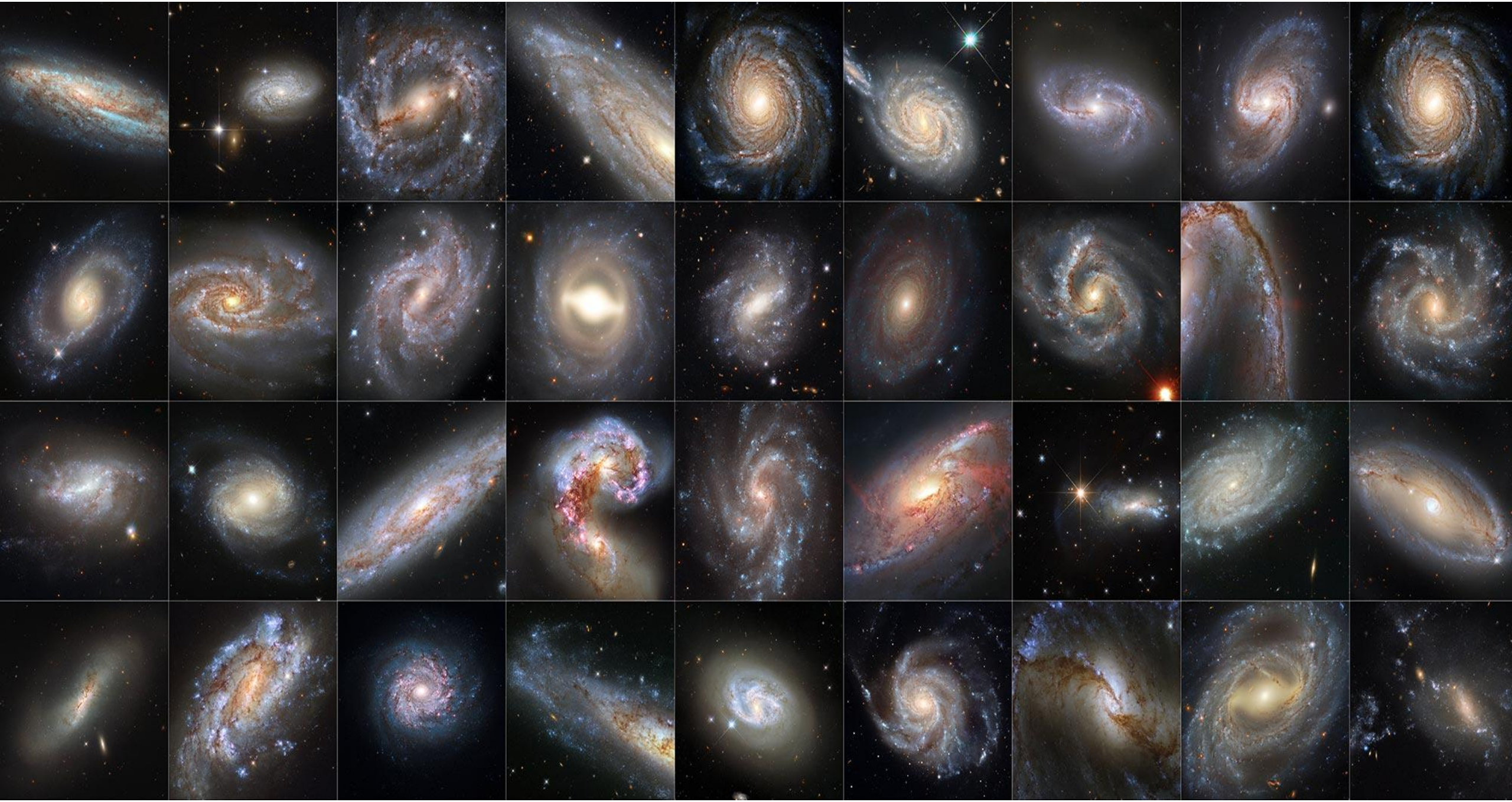
The Hidden Hearts of Nearby Galaxies

MacKenzie Dean

University of Colorado **Boulder**

Maria Mitchell Association



NASA, ESA, ADAM G. RIESS (STSCI, JHU)

Morphology: Spirals

NASA and The Hubble Heritage Team (STScI/AURA)

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Morphology: Spirals

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SSRO/PROMPT and NOIRLab/NSF/AURA

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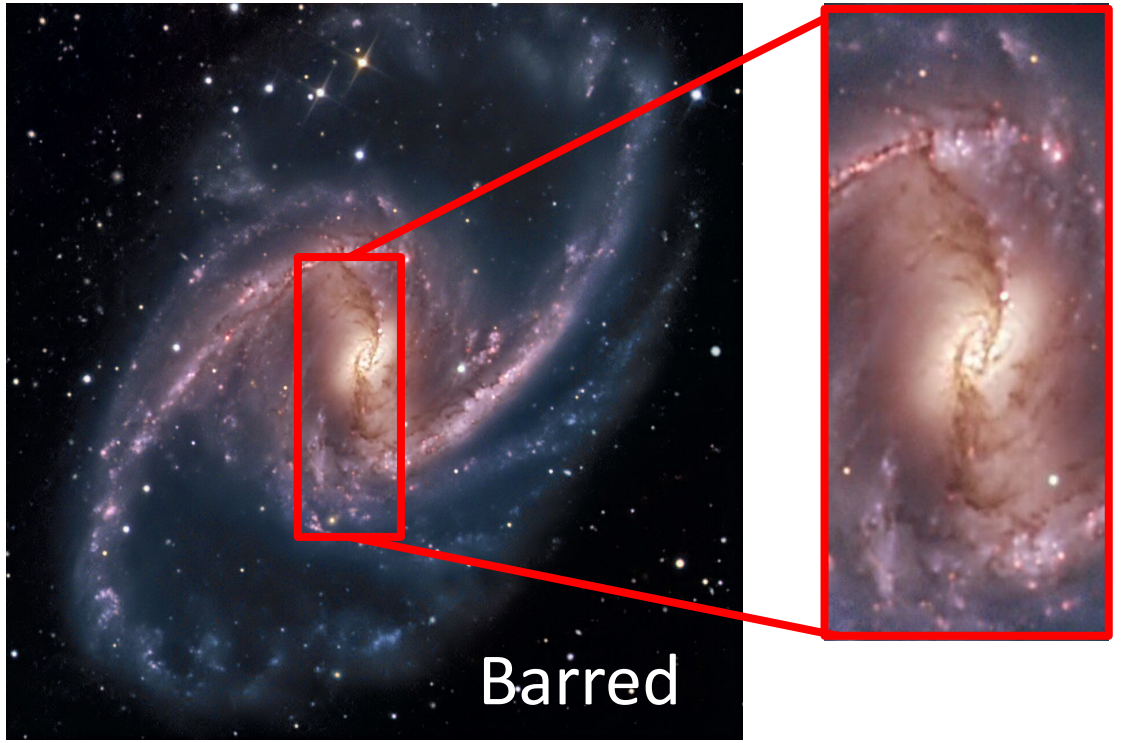

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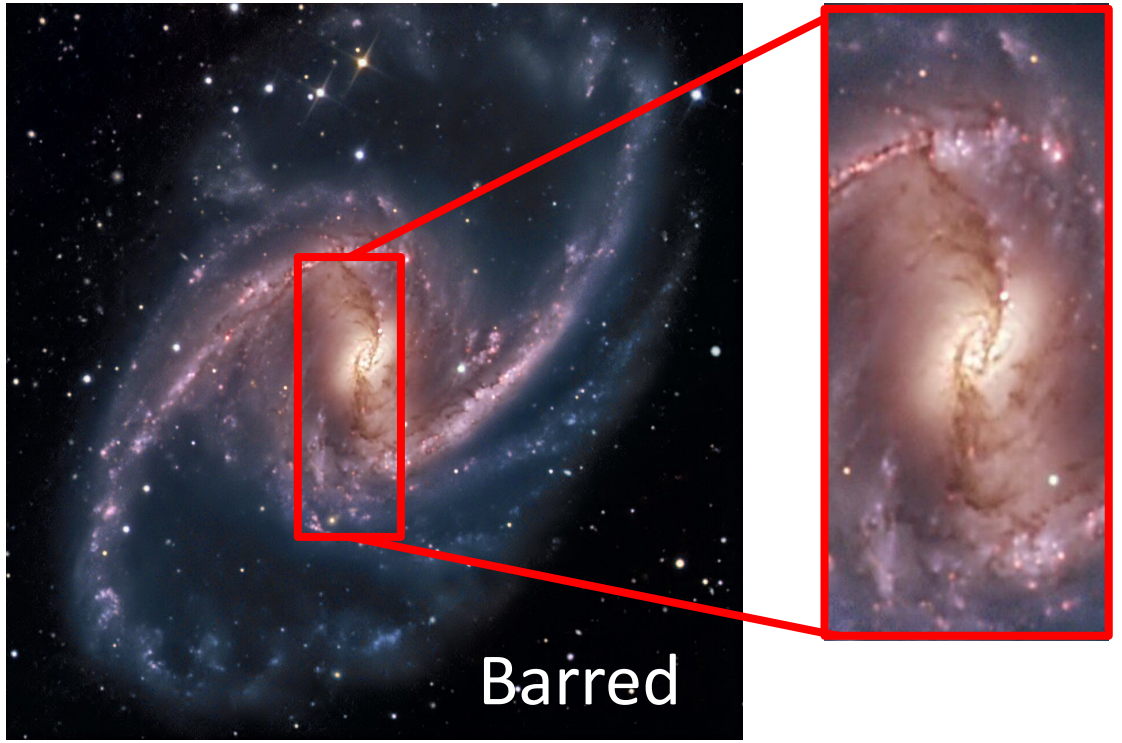

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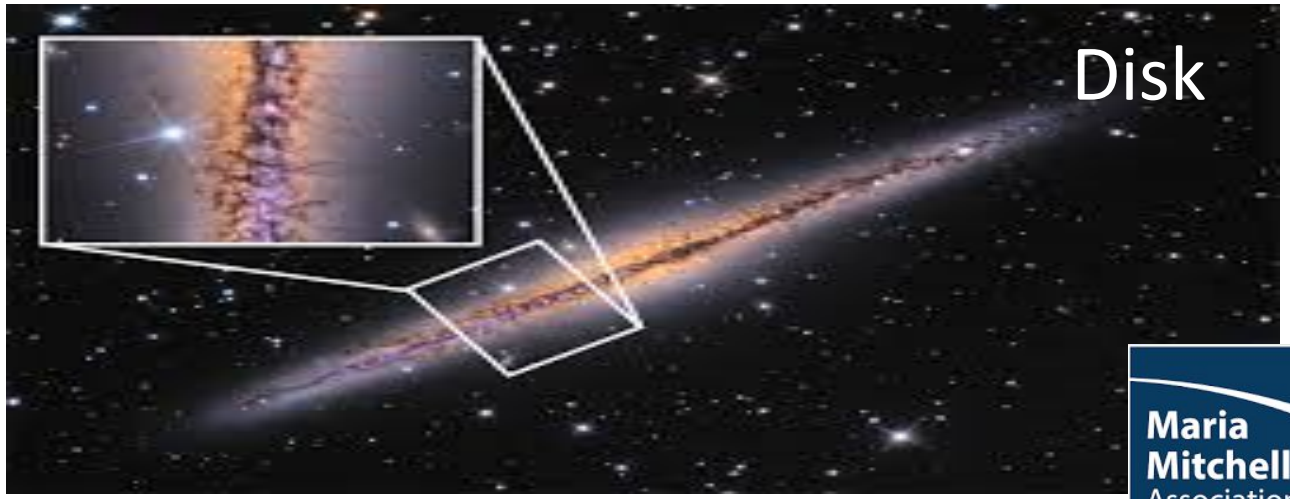

Adam Block/Mount Lemmon SkyCenter/University of Arizona

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Morphology: Others

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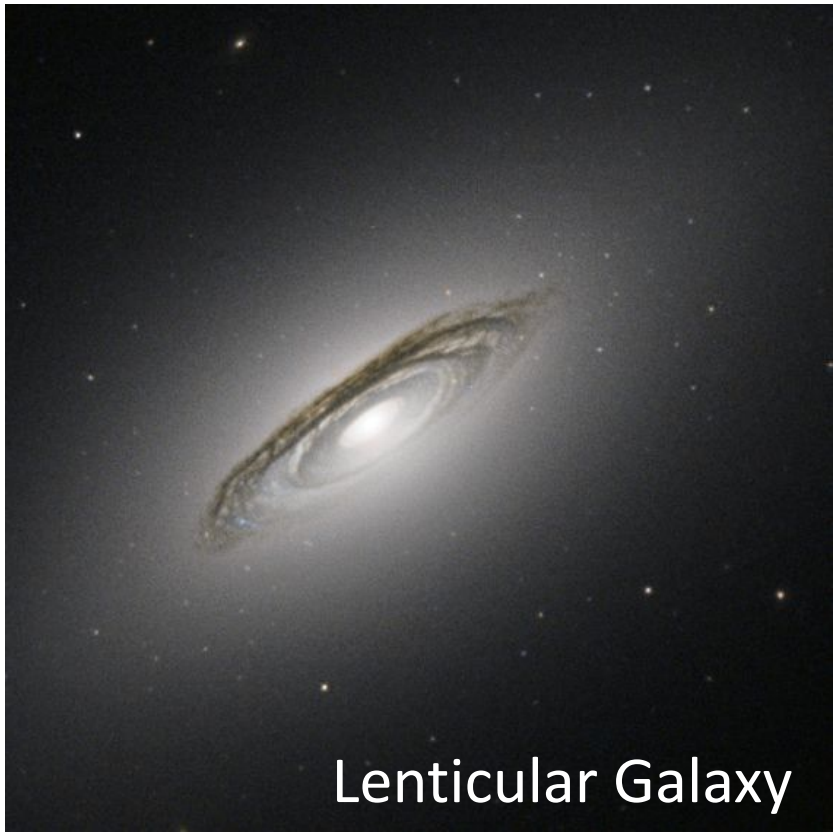

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Morphology: Others

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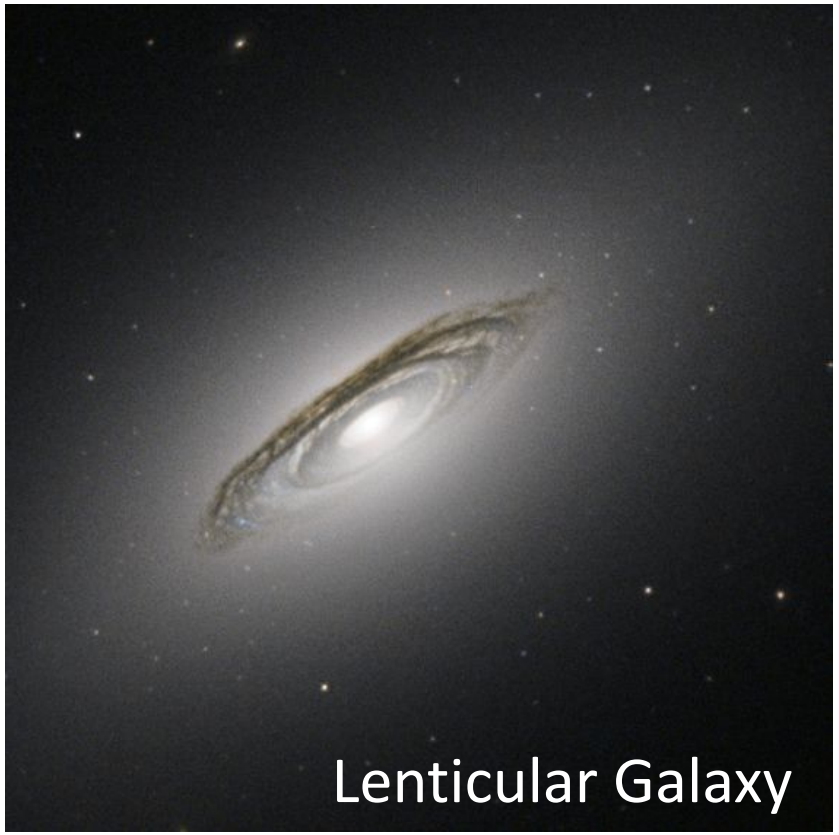

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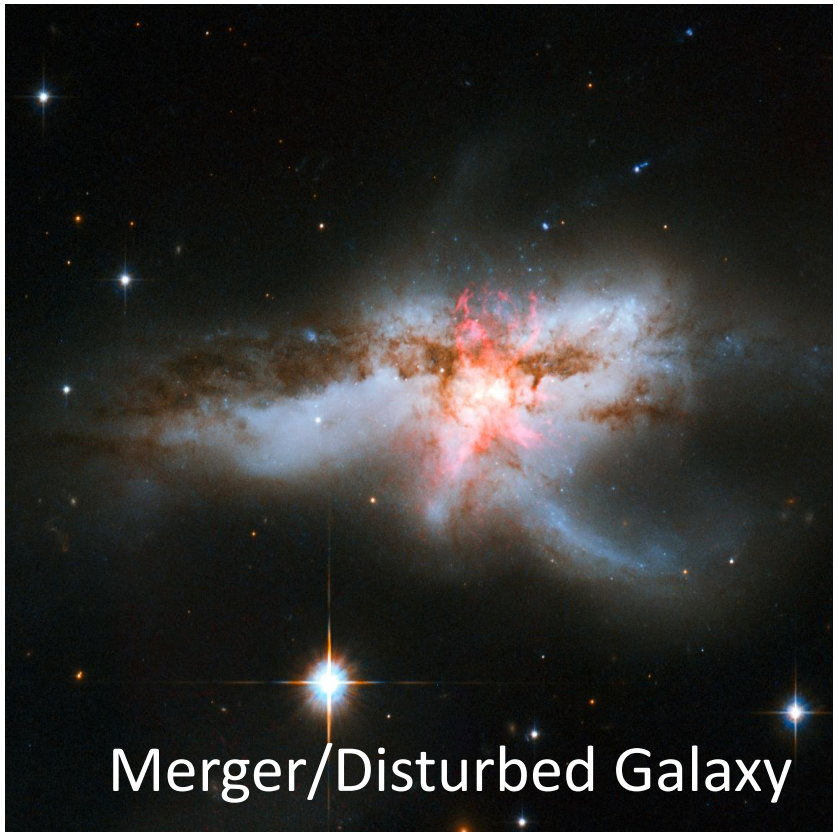

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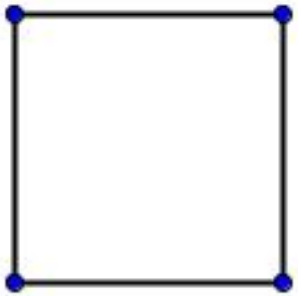
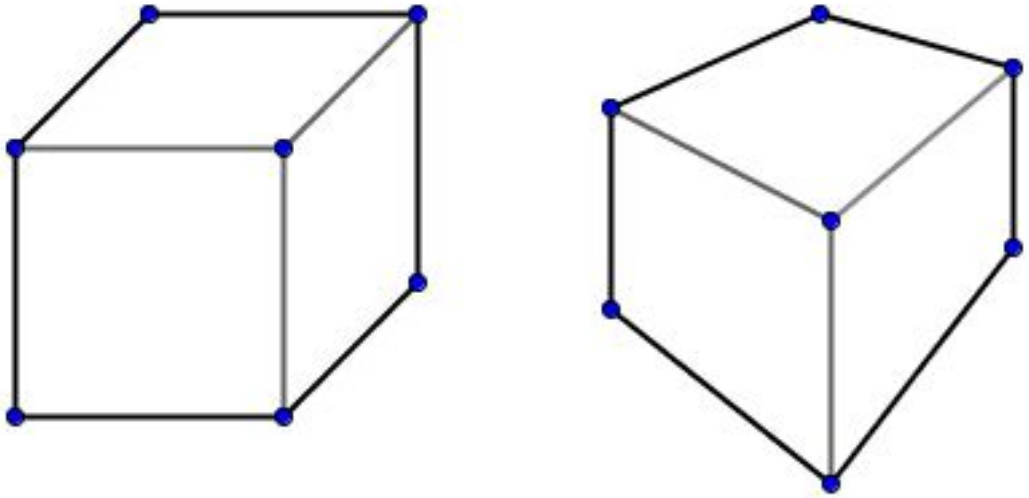
Orientation

The relative arrangement of a geometric figure to your point of view

Cube is facing the viewer



Cube is rotated



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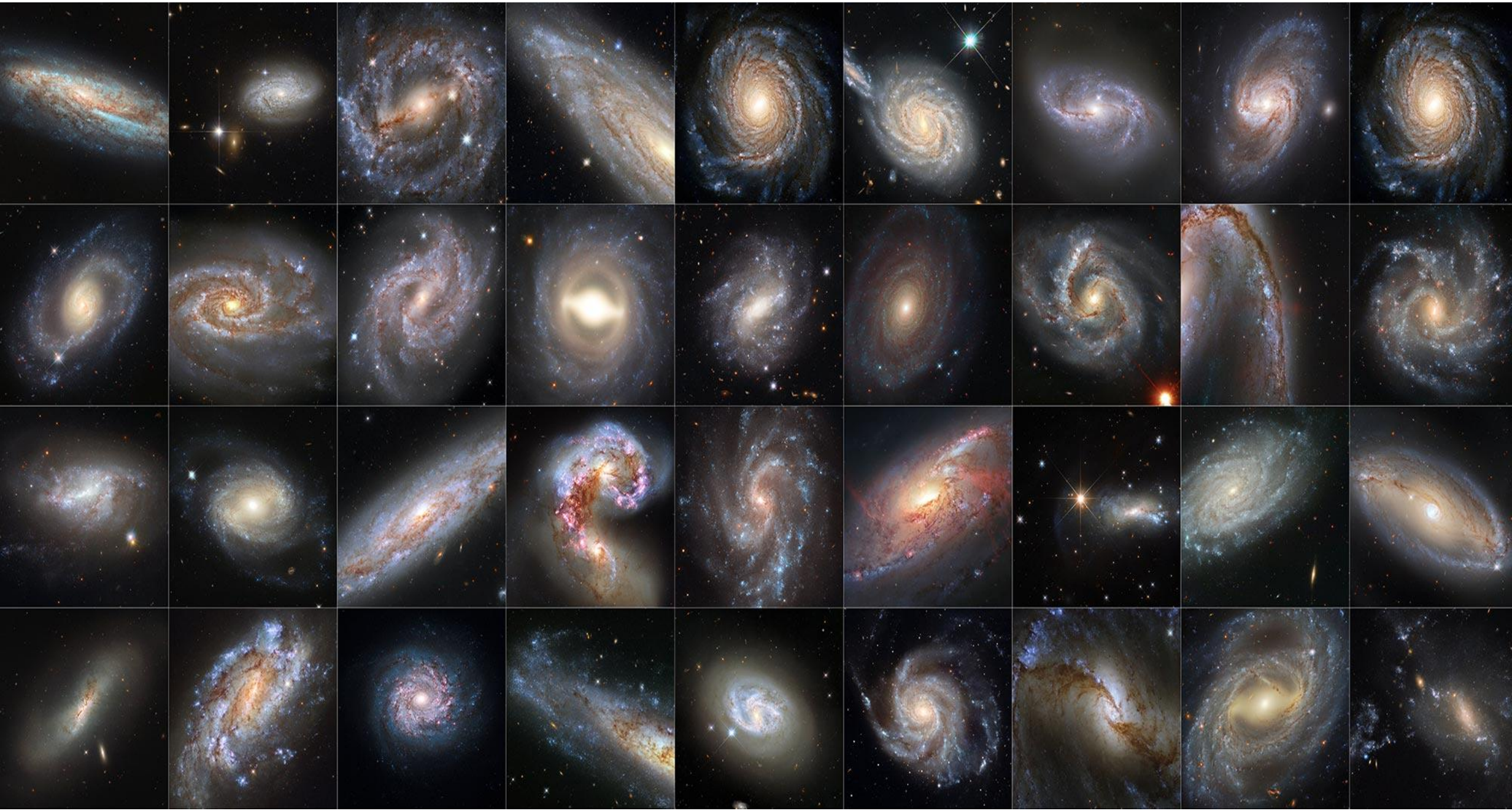

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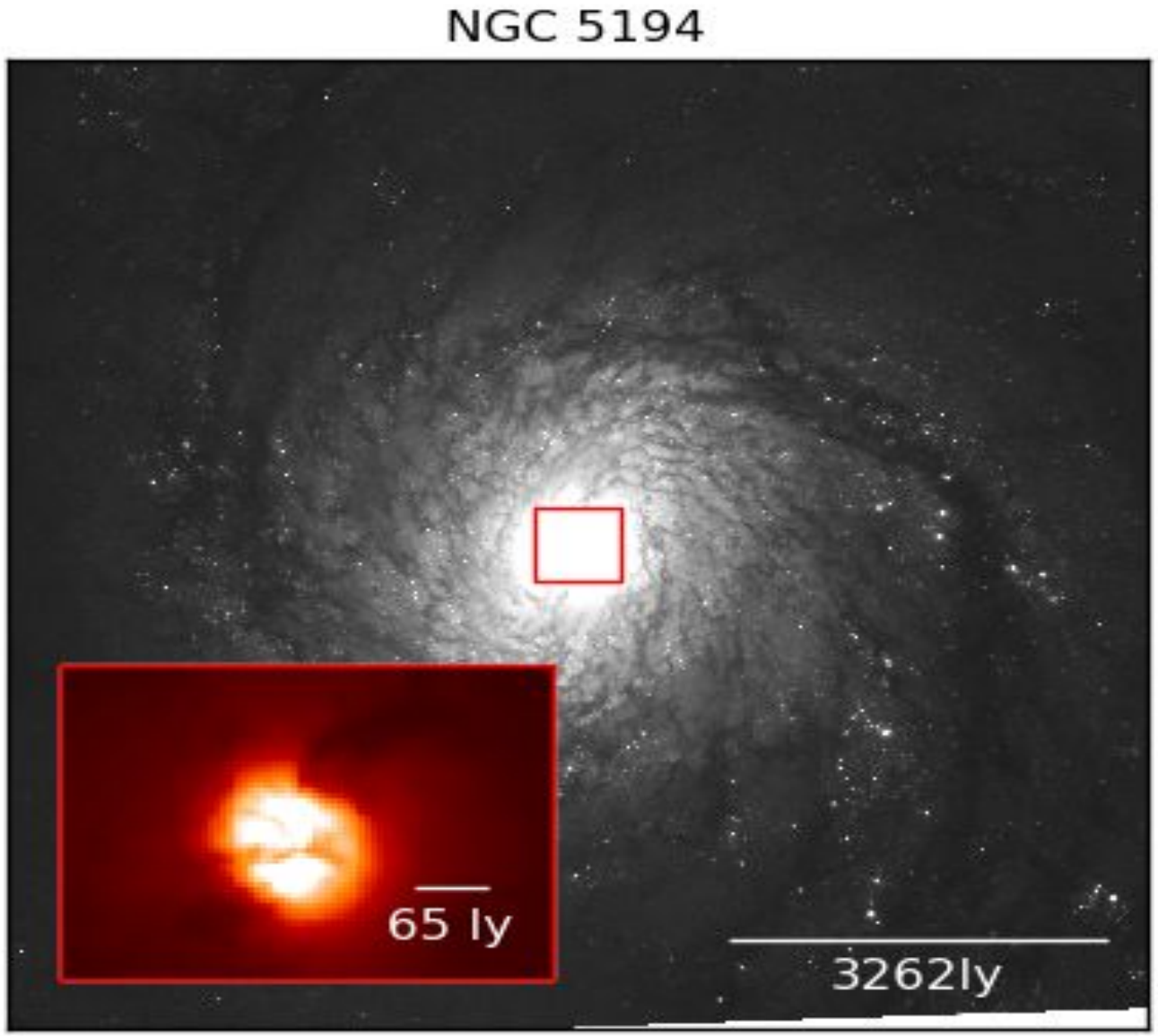

Dust Features

- YES

Morphology

- Spiral

Orientation

- Face-on galaxy

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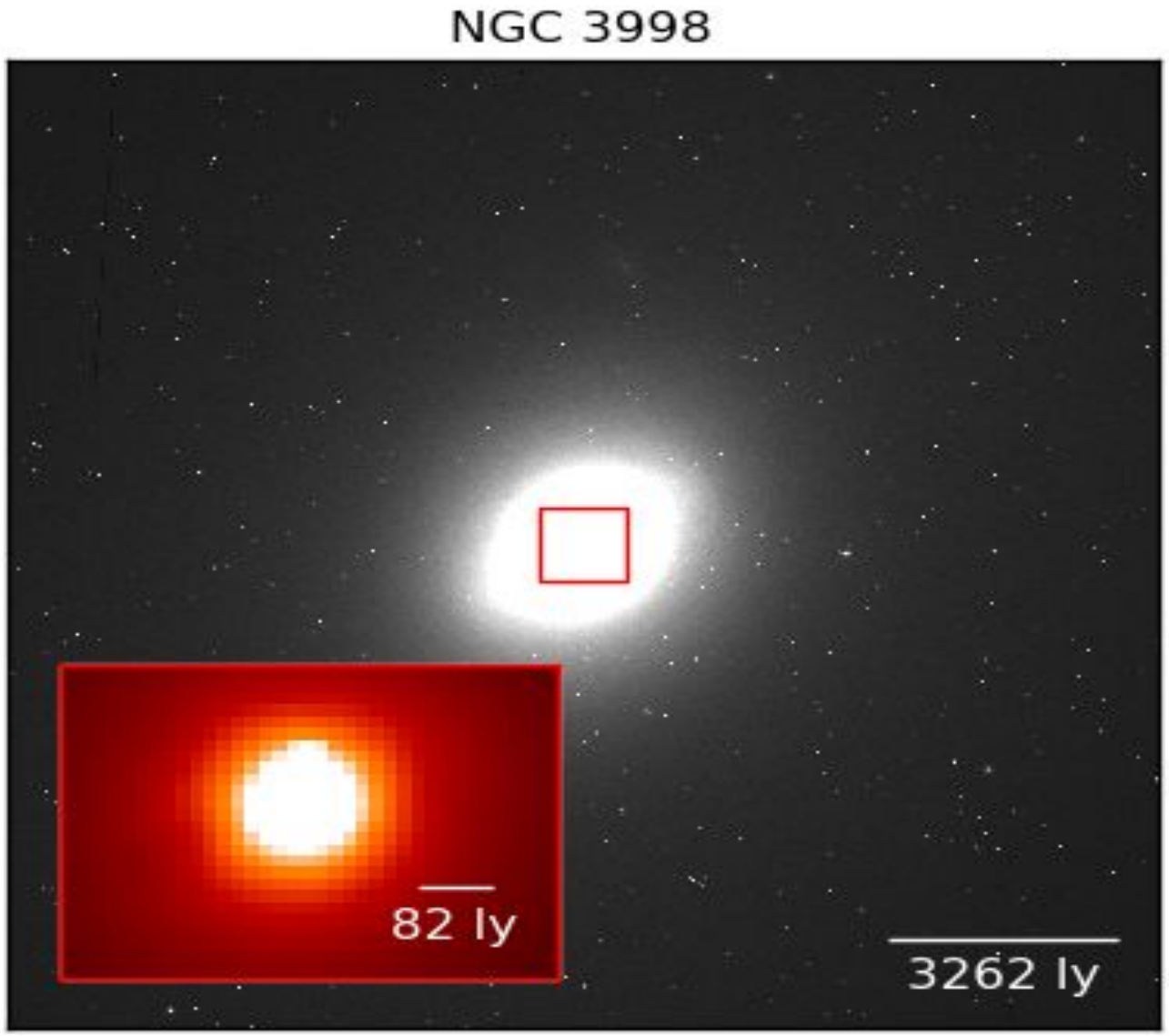


Dust Features

- NO

Morphology

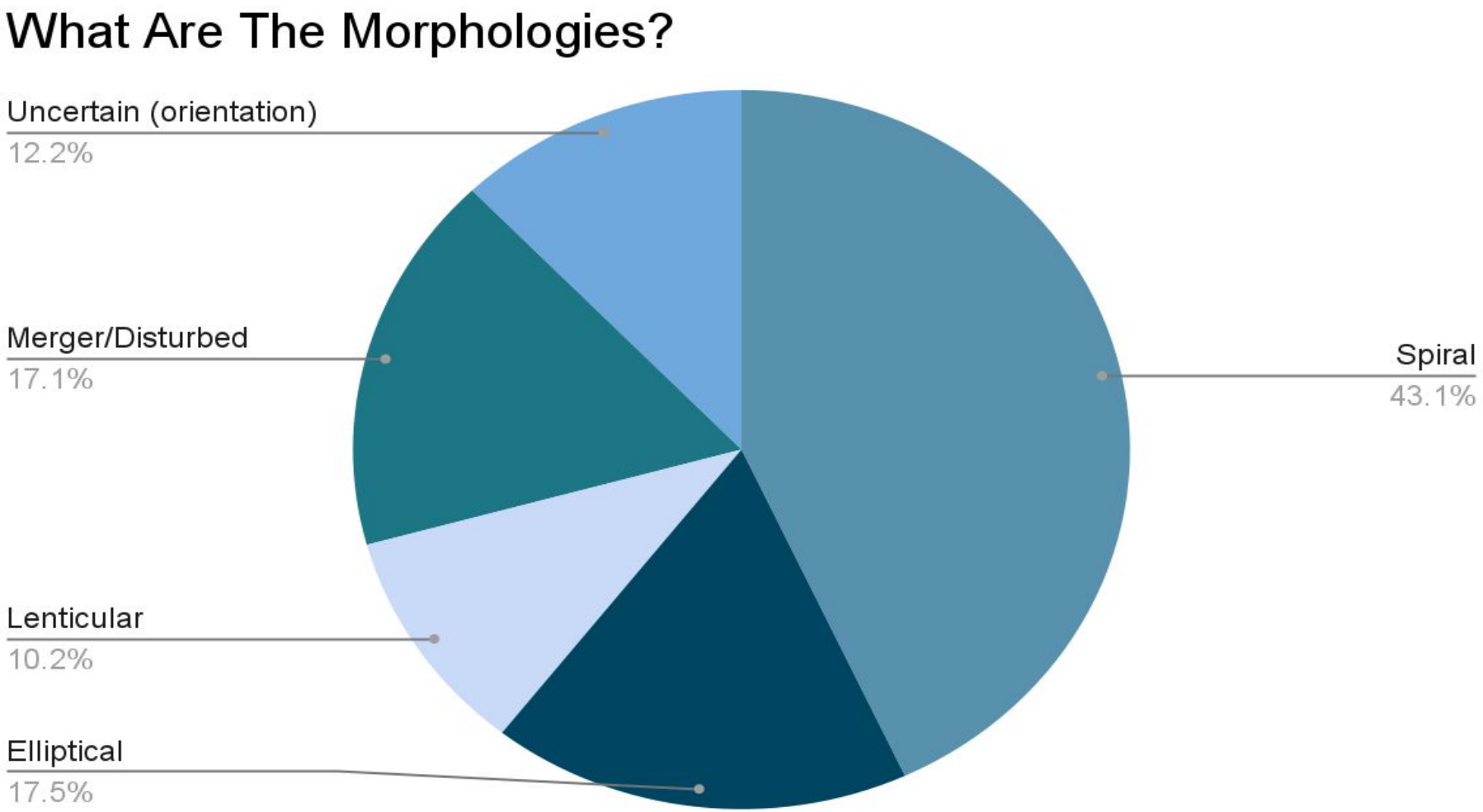
- Lenticular (smooth)

Orientation

- Nearly face-on

73% of sample exhibits dust!

73% of sample exhibits dust!



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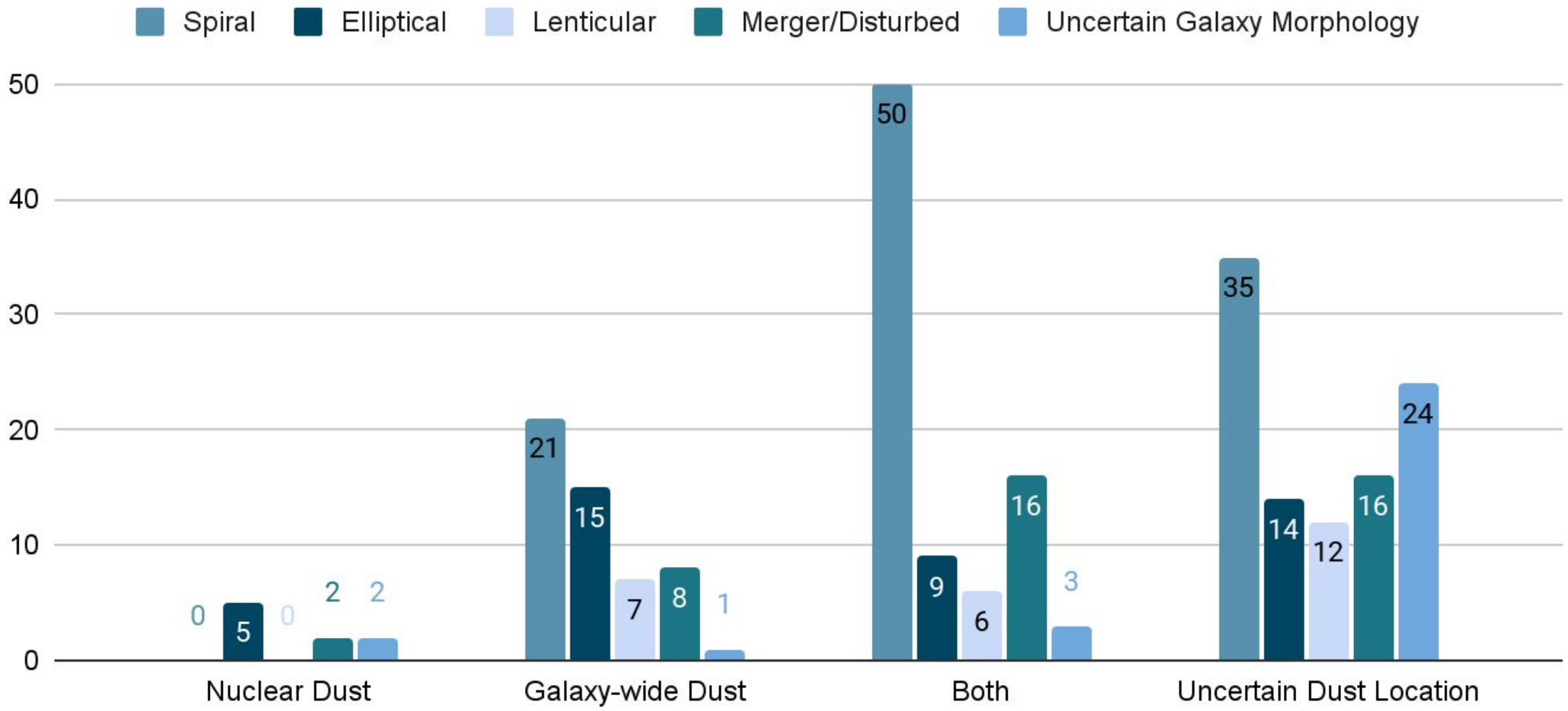
Does Galaxy Morphology Influence Where Dust is Found?



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Spiral Galaxies

- Younger stars
  - Needs dust!
- Visible structure
  - Needs dust!

*Still using the dust!

Elliptical Galaxies

- Older stars
  - No dust!
- No structure
  - No dust!

*Used most/all dust!

Spiral Galaxies

- Younger stars
  - Needs dust!
- Visible structure
  - Needs dust!

*Still using the dust!

Elliptical Galaxies

- Older stars
  - No dust!
- No structure
  - No dust!

*Used most/all dust!

This is only the beginning…

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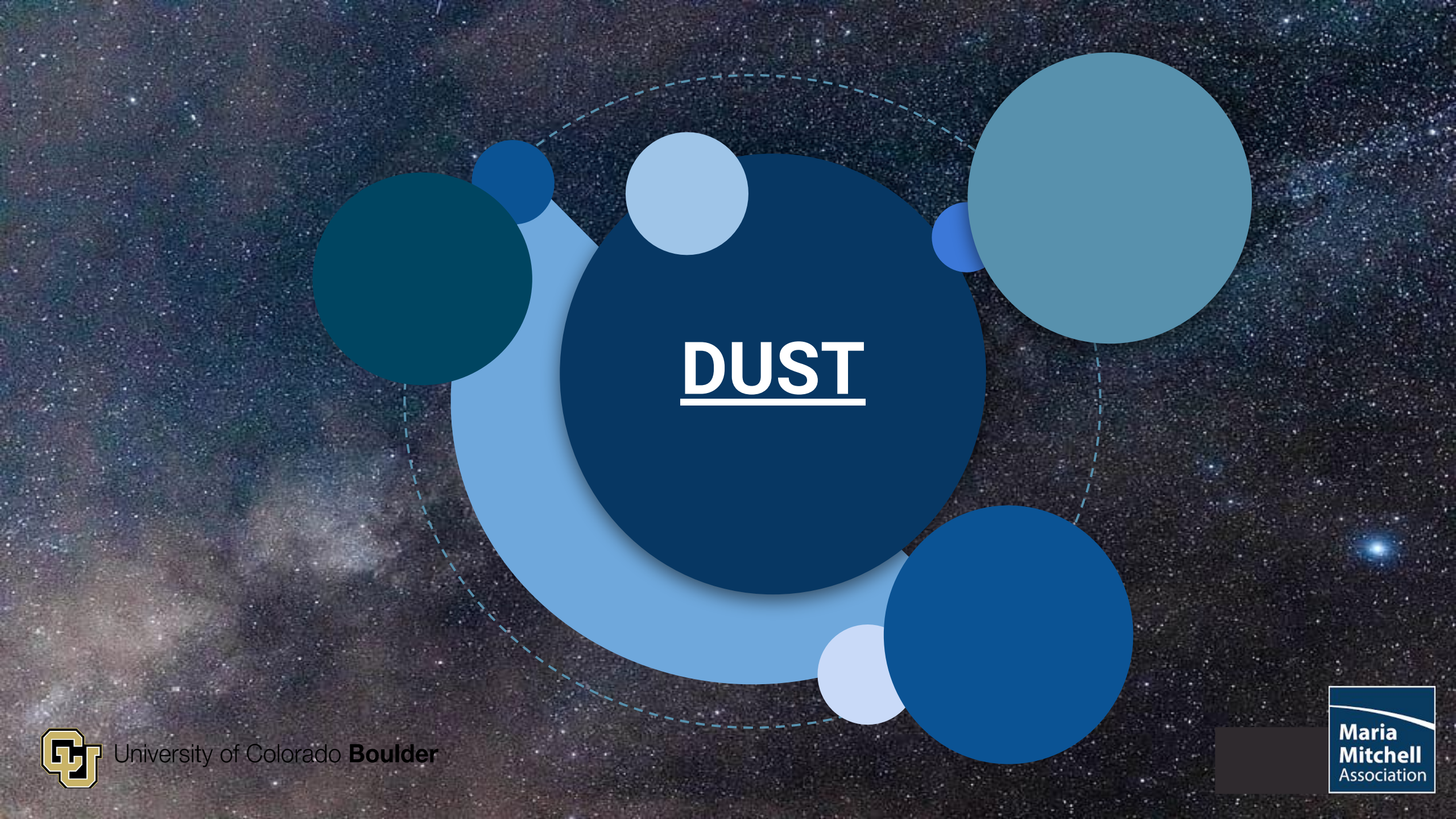

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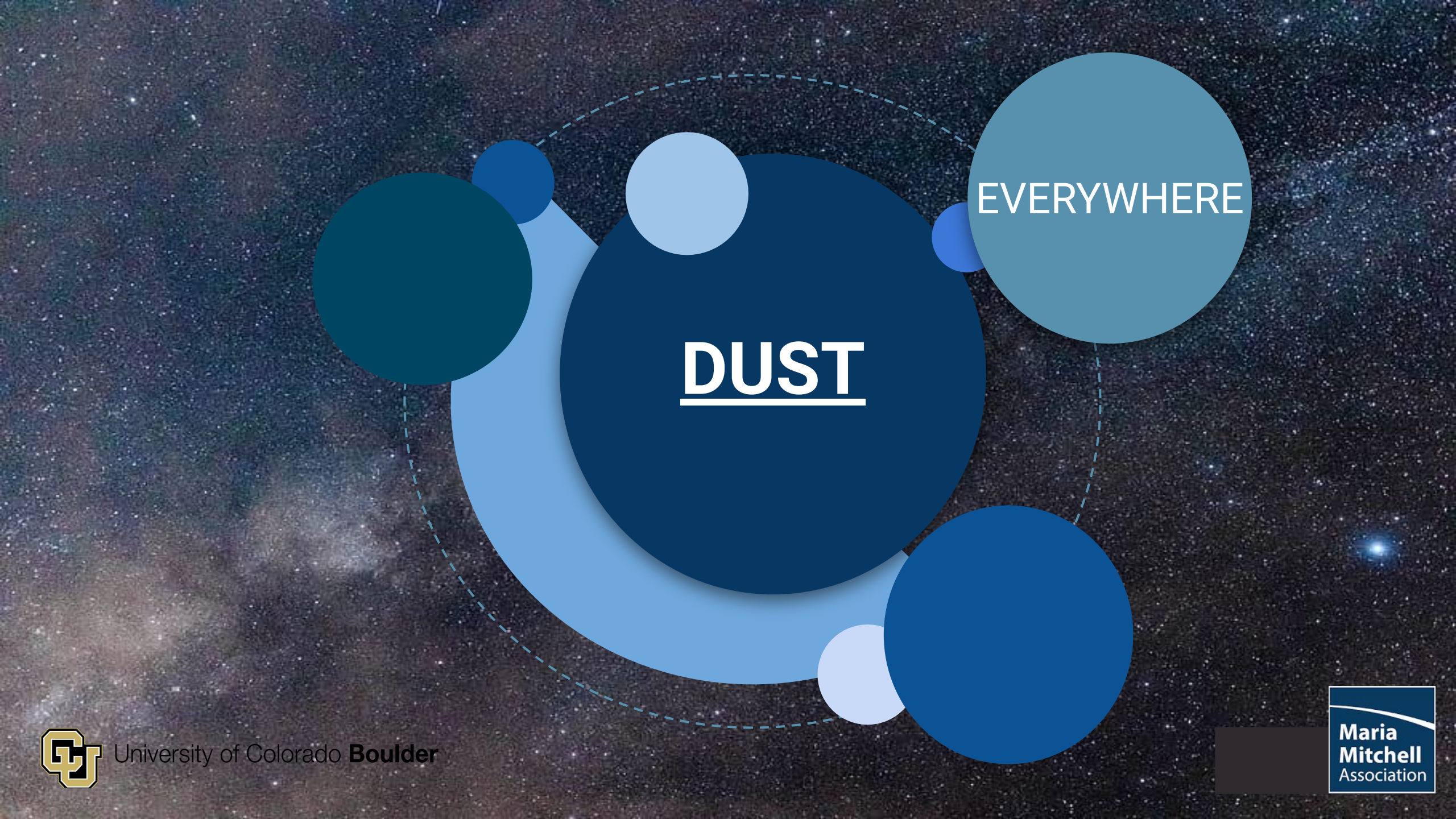

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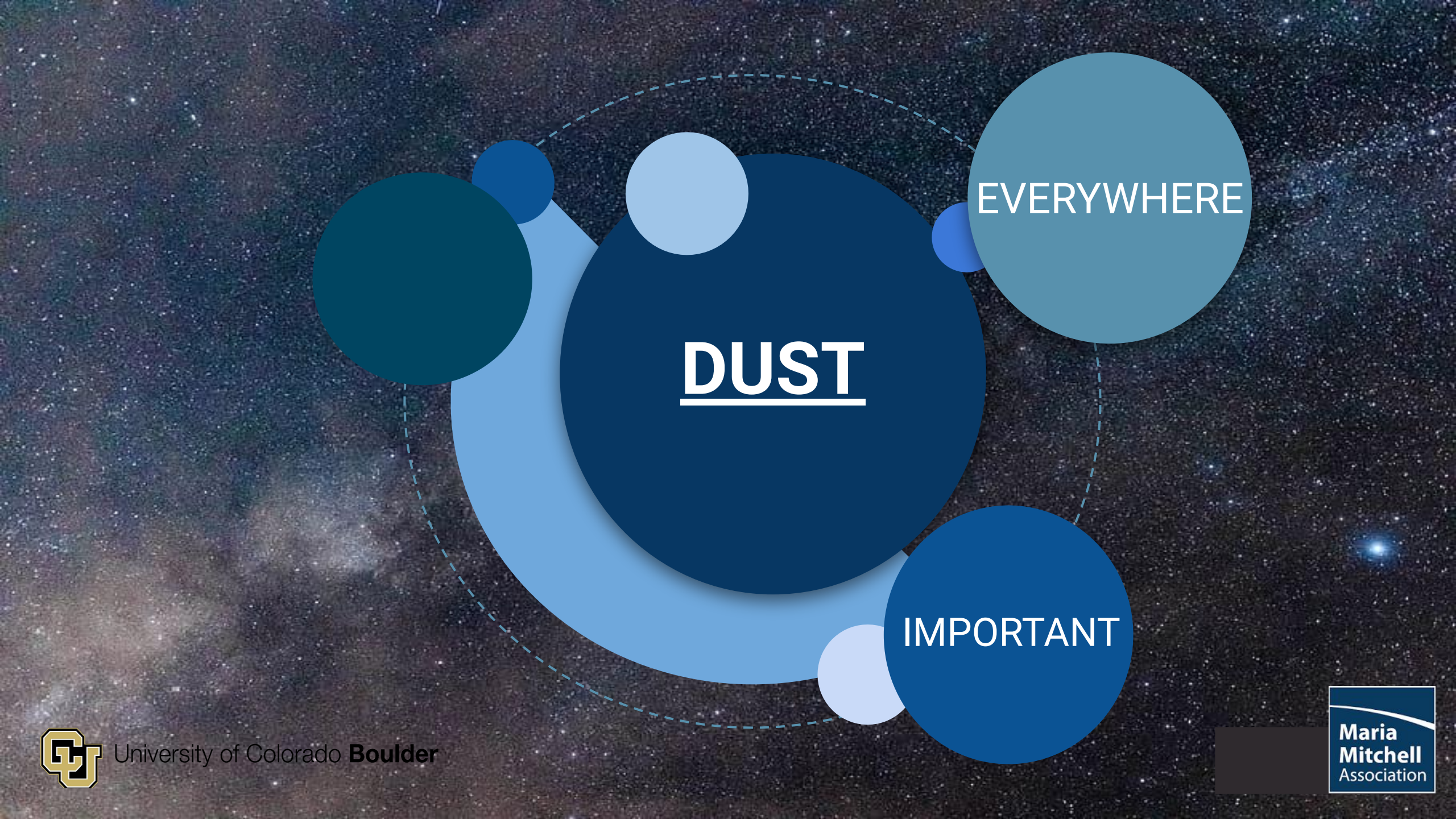

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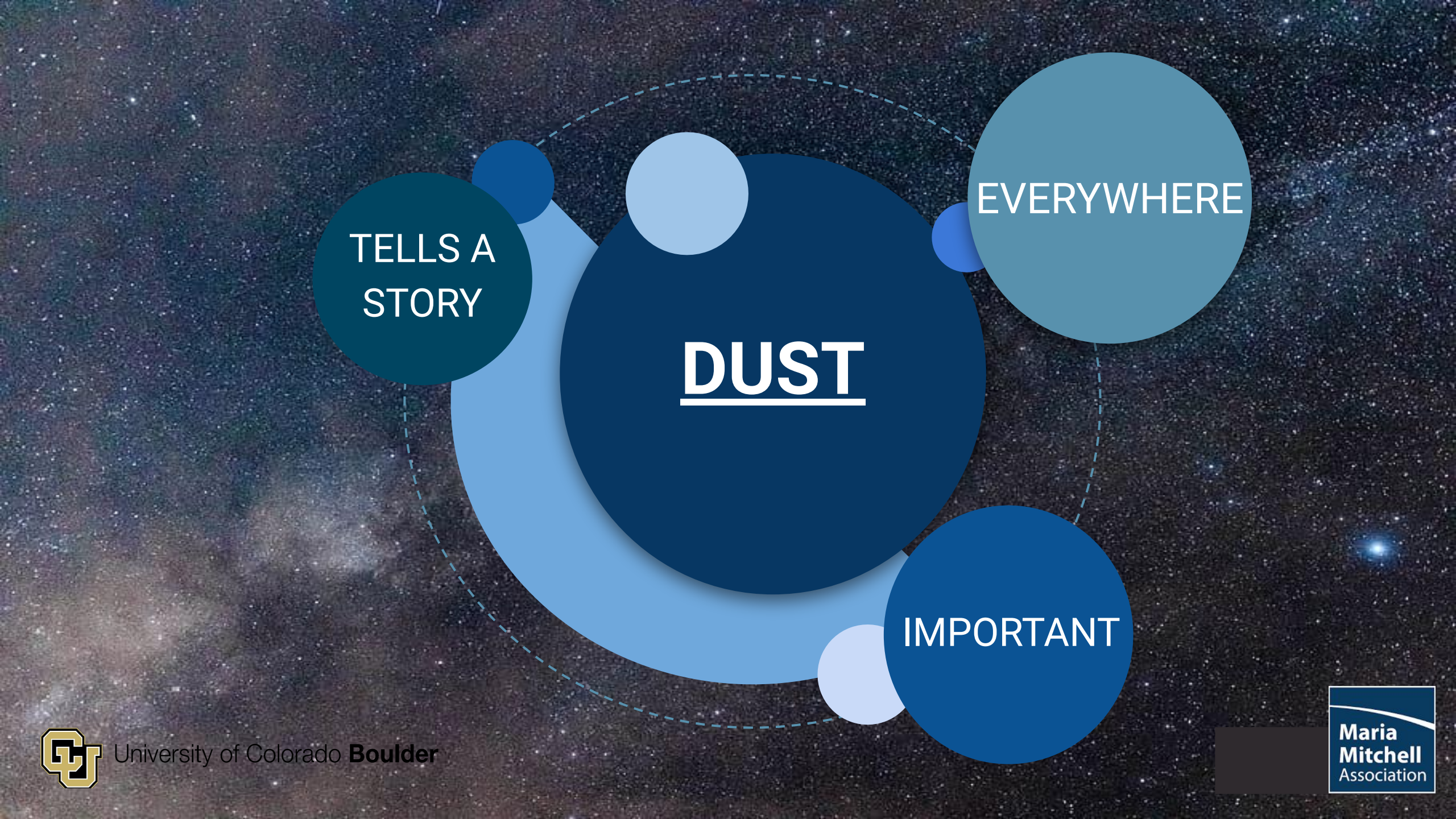

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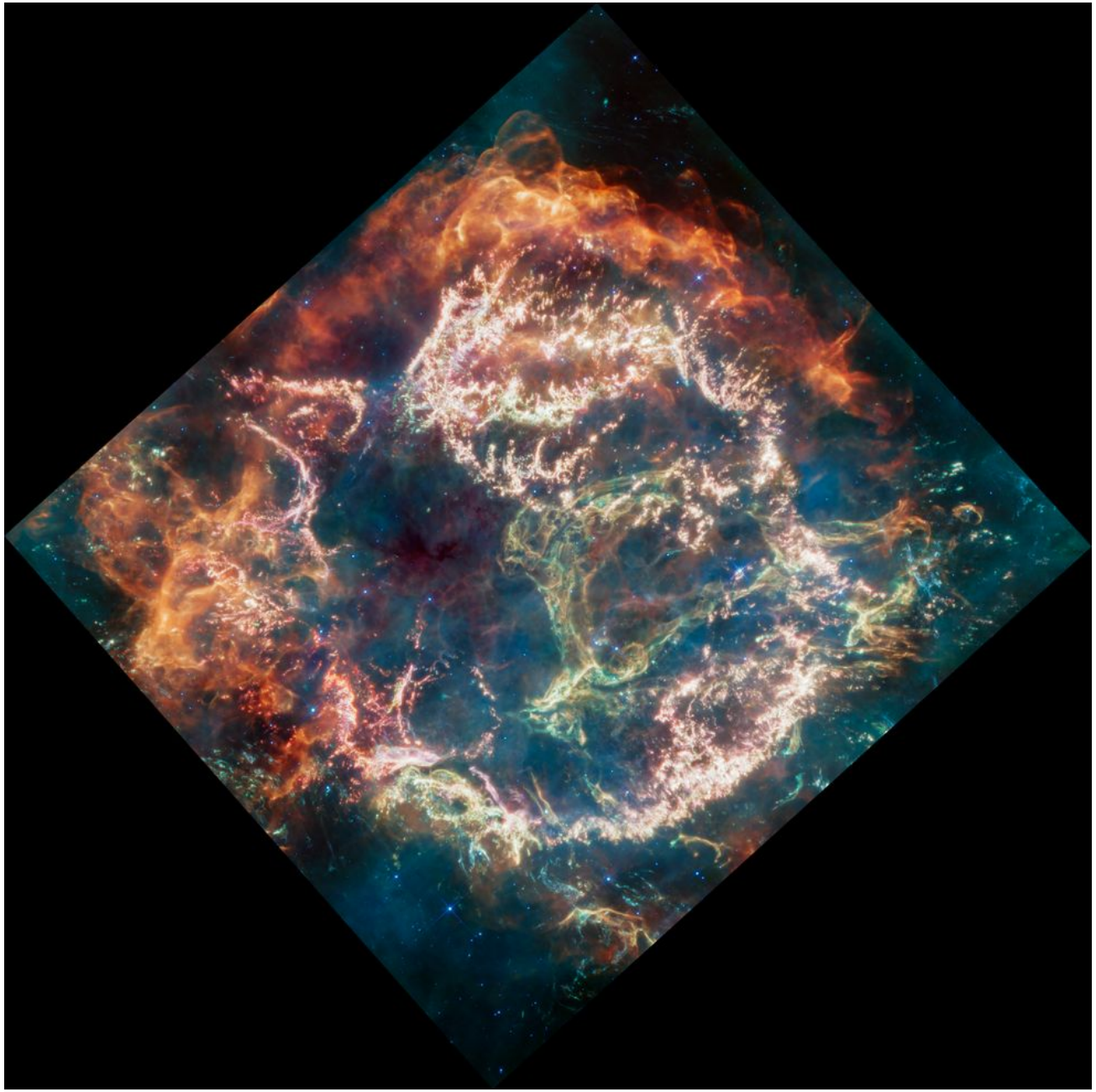
Storytelling

We are made of star stuff! And without dust, nothing would exist!



Current and Future Science

1. AGN Unification Model
    a. Proposed that apparent differences in observed objects is purely due to their orientation with respect to our line of sight! Which might mean that all AGN are built the same, they just seem different!
2. Specific Galaxy Research
    a. Our sample and findings can be used as a resource for other scientists/researchers to build their work off of!

Other Relationships!

1. Dust and X-Ray Luminosity
   a. Does the galaxy use the dust to fuel it, making it shine brighter and at higher energy levels?
2. Dust and Column Density
   a. Is the obscuring material density related to the existence of dust in a galaxy?
3. Dust and AGN Growth Rate
   a. Does the existence of dust around the nucleus help the supermassive black hole at the center grow faster/bigger?