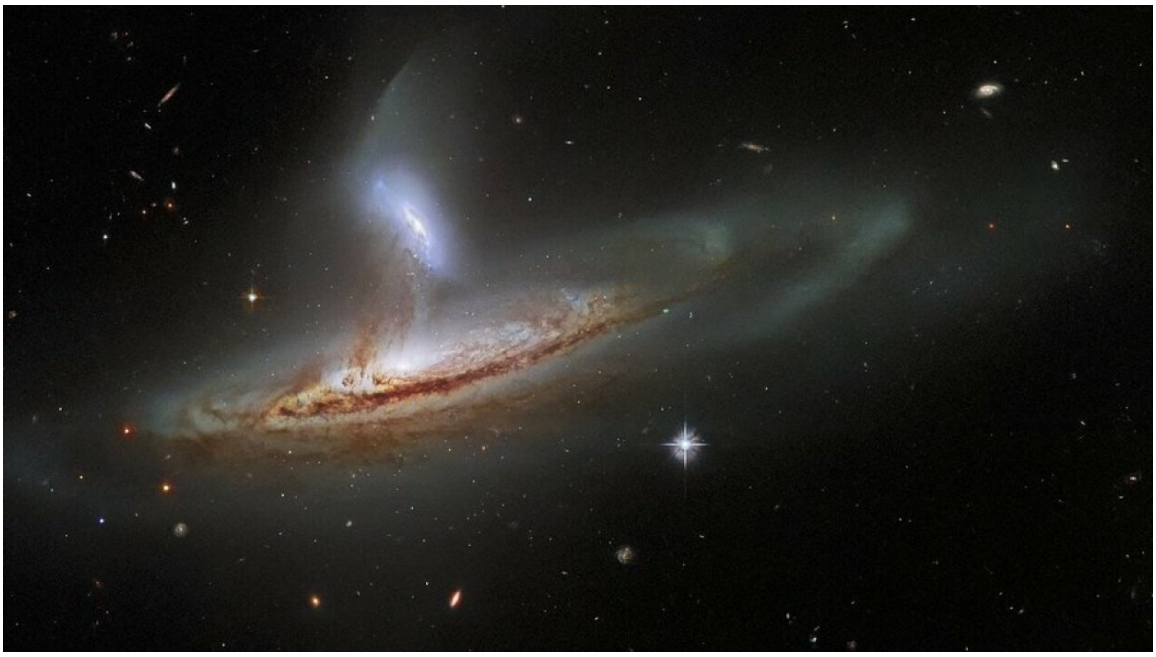
Image Descriptions for Art-in-Science Website

Space Science Institute

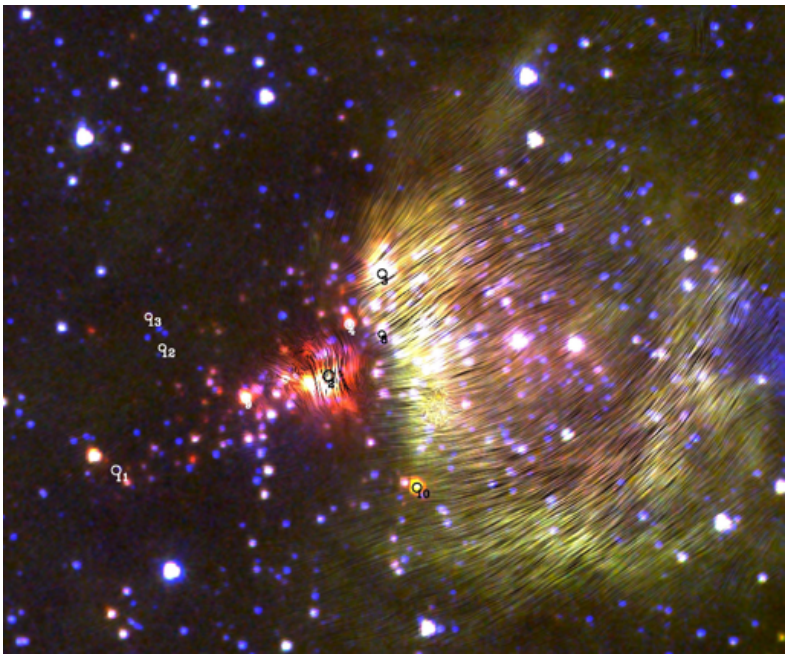


Website banner: Galaxy collisions (above) are colossal; they take billions of years to settle. And yet, nearly all the stars in each galaxy pass right by each other, since galaxies are mostly empty space and the stars well-separated. The gas & dust clouds *between* the stars, however, get violently disrupted, as this *Hubble* image shows, giving rise to vigorous new star formation and large-scale flows into the galaxies' centers. While the existing stars are virtually unscathed, their orbits in each galaxy are severely disturbed, giving rise to spectacular and unusual galaxy shapes.

Mountain sunset by Samuel Ferrara from unsplash.com free wallpapers (below). This view looks very still, but have you seen time-lapse videos of clouds? When our perception of time speeds up, we can sometimes see clouds in mountain valleys sloshing around like water in a bathtub over a period of hours. Over a day, we can see the Sun go across the sky in a graceful arc, higher up in the summer and lower down in the winter. In principle, if we could speed up time to millions of years, we could see mountains slowly get built up by the Earth over time, and also erode away from the weather.

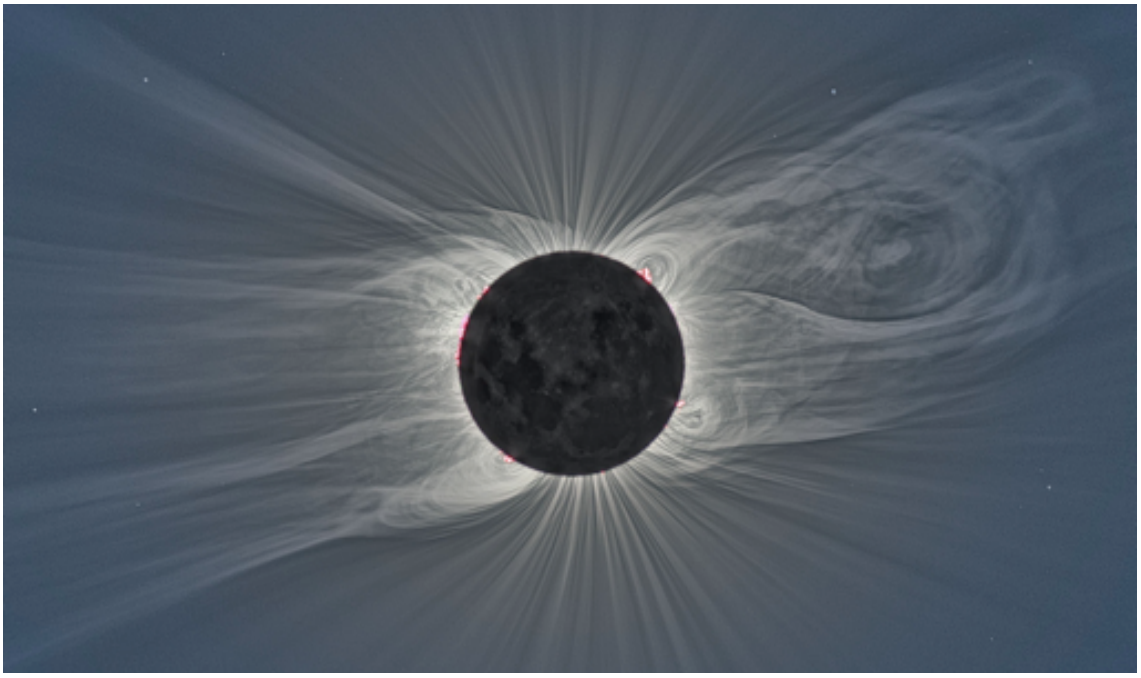
Trees image by Casey Horner from unsplash.com free wallpapers (right). Did you know the carbon in the wood of trees, and in plants in general, does not come from the soil? It is captured directly from the air in the process of photosynthesis, which uses sunlight to produce energy to grow with the carbon, and also produces oxygen for animals (like us!) to breathe.

Worm-Eating Warbler (left), sharpie and watercolor on paper, by Miranda Barnes, age 14. This small, insect-eating bird is widespread across North America, ranging over the Appalachians during breeding season, and wintering over in eastern Mexico, Cuba, and Hispaniola.



Star-forming nebula in the constellation Carina (right). This is an infrared view of the gas & dust cloud surrounding the formation of a massive star (number 2 in the reddest part of the picture), made with the *Spitzer* Space Telescope and Anglo-Australian Telescope. The image is overlaid by a swirly pattern which represents the orientation of the magnetic field in this cloud (like iron filings around a magnet), as mapped by the SOFIA airborne telescope and HAWC+ camera. Magnetic fields tend to resist the formation of stars as gas clouds try to collapse due to gravity. In the yellow & green parts of the cloud, the field lines show the outward flow from the hot young stars, heating and driving off the gas. In the red parts, the magnetic field is overpowered by the protostar's strong gravity, twisting the field lines into a different direction.

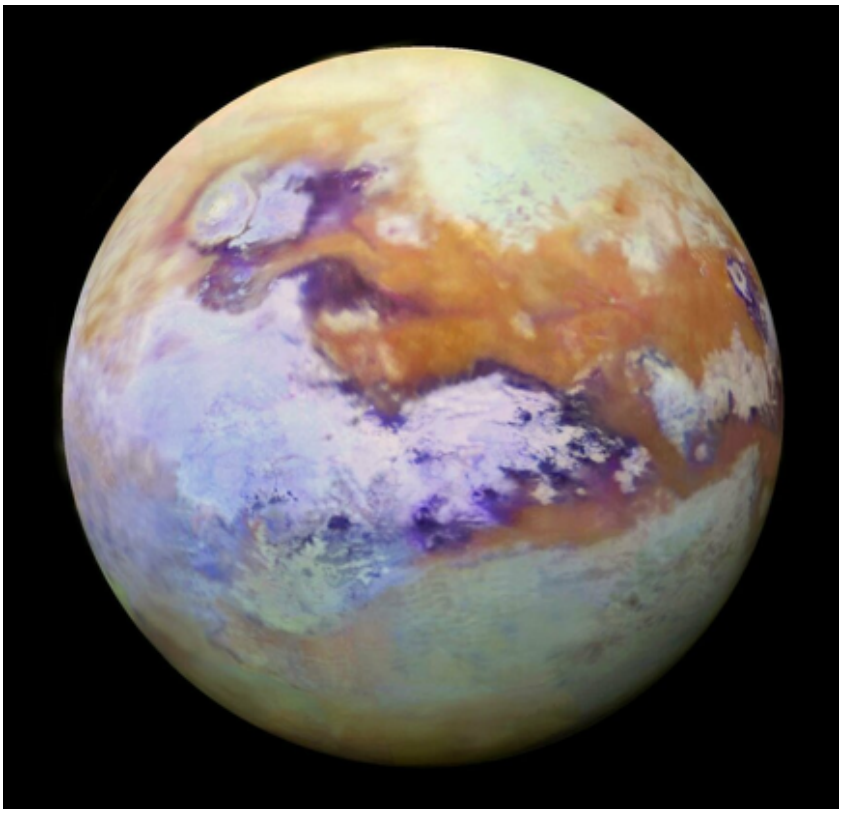
Other images



Total solar eclipse (above) in Patagonia, 2020 Dec 14, imaged by A. Möller & M. Druckmüller, showing red prominences and intricate details in the solar corona reflecting its own magnetic field, plus nighttime on the near side of the moon bathed in Earthlight.

Coral reef by Shaun Low from unsplash.com free wallpapers (above): a riot of colors! How many species, *just of coral*, can you spot in this picture? Did you know that coral reefs have a higher density and variety of life, both in number of creatures and number of species, than tropical rainforests? However, coral reefs worldwide are under dire threat from climate change.

Saturn's moon Titan (right): Surface features as imaged by the *Cassini* spacecraft's infrared camera, which can penetrate Titan's thick, methane-laden cloud layers that are completely opaque to visible light. Titan's atmosphere is almost twice as thick as the Earth's, and may even have a hydrological cycle, i.e., evaporation of liquids into clouds, making rain. But since Titan is much colder than the Earth, this cycle would run on liquid ethane, not water.



The night sky by Benjamin Voros from unsplash.com free wallpapers (above), showing the Milky Way, our home galaxy, a rather flat (a few thousand light-years) but wide (100,000 light-years) collection of a few hundred billion stars. The stars in the Milky Way are actually rather smoothly distributed across this expanse, but between the stars there are gas & dust clouds which obscure the view, and make the background star field look patchy.

Galaxy interactions (below) from the *Hubble* Space Telescope shows two galaxies, NGC 1512 and 1510, each made up of billions of stars plus gas & dust, passing by each other in a "gravitational encounter." The tidal forces from the gravity of the smaller galaxy on the right have disturbed the orderly rotation of the larger galaxy as it passed by, creating the strong bar of stars in the larger galaxy that links the outer spiral arms to the inner nucleus. The gas & dust flows from the spiral to the nucleus can be seen as narrow, dark lanes projected onto the bar. The disturbance also promotes the formation of hot, young, blue stars in the spiral arms and nuclear ring.