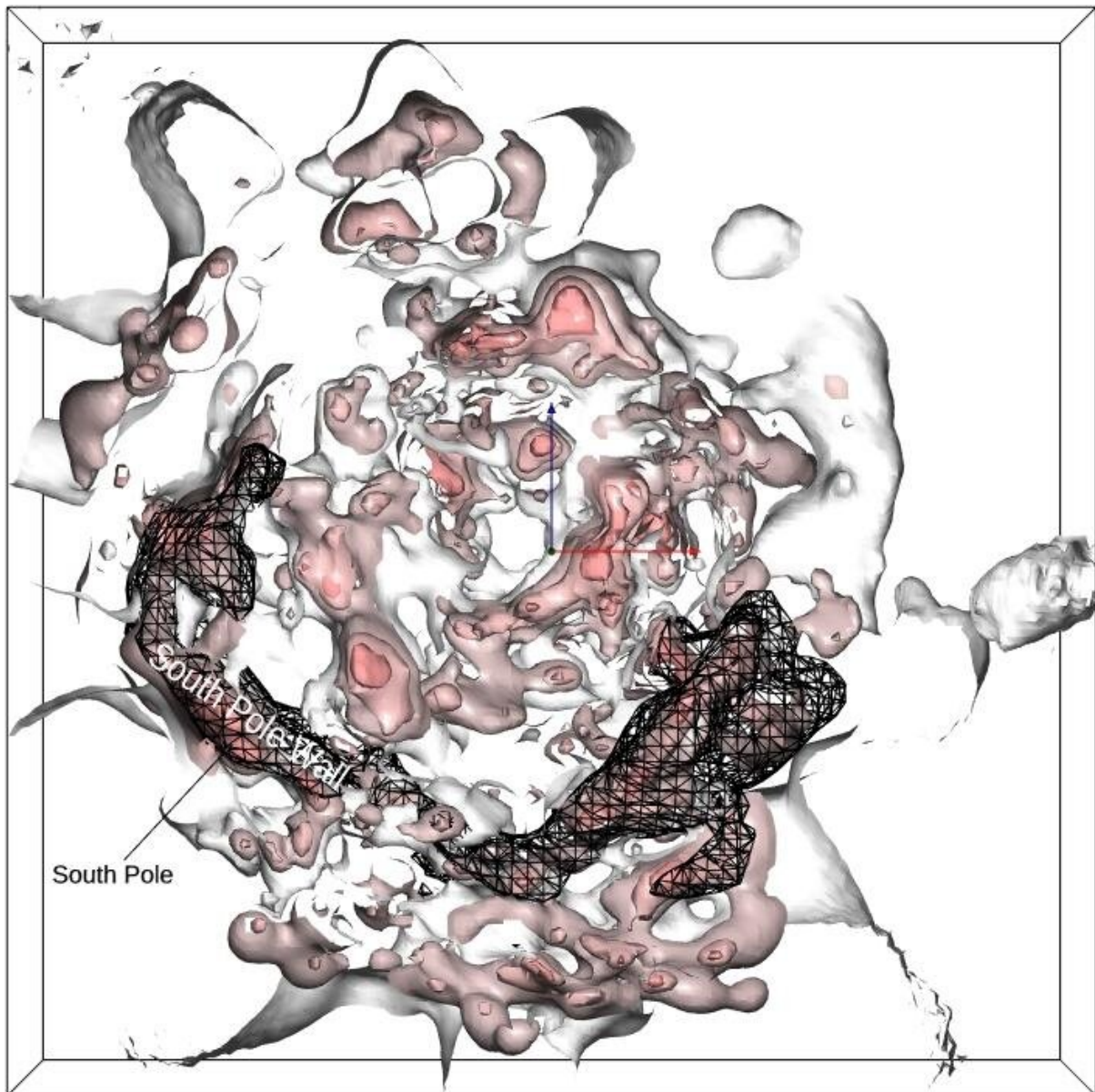


Astronomers map massive structure beyond Laniakea Supercluster

July 13 2020



South Pole Wall. Credit: University of Hawaii at Manoa

For the past decade, an international team of astronomers, led in part by Brent Tully at the University of Hawai'i Institute for Astronomy, has been mapping the distribution of galaxies around the Milky Way. They have discovered an immense structure beyond Laniakea, an immense supercluster of galaxies, including our own. Astronomers have dubbed the newly identified structure the South Pole Wall.

The South Pole Wall lies immediately beyond the Laniakea Supercluster, wrapping the region like an arm. The densest part of it lies in the direction of the Earth's South Pole, inspiring the name. It extends in a great arc of 200 degrees—more than a semicircle—reaching well into the northern sky. The concentration at the South Pole lies at a distance of 500 million [light years](#). Following the arm north, it folds inward to within 300 million light years of the Milky Way. Along the arm, [galaxies](#) are slowly moving toward the South Pole, and from there, across a part of the sky obscured from Earth by the Milky Way toward the dominant structure in the nearby universe, the Shapley connection.

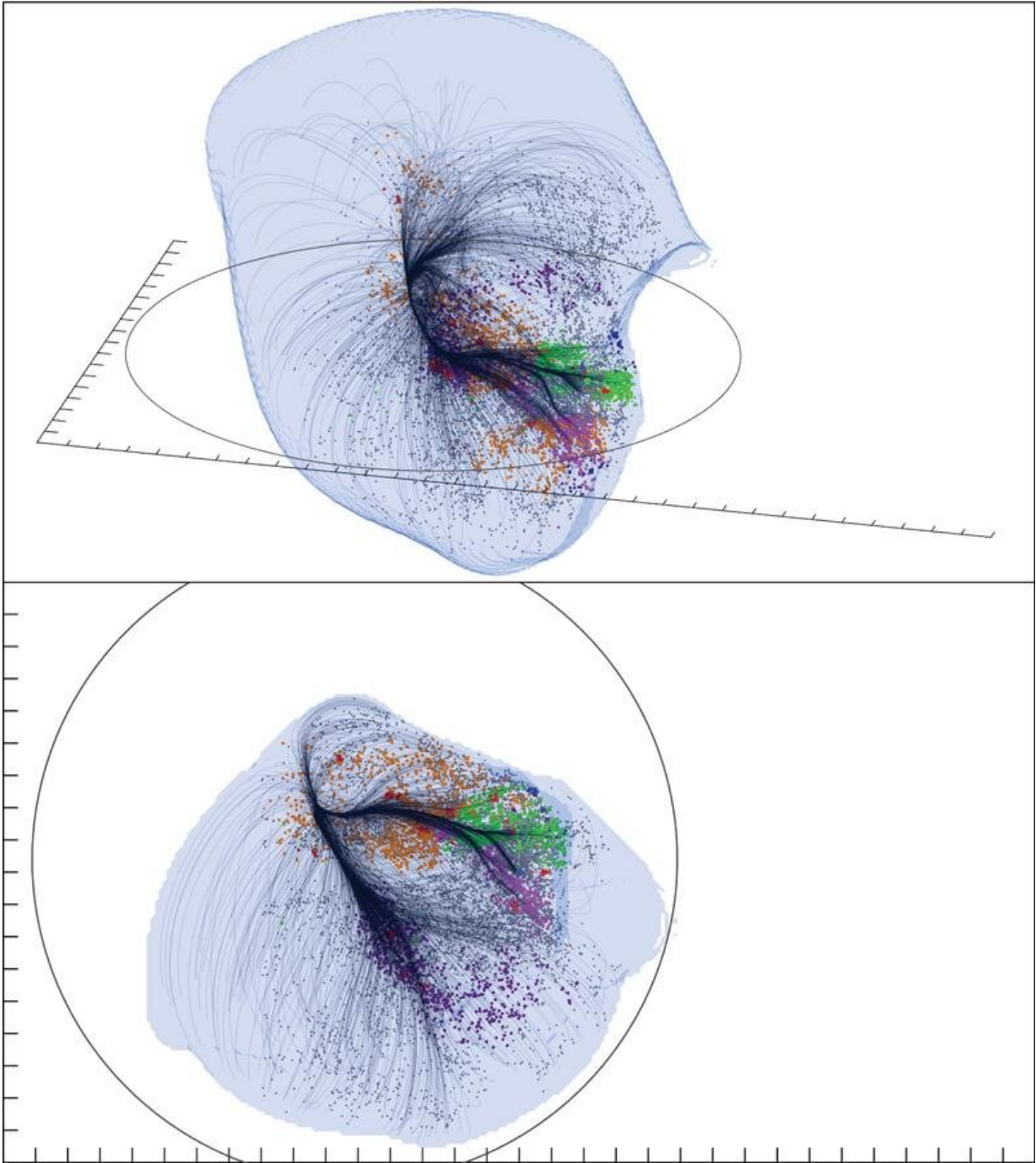
"We wonder if the South Pole Wall is much bigger than what we see. What we have mapped stretches across the full domain of the region we have surveyed. We are early explorers of the cosmos, extending our maps into unknown territory," described Tully.

The team's research was published in *Astrophysical Journal*.

Throughout the last 40 years, there has been a growing appreciation of patterns in the distribution of galaxies in the Universe, reminiscent of geographic features like mountain ranges and island archipelagos. The Milky Way galaxy, with its 100 billion stars, is part of the small Local

Group of galaxies, which in turn is a suburb of the Virgo cluster with thousands of galaxies. The Virgo cluster in turn is an outer component of an even larger conglomeration of many rich clusters of galaxies, collectively called the "Great Attractor" because of its immense gravitational pull. In 2014, the team mapped out the Laniakea Supercluster, the bundling of a hundred thousand galaxies over an even larger region, spanning 500 million light years.

The South Pole Wall is as large as the Sloan Great Wall, one of the largest structures known in the Universe, but the new discovery is much closer. University of Paris-Saclay cosmic cartographer Daniel Pomarede, one of the study's lead authors, explained "One might wonder how such a large and not-so distant structure remained unnoticed. This is due to its location in a region of the sky that has not been completely surveyed, and where direct observations are hindered by foreground patches of galactic dust and clouds. We have found it thanks to its gravitational influence, imprinted in the velocities of a sample of galaxies."



Laniakea Supercluster. Credit: University of Hawaii at Manoa

More information: Daniel Pomarède et al. Cosmicflows-3: The South Pole Wall, *The Astrophysical Journal* (2020). [DOI: 10.3847/1538-4357/ab9952](https://doi.org/10.3847/1538-4357/ab9952)

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