



## Longstanding German Circus Replaces Live Animals With Holograms

[MADISON DAPCEVICH](#), Jun 7, 2019

Germany's [Circus Roncalli](#) may have been entertaining Europeans with animal exhibitions, acrobatics, and circus arts since 1976, but in recent years they have moved to modern techniques to showcase their unique talents.

In an effort to support the [welfare of animals](#), the circus is upholding a decision made two years ago to use hologram animals in place of real ones. The shift was first reported by German publication [RP Online](#) in 2017 and implemented a year later, but a recent [reddit](#) thread brought the decision back to the limelight earlier this week.

The show is much like a normal circus act; the ringmaster sits in the center of his ring with an audience surrounding him on all sides. The animals appear as if from nowhere – horses stampeding in circles, an elephant balancing on its two front legs, and a zebra-sized goldfish suspended in the center – but this time around, they're simply 3D holograms and projections.

A crew of 15 3D designers and software engineers, eleven laser beams, and more than 3,000 processes made the dream possible.

"We did pioneer work. We made the holographic round because in [the] circus, the stage is round," said Roncalli Founder and Director Bernhard Paul in an email to IFLScience, adding that the move to digital animals has been well-received from thousands of visitors around the world. In the video, 360° 3D holographic images fill the arena, measuring 32 meters (105 feet) wide and 5 meters (16 feet) deep, as the crowd awes and applauds just as they might at an old-fashioned circus.

According to the [University of Illinois Department of Physics](#), holograms are created using laser beams because their lights are the same size, vibrate simultaneously, and bend in the same way. Different colors have different waves and sizes, and as they're projected the beam is split into two, with one diversion shining on an object and the other bouncing off a mirror onto a special film that is also in the field of view of the object being projected. It works in much the same way as a normal image captured from a lens onto film or a digital sensor, except as the light bounces off the object, it interferes with the light from the mirror. When it hits the film, it records the interference pattern between the two beams of light.

Et voila, elephants for a 21st-century circus. Indeed, a number of countries have [come forward](#) in recent years to ban the use of circus animals, including Ireland, Italy, and India. This year, Roncalli was also able to incorporate a real robot as an acrobatic partner for a human being.

Circus Roncalli retired the last of its horses and ponies at the end of 2017.