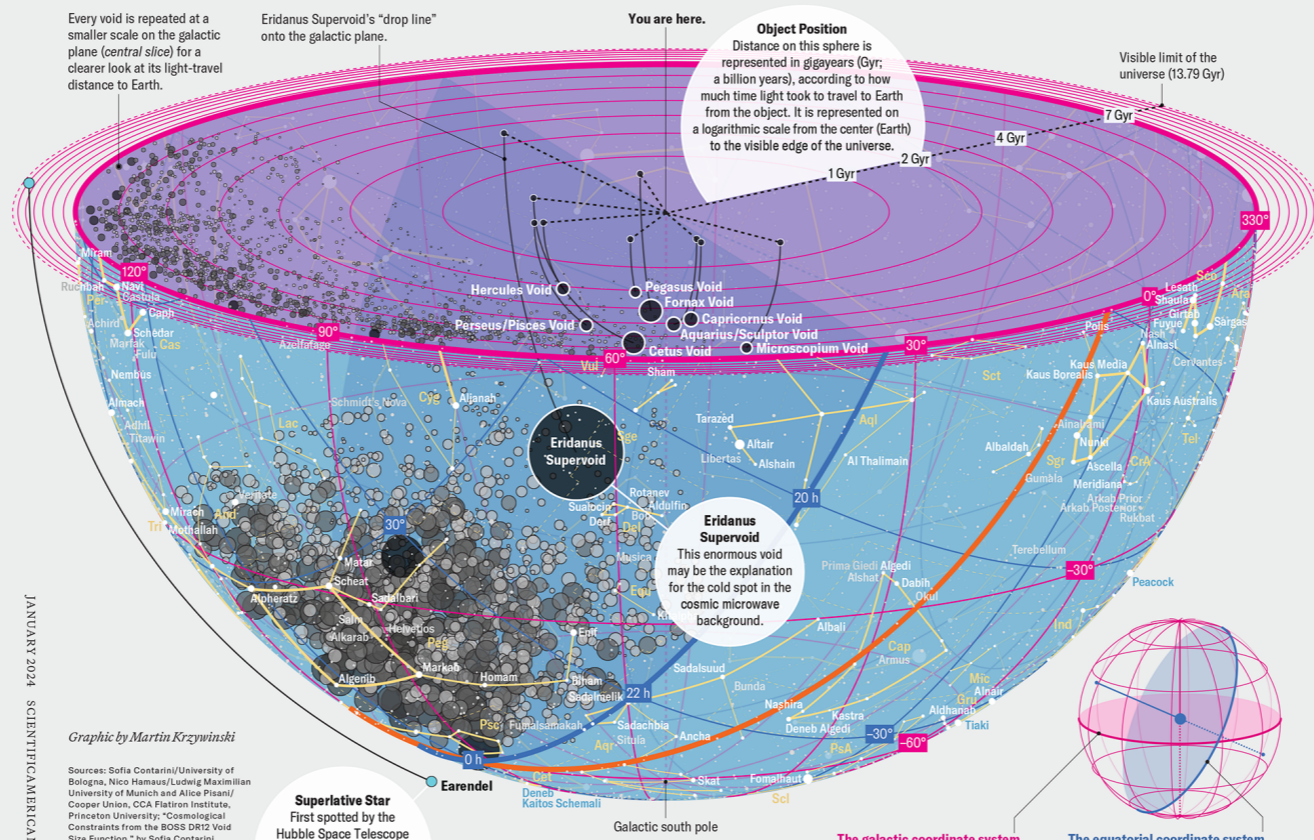
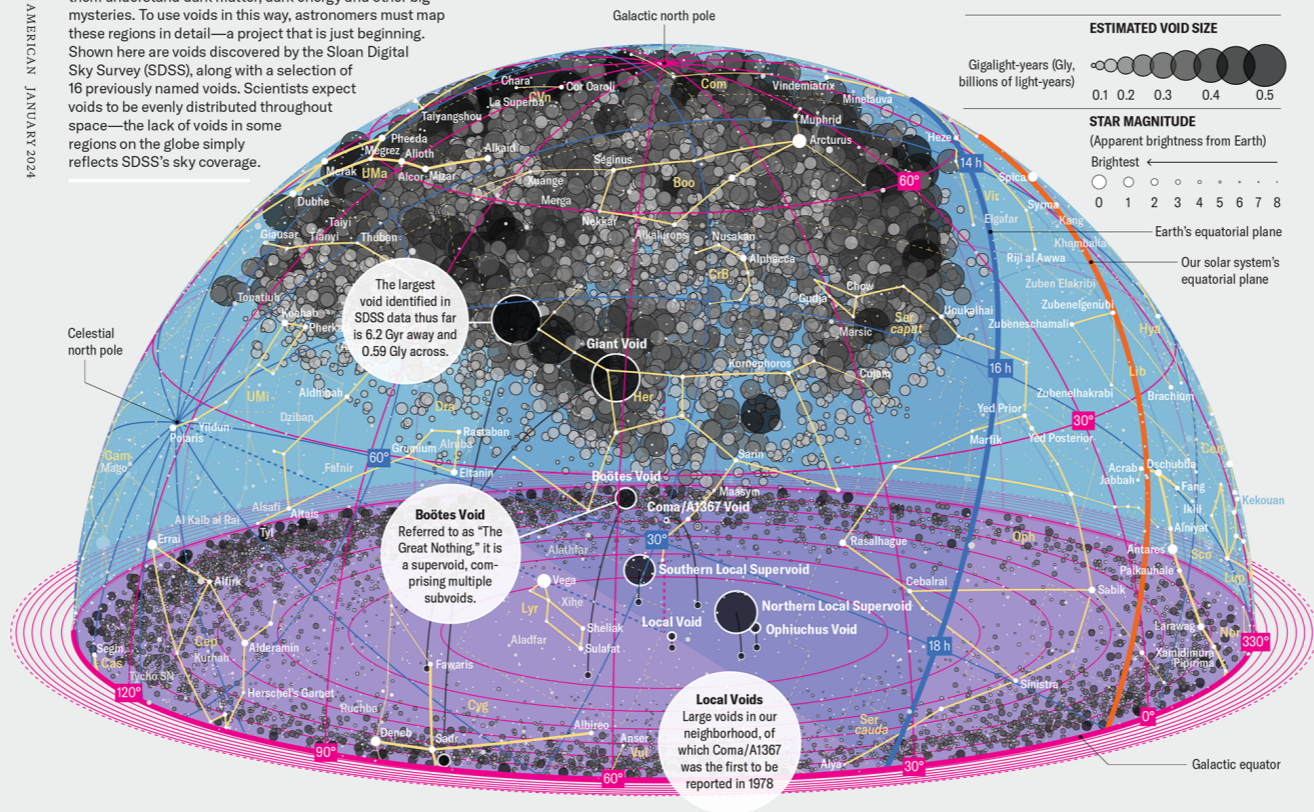


# A Map of Nothing

Regions of relatively empty space called cosmic voids are everywhere in the universe, and scientists believe studying their size, shape and spread across the cosmos could help them understand dark matter, dark energy and other big mysteries. To use voids in this way, astronomers must map these regions in detail—a project that is just beginning. Shown here are voids discovered by the Sloan Digital Sky Survey (SDSS), along with a selection of 16 previously named voids. Scientists expect voids to be evenly distributed throughout space—the lack of voids in some regions on the globe simply reflects SDSS's sky coverage.

This sphere holds 6,448 voids, mapped in space using the galactic coordinate system. Every void is repeated at a smaller size on the Milky Way's so-called galactic plane (central slice) for a clearer look at its light-travel distance to Earth. (The time light took to travel to us from that point is represented in gigayears, or Gyr.) Familiar benchmarks—in the form of stars and constellations—are projected onto the sphere at 7 Gyr from Earth, as all of the shown voids are found within this radius.



Graphic by Martin Krzywinski  
Sources: Sofia Contarini/University of Bologna, Nico Hamaus/Ludwig-Maximilians-University of Munich and Alice Piana/Cooper Union, CCA Flatiron Institute, Princeton University; "Cosmological Constraints from the BOSS DR12 Void Size Function," by Sofia Contarini et al., in *Astrophysical Journal*, Vol. 953, August 2023; "Precision Cosmology with Voids in the Final BOSS Data," by Nico Hamaus et al., in *Journal of Cosmology and Astroparticle Physics*, No. 12, December 2020 (void data)

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