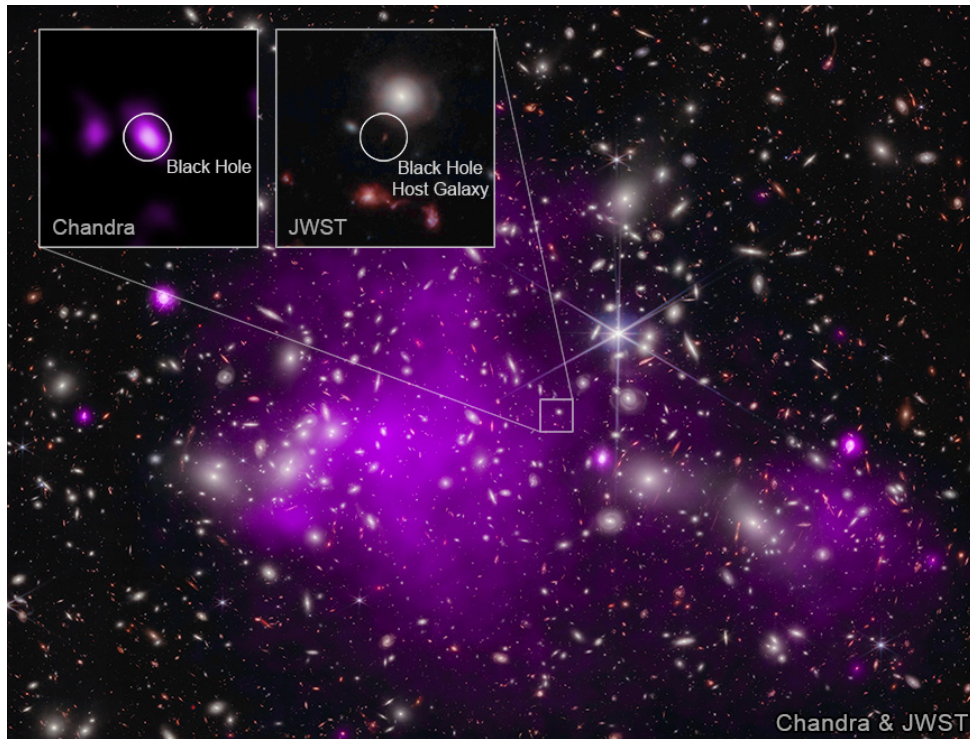




# Chandra Science Highlight

## NASA Telescopes Discover Record-Breaking Black Hole \$



**Caption:** This image of the galaxy cluster Abell 2744 includes X-ray data from Chandra (purple) showing hot gas and infrared data from Webb (red, green, blue) showing hundreds of galaxies. This field contains a distant black hole located in the galaxy UHZ1. The galaxy cluster is about 3.5 billion light-years from Earth, but Webb data shows that UHZ1 is much farther away than Abell 2744, at some 13.2 billion light-years away. The insets zoom into a small area centered on UHZ1. The small object in the center of the Webb image is UHZ1 and the Chandra image shows X-rays from material close to the supermassive black hole in the middle of UHZ1.

- The most distant supermassive black hole yet detected has been discovered.
- The black hole and its host galaxy, UHZ1, are 13.2 billion light-years away, seen when the universe was only 3% of its current age.
- NASA's Chandra X-ray Observatory and James Webb Space Telescope joined forces to make this discovery.
- This is considered the best evidence to date that some early black holes formed from massive clouds of gas.

**Distance estimate:** 13.2 billion light-years

**Credits:** X-ray: NASA/CXC/SAO/Ákos Bogdán et al.; Infrared: NASA/ESA/CSA/STScI; Image Processing: NASA/CXC/SAO/L. Frattare & K. Arcand

**Instrument:** ACIS

**Reference:** Bogdán, Á. et al., 2023, Nature Astronomy, accepted: <https://arxiv.org/abs/2305.15458> ;  
Goulding, A. et al; 2023, ApJL, 955, L24:  
<https://arxiv.org/abs/2308.02750> ;  
Natarajan, P. et al; 2023, ApJ, accepted:  
<https://arxiv.org/abs/2308.02654>

**More information:** <https://chandra.si.edu/photo/2023/uhz1/>

The CXC is operated for NASA by the Smithsonian  
Astrophysical Observatory



November 2023