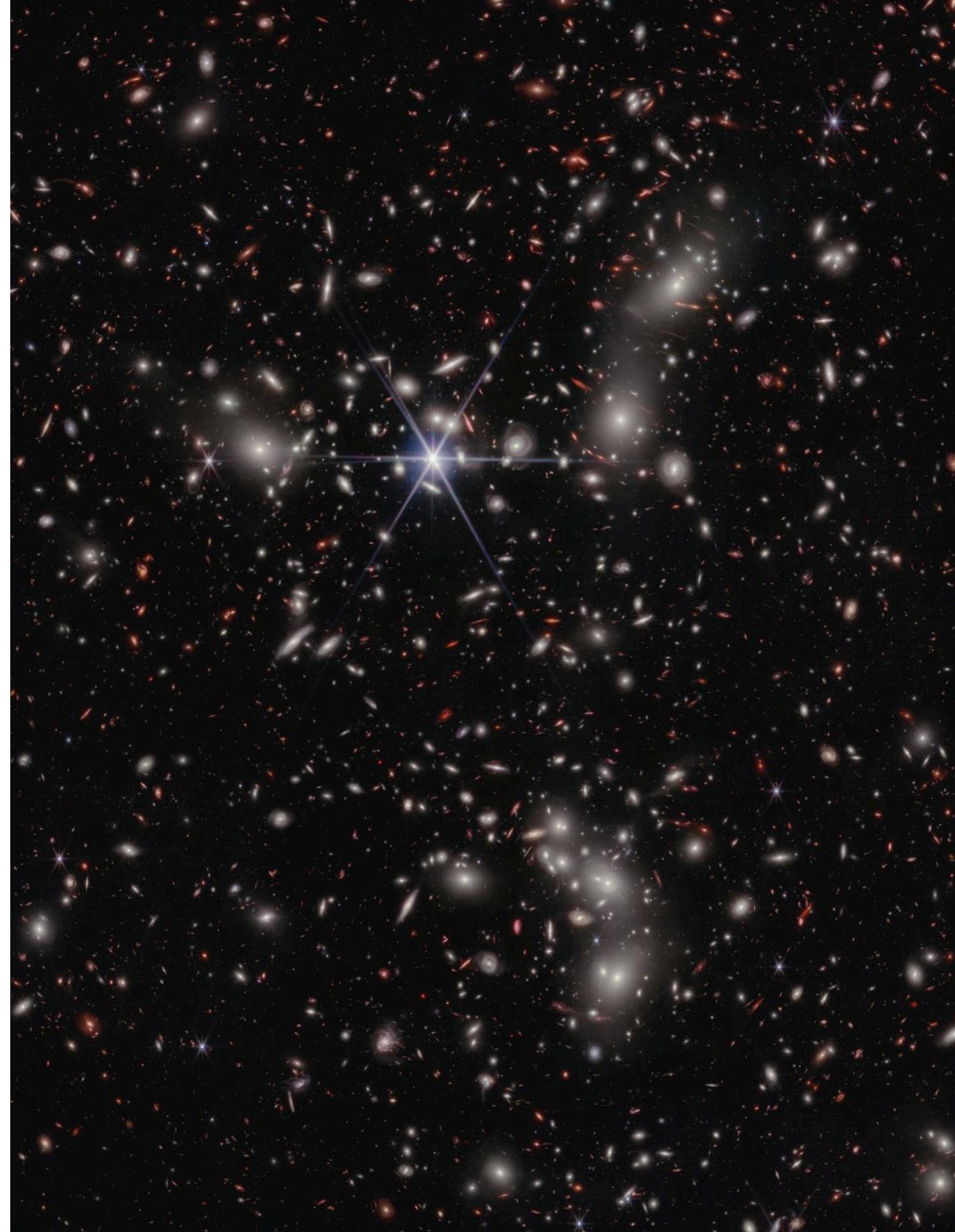
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**Indian institute of Astrophysics**  
**Bangalore, India**

**jayanthaoc@gmail.com**

**31 October 2025**



Credit : NASA, ESA, CSA, I. Labbe (Swinburne University of Technology), R. Bezanson (University of Pittsburgh), A. Pagan (STScI)



# Aim

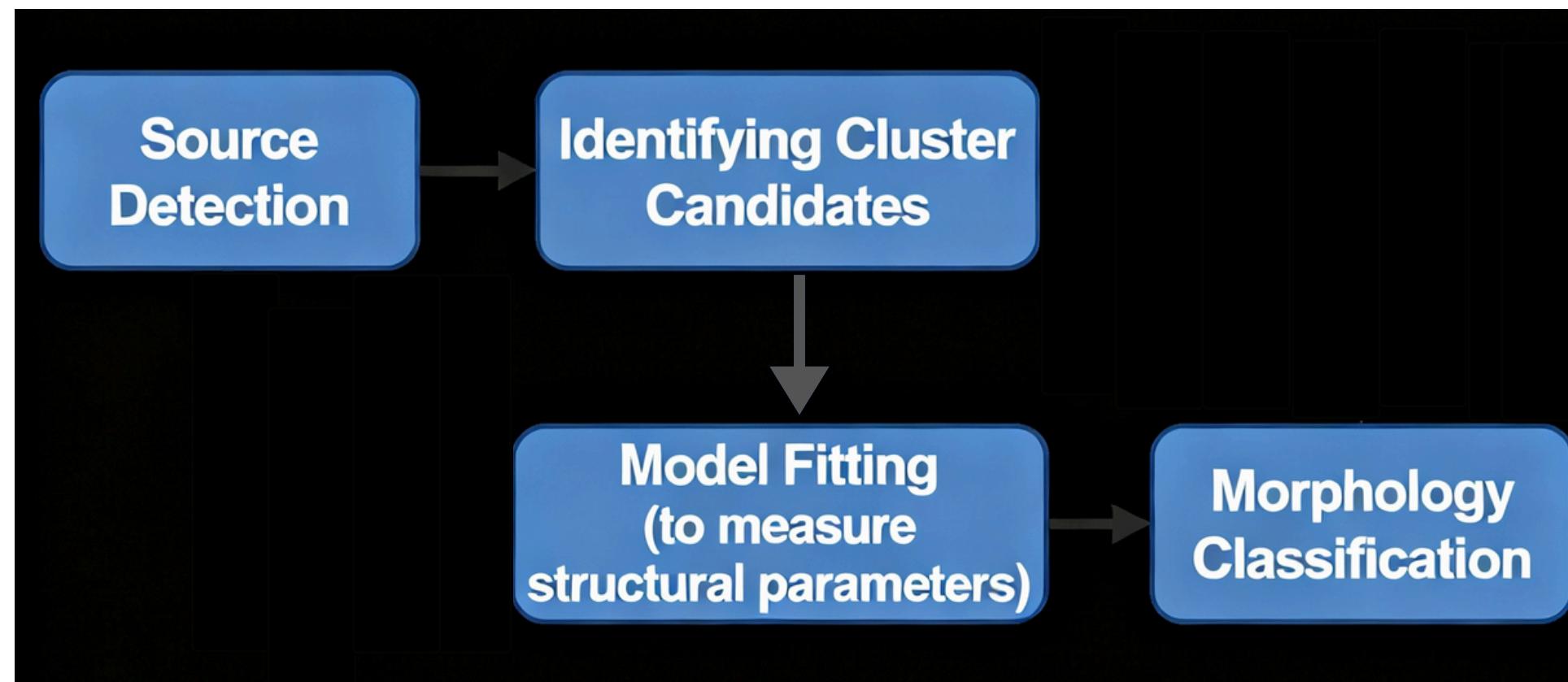
To identify galaxies from the cluster **Abell 2477** and classify the morphology using models fitting.

# Data

Science-ready Image and catalogue from **JWST UNCOVER (Ultradeep NIRSpec and NIRCam ObserVations before the Epoch of Reionization)** project.

- Redshift of **0.308\***
- Mosaic of Abell2477 from **NIRCam Filter - F444W** from UNCOVER DR3\*

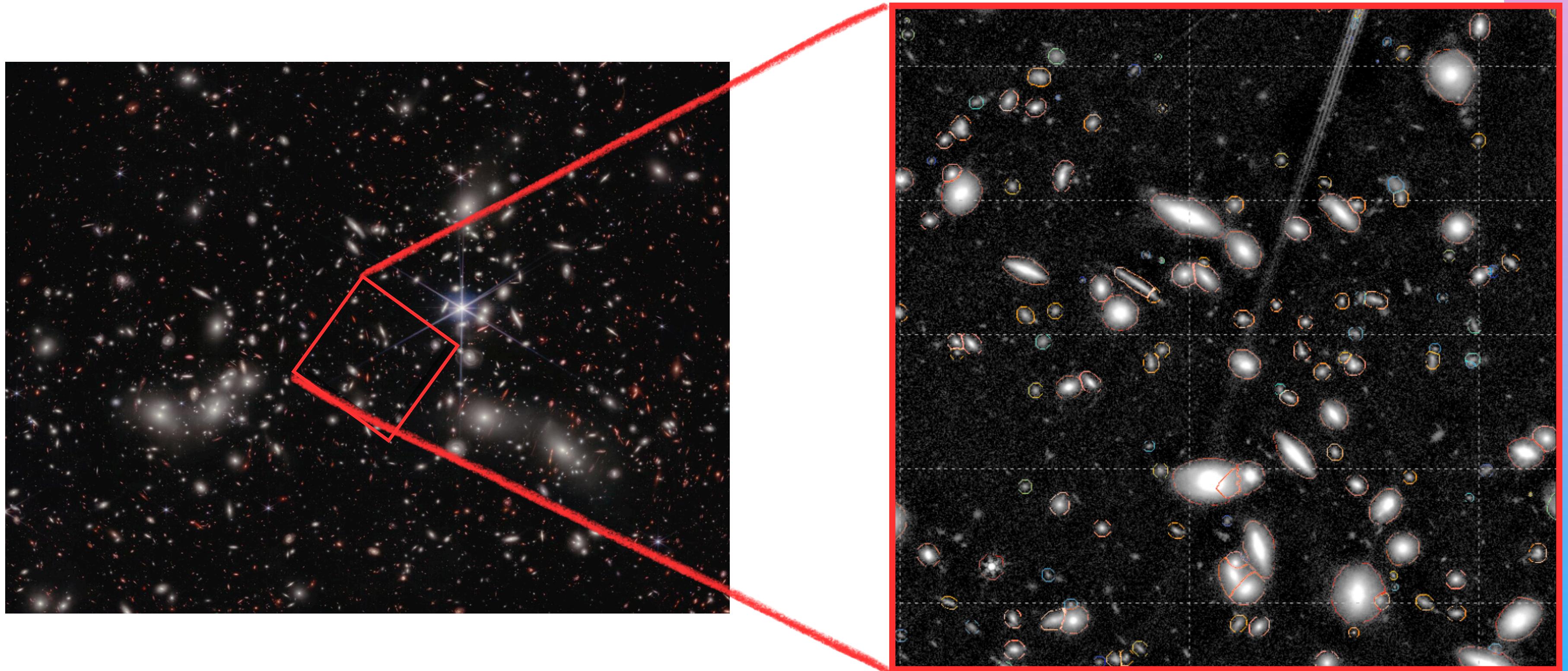
# Execution



\*Couch & Newell (1984)

\*Suess et al. (2024)

# Source Detection - ProFound (Robotham et al. 2018)



Credit: NASA, ESA, CSA, I. Labbe (Swinburne University of Technology), R. Bezanson (University of Pittsburgh), A. Pagan (STScI)

**~16000 sources**

# ProFound and JWST UNCOVER Catalog ~ 60k sources

- ProFound and UNCOVER catalog crossmatch with radius 0.1 arcsec (found ~14k sources)
- UNCOVER catalog provides redshift posterior percentiles (z50).
- A narrow cut of **0.3** to **0.31** was applied to identify only cluster members, and 160 galaxies were found.

The UNCOVER Survey: A First-look HST+JWST Catalog of Galaxy Redshifts and Stellar Population Properties Spanning  $0.2 \lesssim z \lesssim 15$

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Wang, Bingjie [ID](#); Leja, Joel [ID](#); Labb  , Ivo [ID](#); Bezanson, Rachel [ID](#); Whitaker, Katherine E. [ID](#); Brammer, Gabriel [ID](#); Furtak, Lukas J. [ID](#); Weaver, John R. [ID](#); Price, Sedona H. [ID](#); Zitrin, Adi [ID](#); Atek, Hakim [ID](#); Coe, Dan [ID](#); Cutler, Sam E. [ID](#); Dayal, Pratika [ID](#); van Dokkum, Pieter [ID](#); Feldmann, Robert [ID](#); Marchesini, Danilo [ID](#); Franx, Marijn [ID](#); F  rster Schreiber, Natascha [ID](#); Fujimoto, Seiji [ID](#); Geha, Marla [ID](#); Glazebrook, Karl [ID](#); de Graaff, Anna [ID](#); Greene, Jenny E. [ID](#); Juneau, St  phanie [ID](#); Kassin, Susan [ID](#); Kriek, Mariska [ID](#); Khullar, Gourav [ID](#); Maseda, Michael [ID](#); Mowla, Lamiya A. [ID](#); Muzzin, Adam [ID](#); Nanayakkara, Themiya [ID](#); Nelson, Erica J. [ID](#); Oesch, Pascal A. [ID](#); Pacifici, Camilla [ID](#); Pan, Richard [ID](#); Papovich, Casey [ID](#); Setton, David J. [ID](#); Shapley, Alice E. [ID](#); Smit, Renske [ID](#); Stefanon, Mauro [ID](#); Suess, Katherine A. [ID](#); Taylor, Edward N. [ID](#); Williams, Christina C. [ID](#)

# ProFound and JWST UNCOVER Catalog

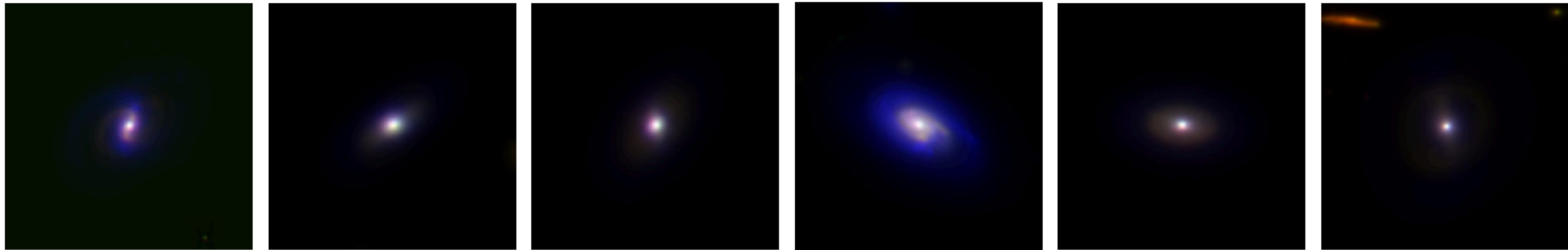
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F444W + F271W + F150W

# Galaxy Structural Modeling and Profile Fitting

Python package - Statmorph

Image data

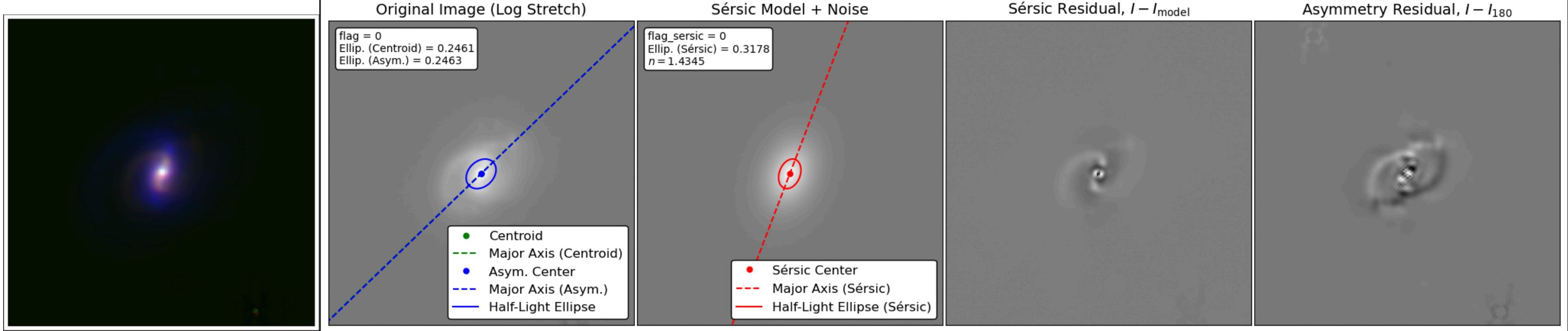
Segmentation Map

Weight Map/(gain+psf)

The optical morphologies of galaxies in the IllustrisTNG simulation: a comparison to Pan-STARRS observations

Show affiliations

Rodriguez-Gomez, Vicente [ID](#) ; Snyder, Gregory F. [ID](#) ; Lotz, Jennifer M. ; Nelson, Dylan ; Pillepich, Annalisa ;  
Springel, Volker [ID](#) ; Genel, Shy [ID](#) ; Weinberger, Rainer [ID](#) ; Tacchella, Sandro [ID](#) ; Pakmor, Rüdiger [ID](#) ;  
Torrey, Paul [ID](#) ; Marinacci, Federico [ID](#) ; Vogelsberger, Mark ; Hernquist, Lars ; Thilker, David A.



Gini coefficient: 0.5932221363351909

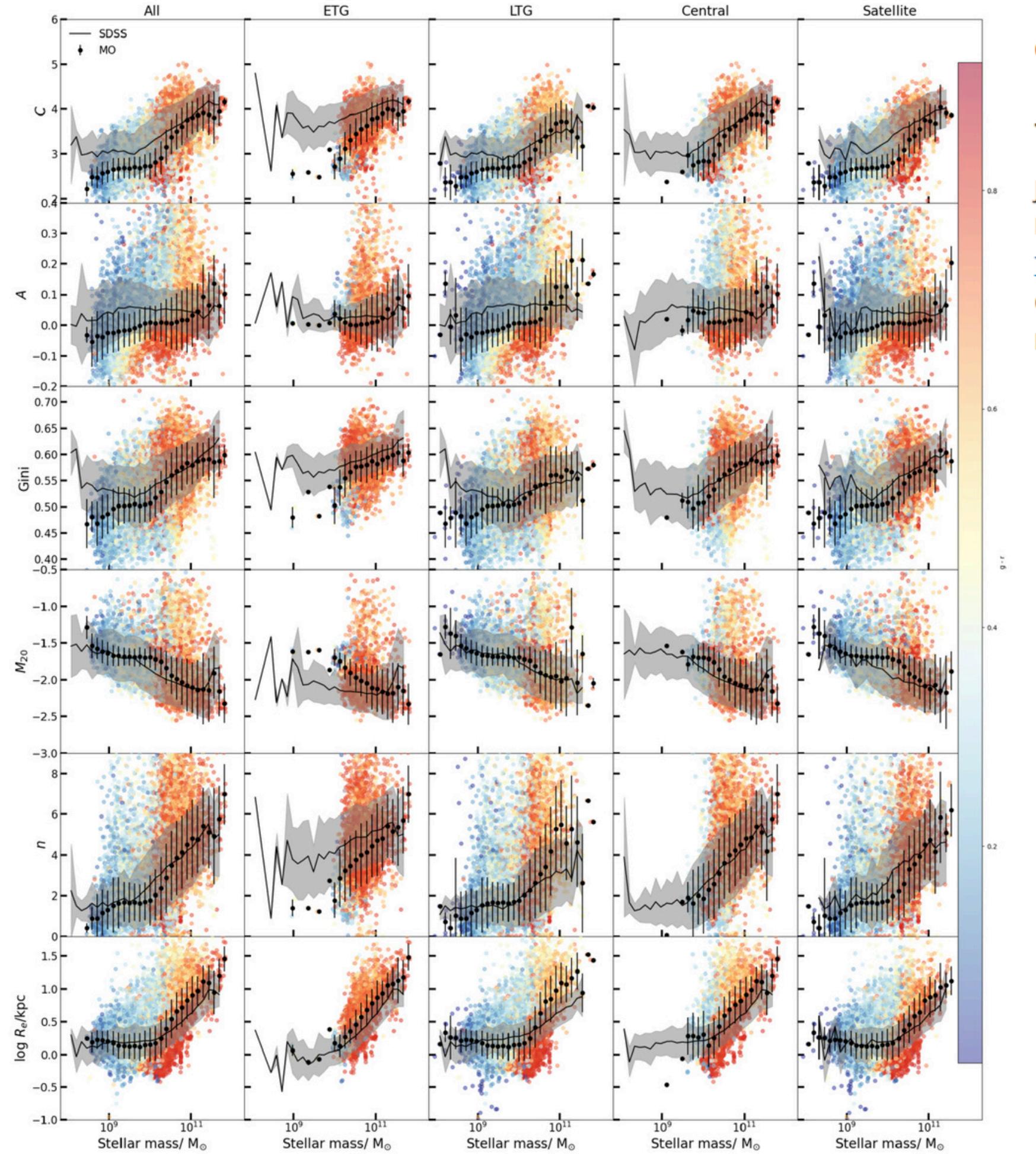
Concentration: 3.4138320398131947

Smoothness: 0.03594852000398734

M20: -2.0977741709213182

Asymmetry: 0.09359542337819962

Sérsic index : 1.4345388452738597



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# Mock Observations: Morphological Analysis of Galaxies in TNG100 Simulations

Jun-Yu Gong, Weipeng Lin, Lin Tang, and Yanyao Lan

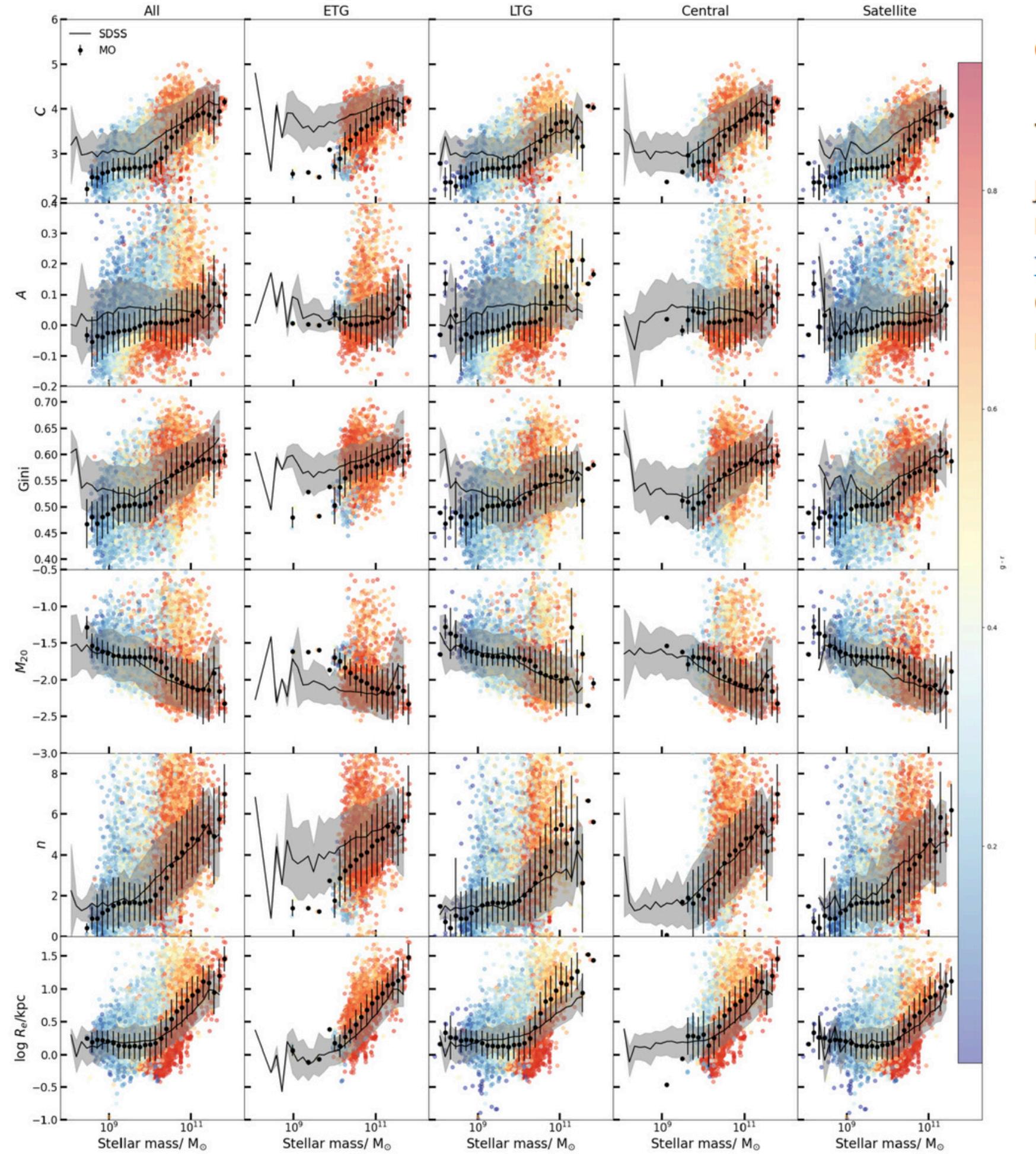
Published 2025 June 27 • © 2025. The Author(s). Published by the American Astronomical Society.

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Stellar mass vs various morphological statistics



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Stellar mass vs various morphological statistics

## Future Goal

- To automate the modelling of all identified objects at various redshifts.
- Expand similar analysis to other cluster data.



# THANK YOU

F O R   T H E   A T T E N T I O N

