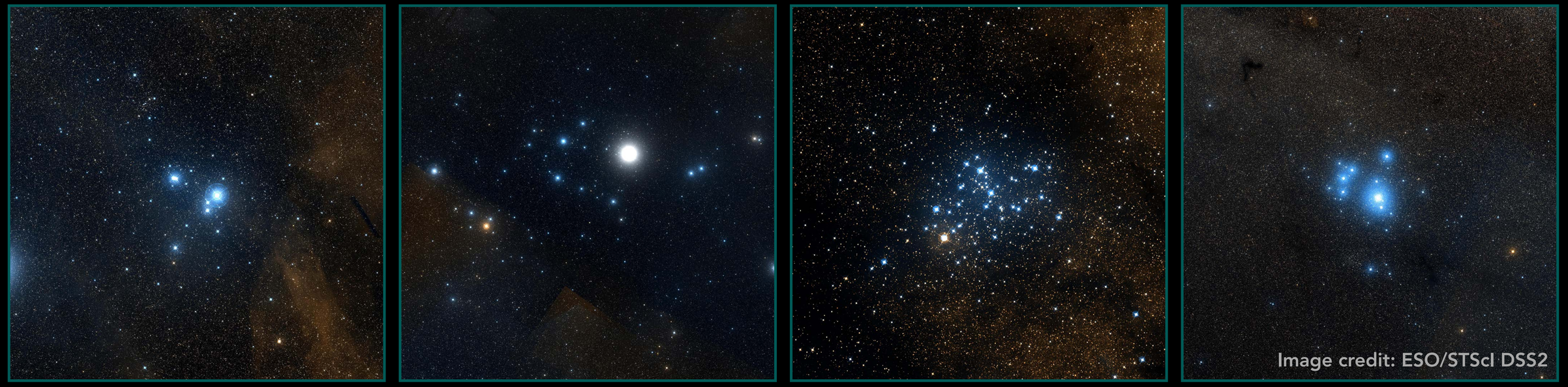
Uncovering three past massive star-forming complexes that shaped local interstellar structures

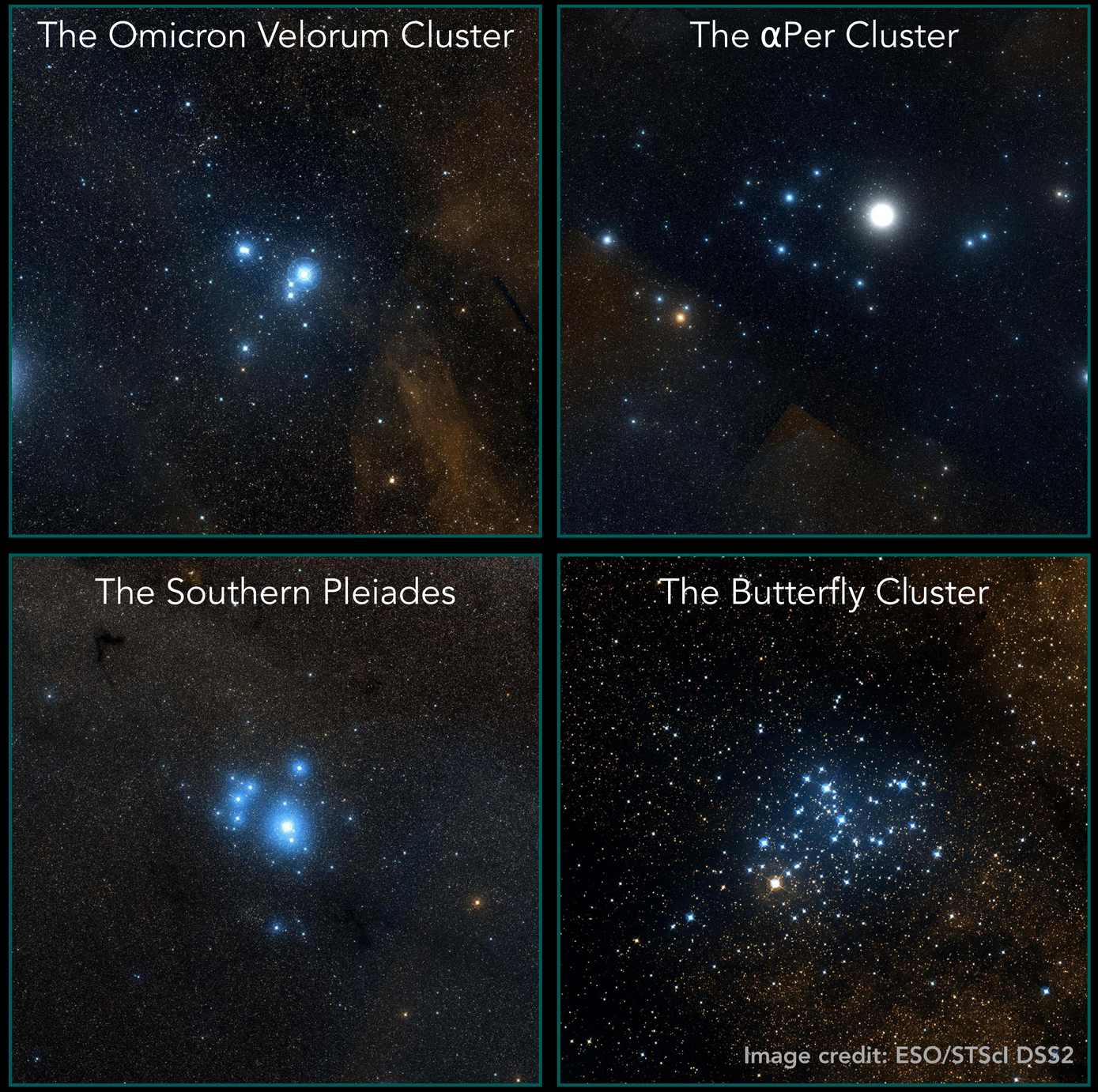


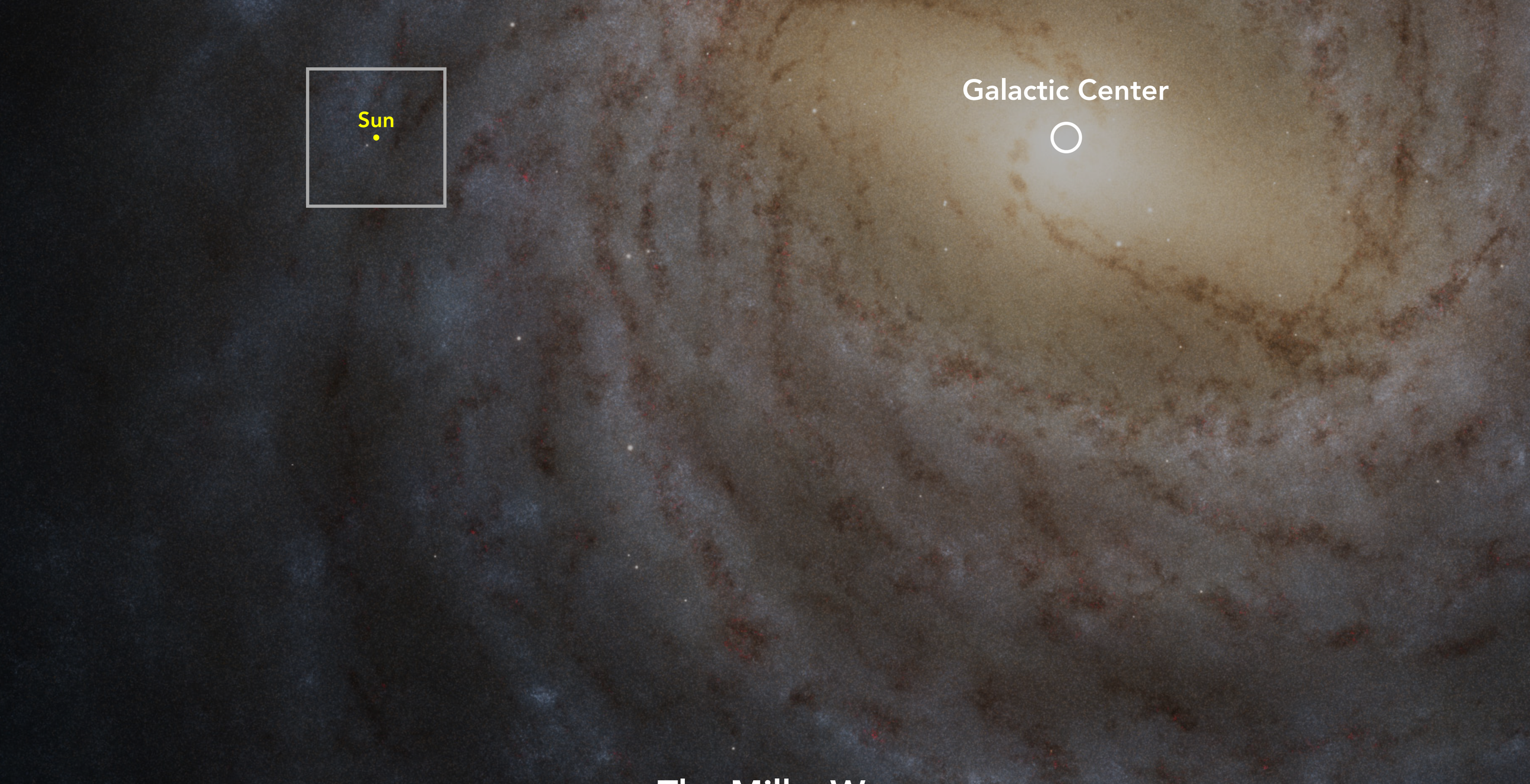
Paper out today in *Nature*

Cameren Swiggum (University of Vienna),
João Alves, Robert Benjamin, Sebastian Ratzenböck, Núria Miret-Roig, Josefa Großschedl, Stefan Meingast, Alyssa Goodman, Ralf Konietzka, Catherine Zucker, Emily Hunt, Sabine Reffert

universität wien

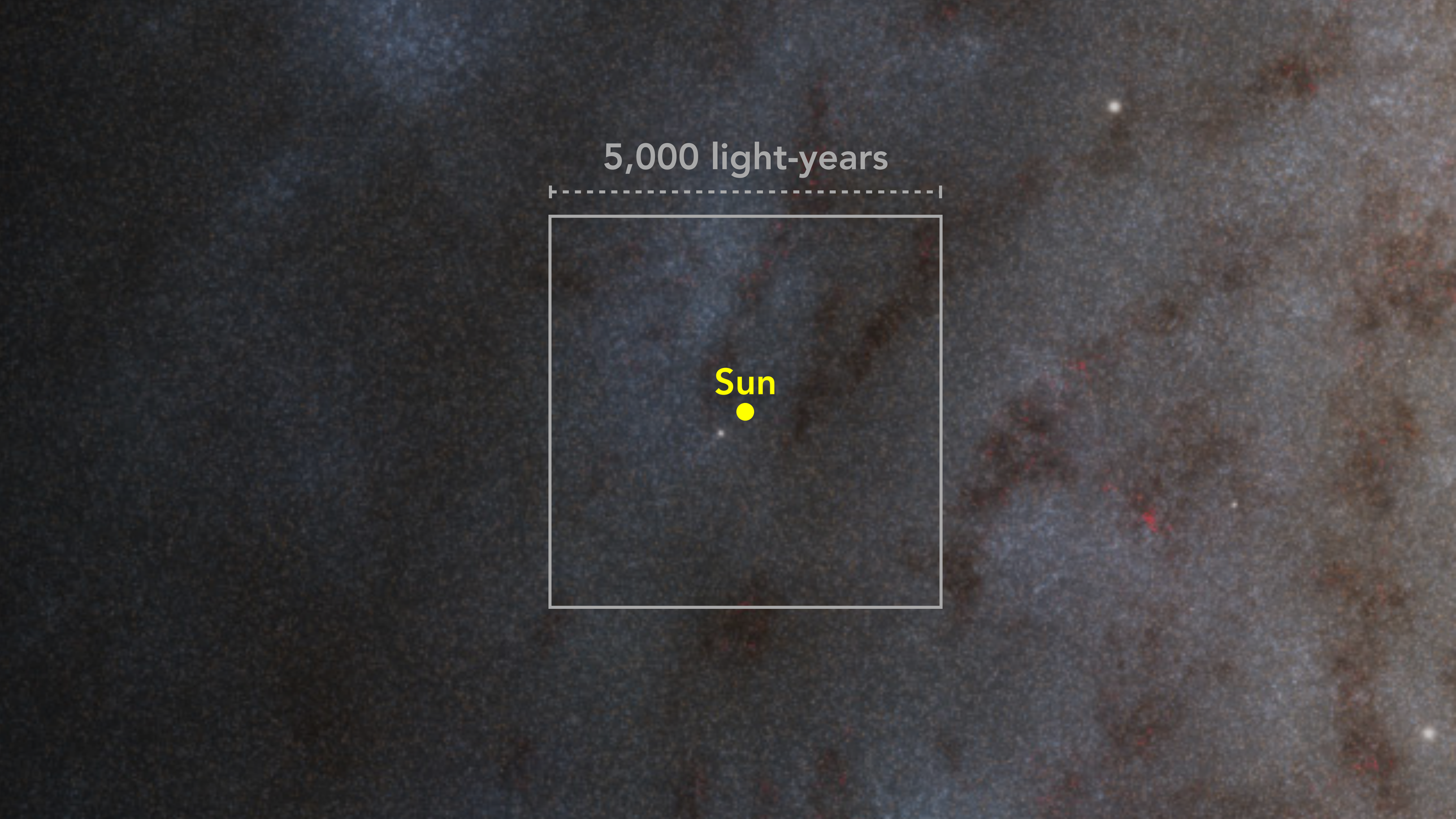
- Stars form with their siblings in clusters.
- Star clusters leave their stellar nurseries after they are born.
- Many bright, young star clusters surrounding the Sun have unclear origins.



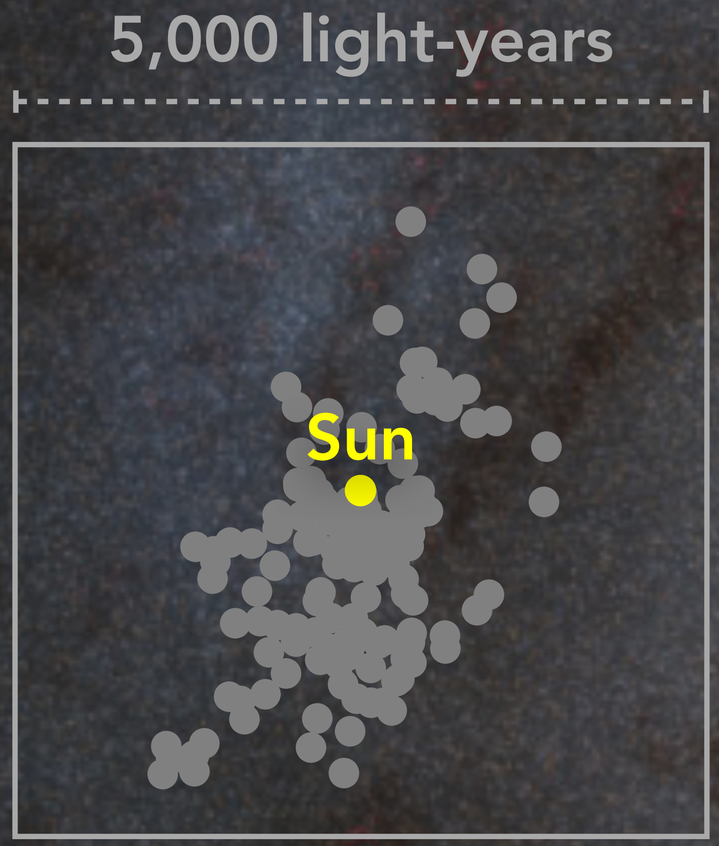


The Milky Way

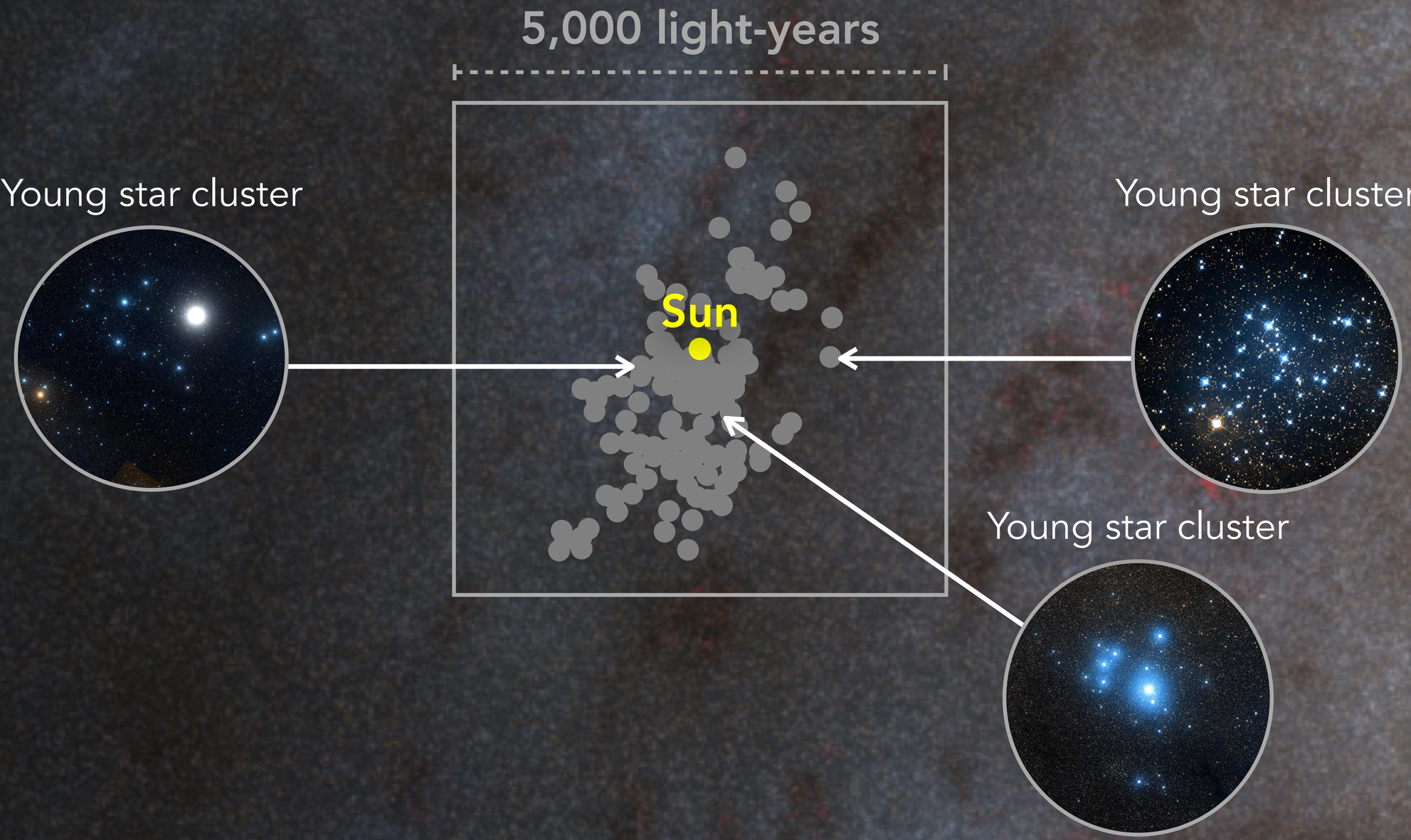
Credit: Stefan Payne-Wardenaar (Artist's impression)

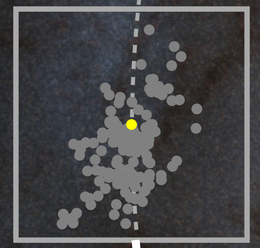

5,000 light-years
Sun

A Galactic map of 155 young star clusters thanks to ***Gaia***.



A Galactic map of 155 young star clusters thanks to ***Gaia***.

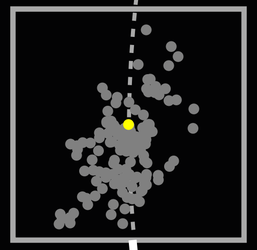




Present Day

Galactic Center

A Galactic 'time-machine' of 155 young star clusters thanks to ***Gaia***.

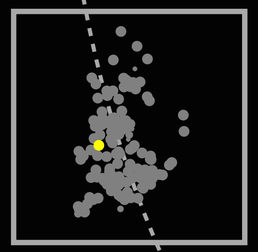


Present Day

Galactic Center

A Galactic ‘time-machine’

Galactic Center

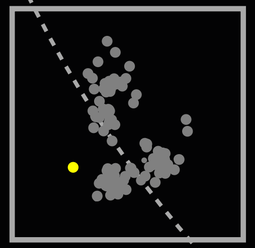


10 million years ago

A Galactic ‘time-machine’

Galactic Center

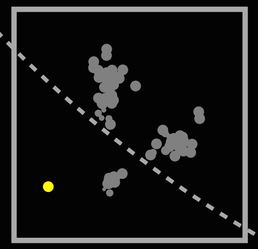
A Galactic ‘time-machine’



20 million years ago

Galactic Center

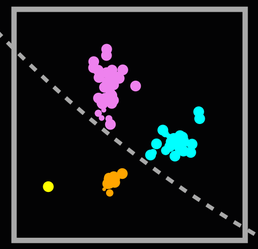
A Galactic ‘time-machine’



30 million years ago

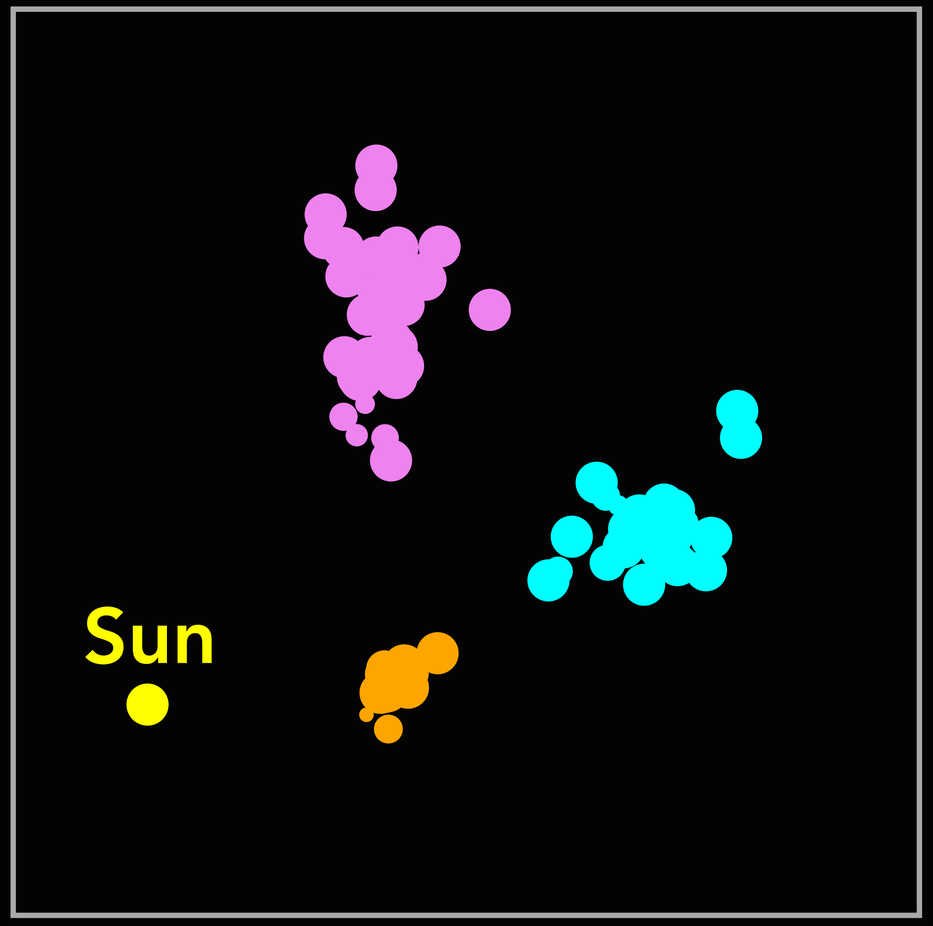
Galactic Center

A Galactic ‘time-machine’



30 million years ago

Young star clusters are part of Galactic 'Bloodlines'



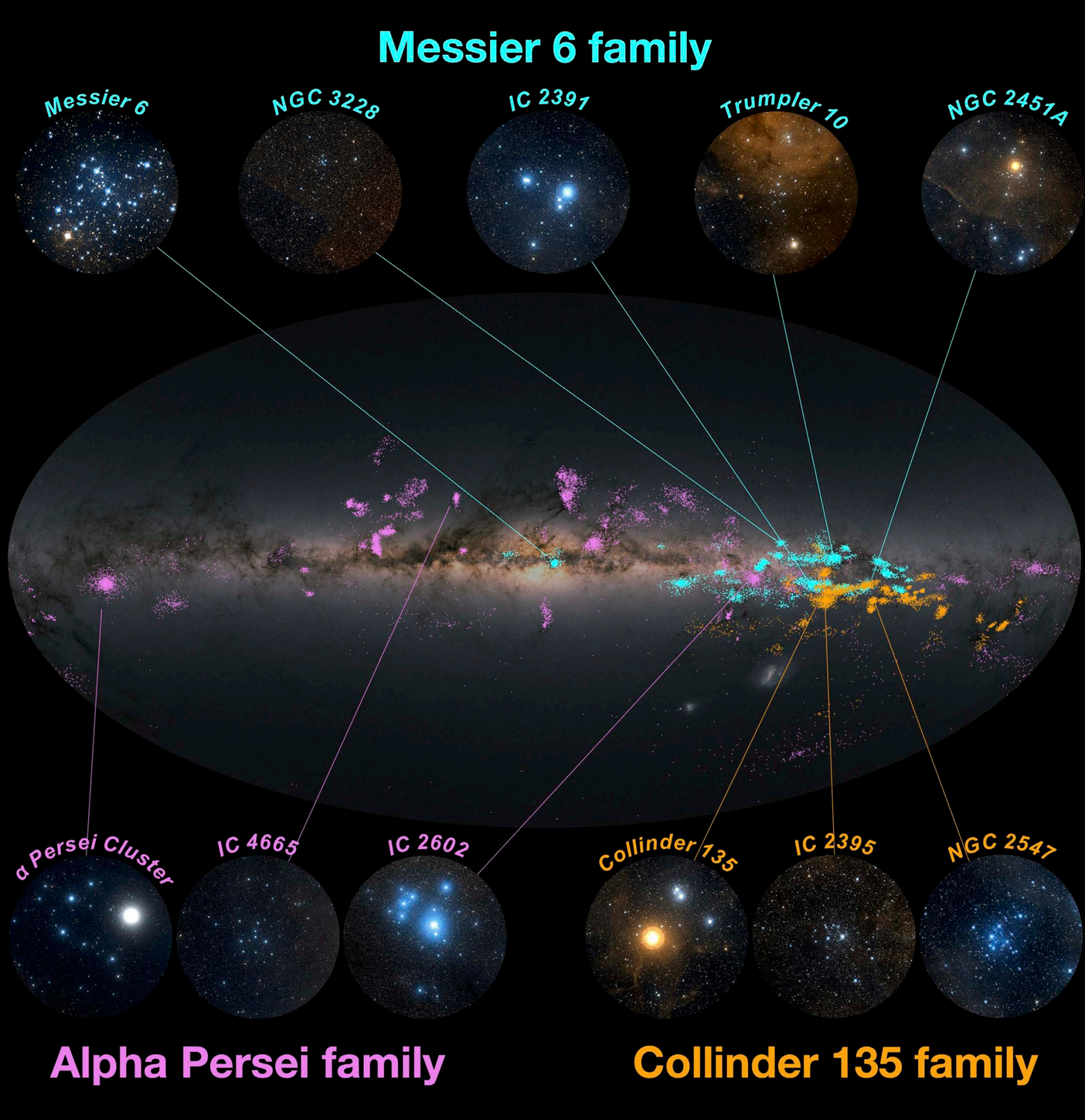
αPer family

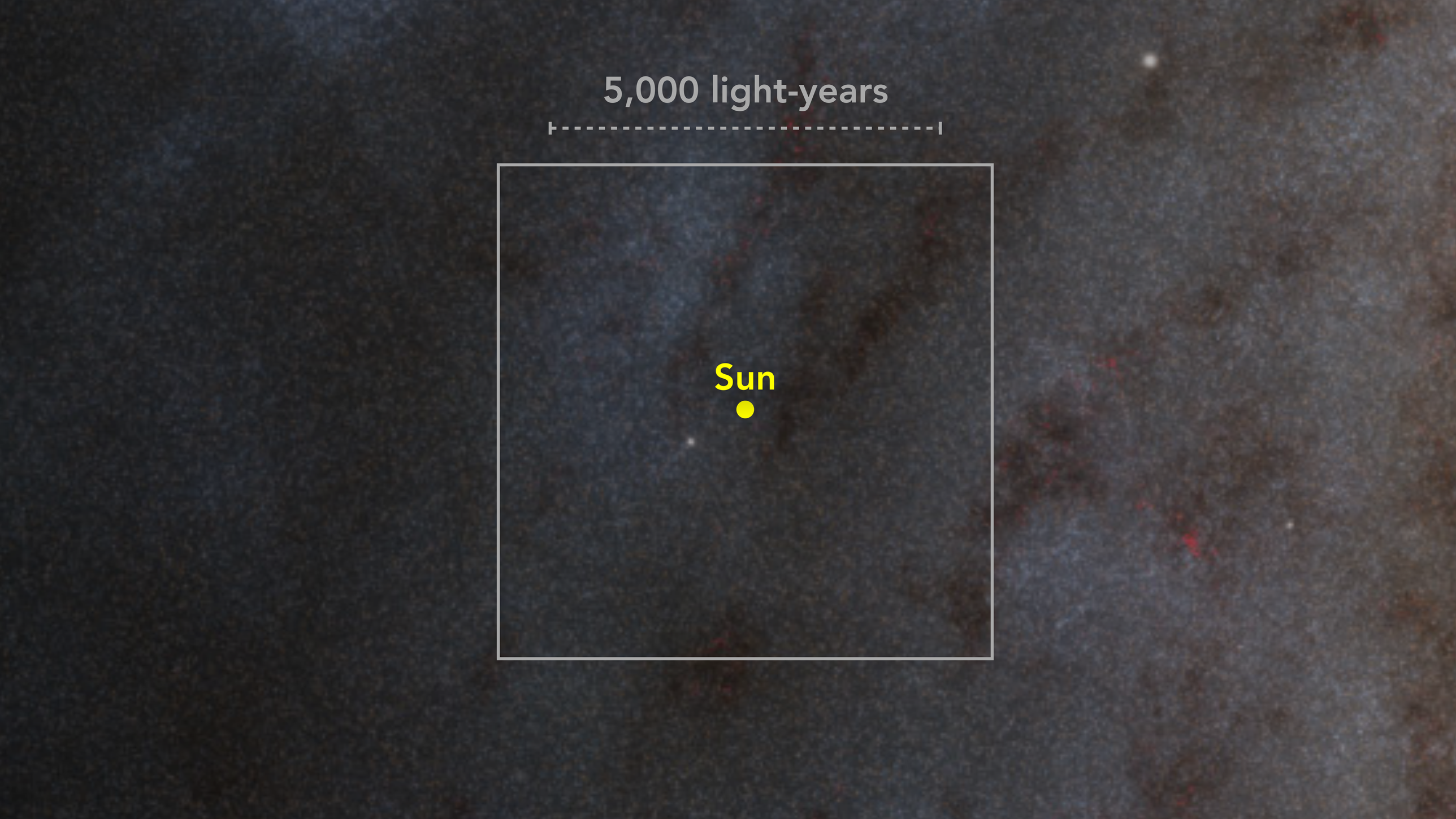
M6 family

Cr135 family

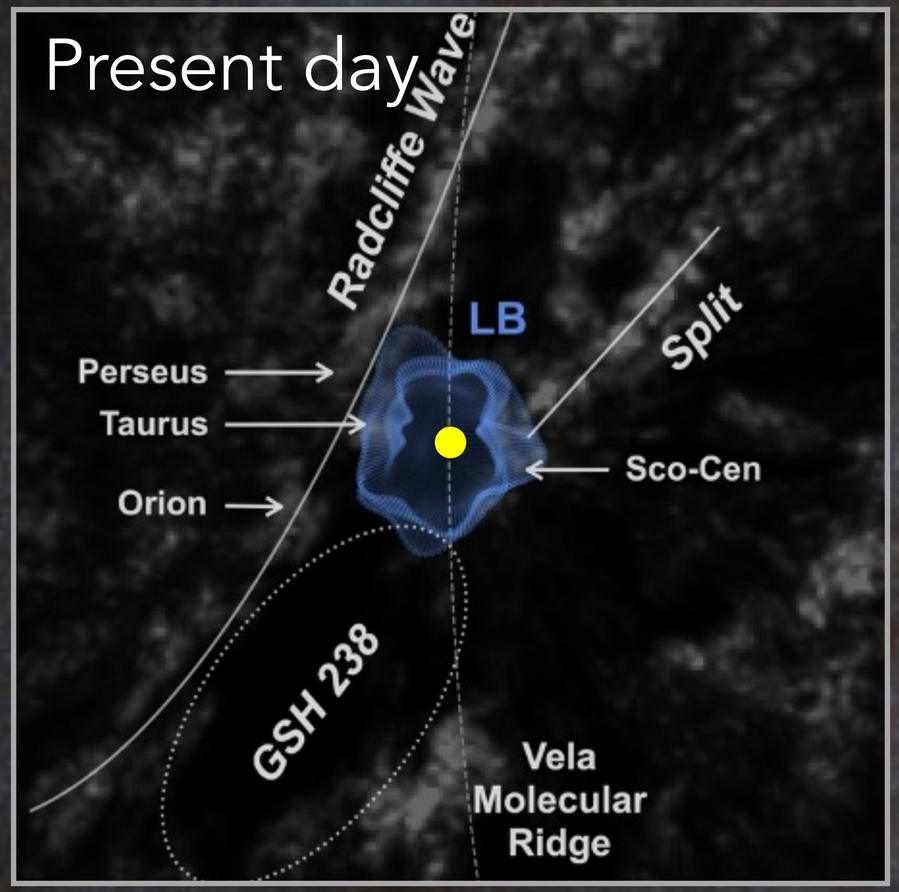
30 million years ago

- Most nearby young star clusters come from one of three families.
- They formed in three previous, massive star-forming nurseries over 30 million years ago.
- They produced over **200 supernovae explosions**.




5,000 light-years
Sun

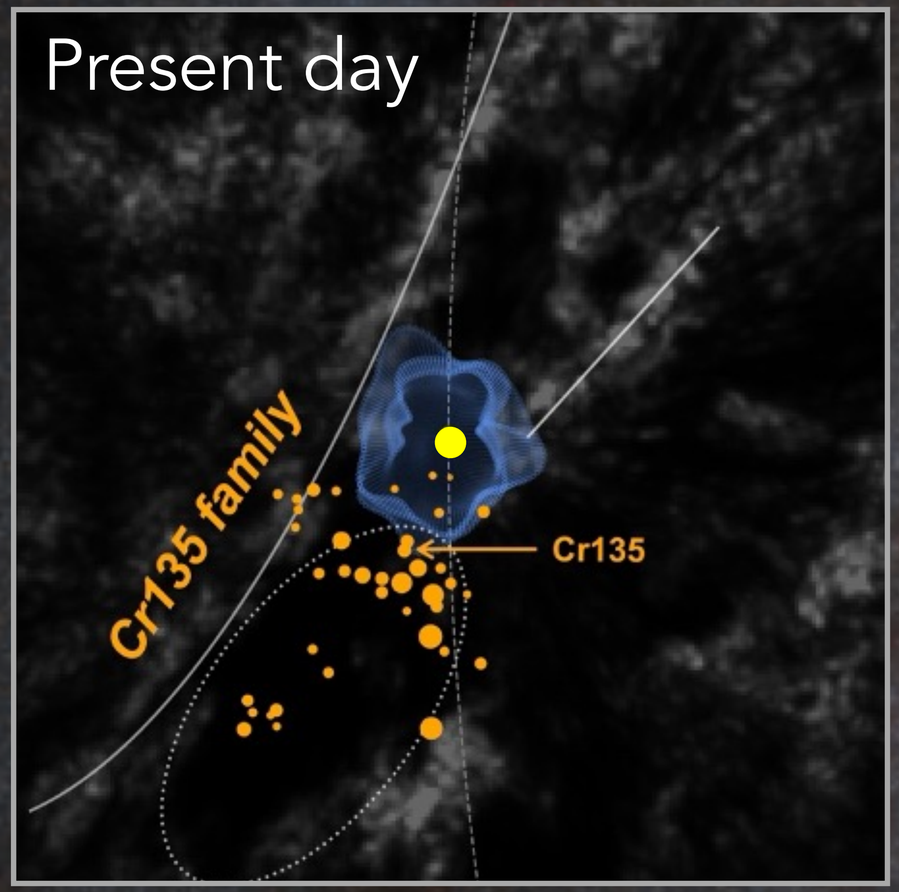
Supernovae carved the interstellar gas into bubbles and supershells



Map of interstellar dust (Vergely et al. 2022)

Supernovae carved the interstellar gas into bubbles and supershells

Cr135 family supernovae explosions formed a 3,000 light-year wide gas supershell (Heiles 1998)



Map of interstellar dust (Vergely et al. 2022)

Summary

- Most nearby young star clusters come from one of three families.
- They formed in three previous, massive star-forming nurseries over 30 million years ago.
- They shaped today's distribution of interstellar gas and dust around the Sun via hundreds supernovae.

Swiggum et al. 2024, Nature
Doi: 10.1038/s41586-024-07496-9