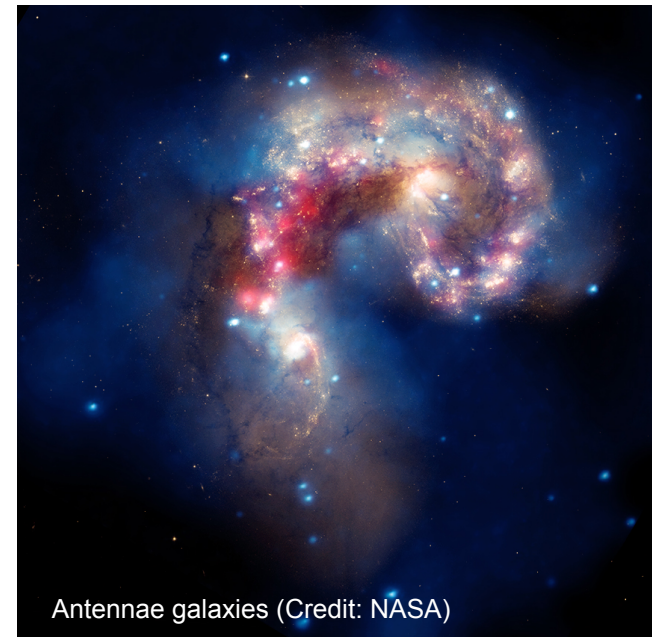


Hunting for Black Holes

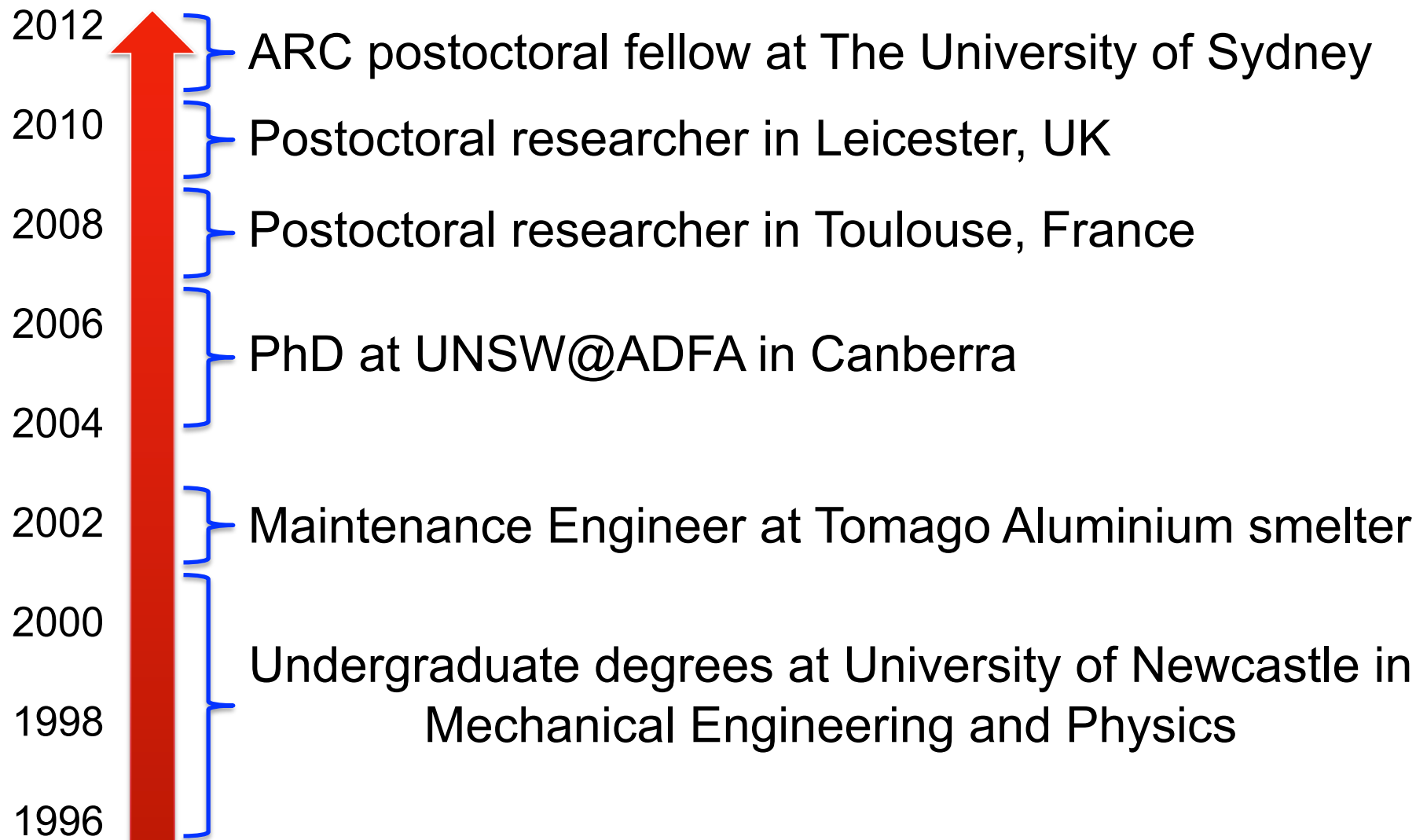
Dr Sean Farrell
The University of Sydney



THE UNIVERSITY OF
SYDNEY



Antennae galaxies (Credit: NASA)





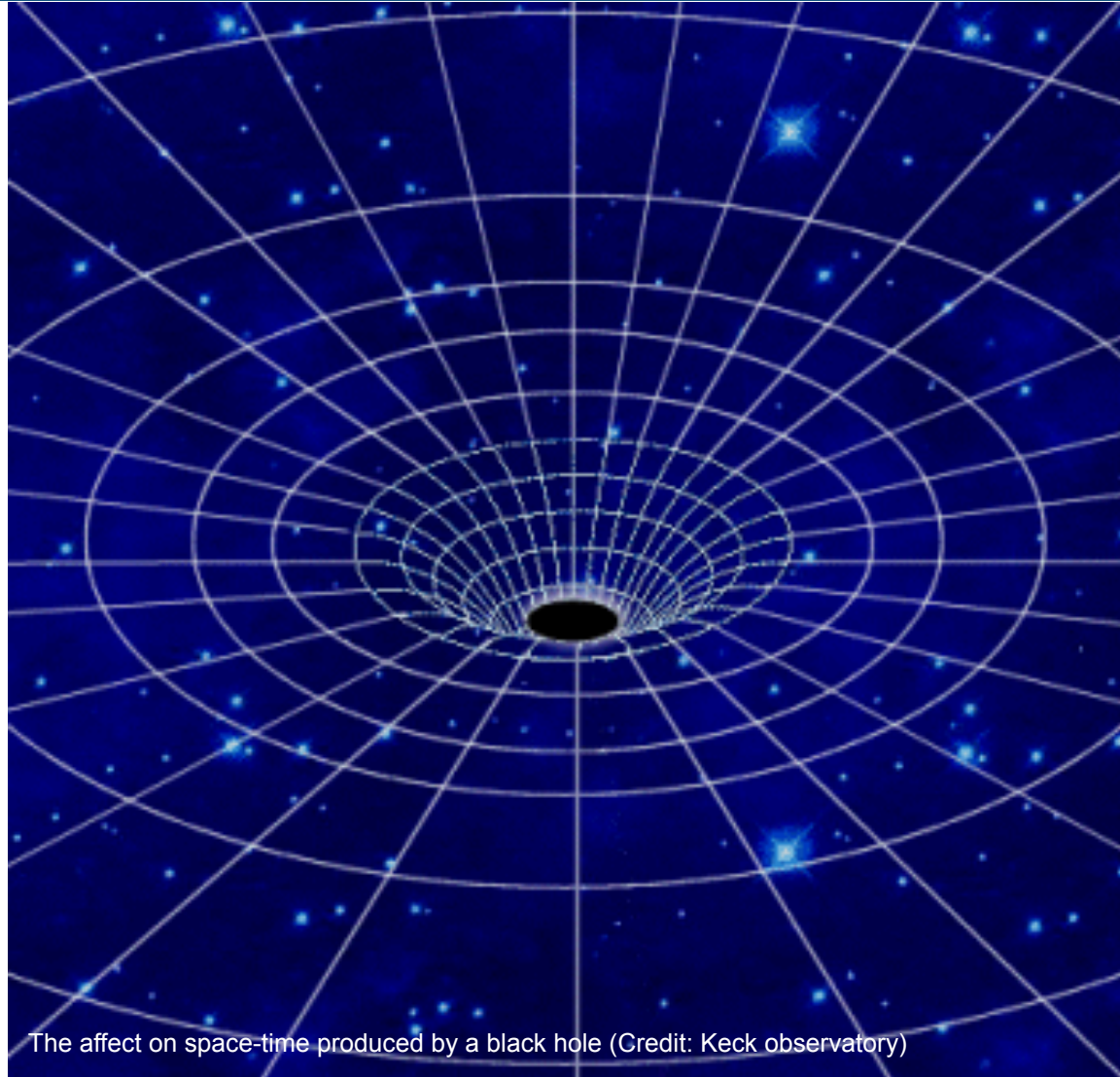
What Are Black Holes?



Artist's impression of a black hole (Credit: ESA/NASA)



What Are Black Holes?

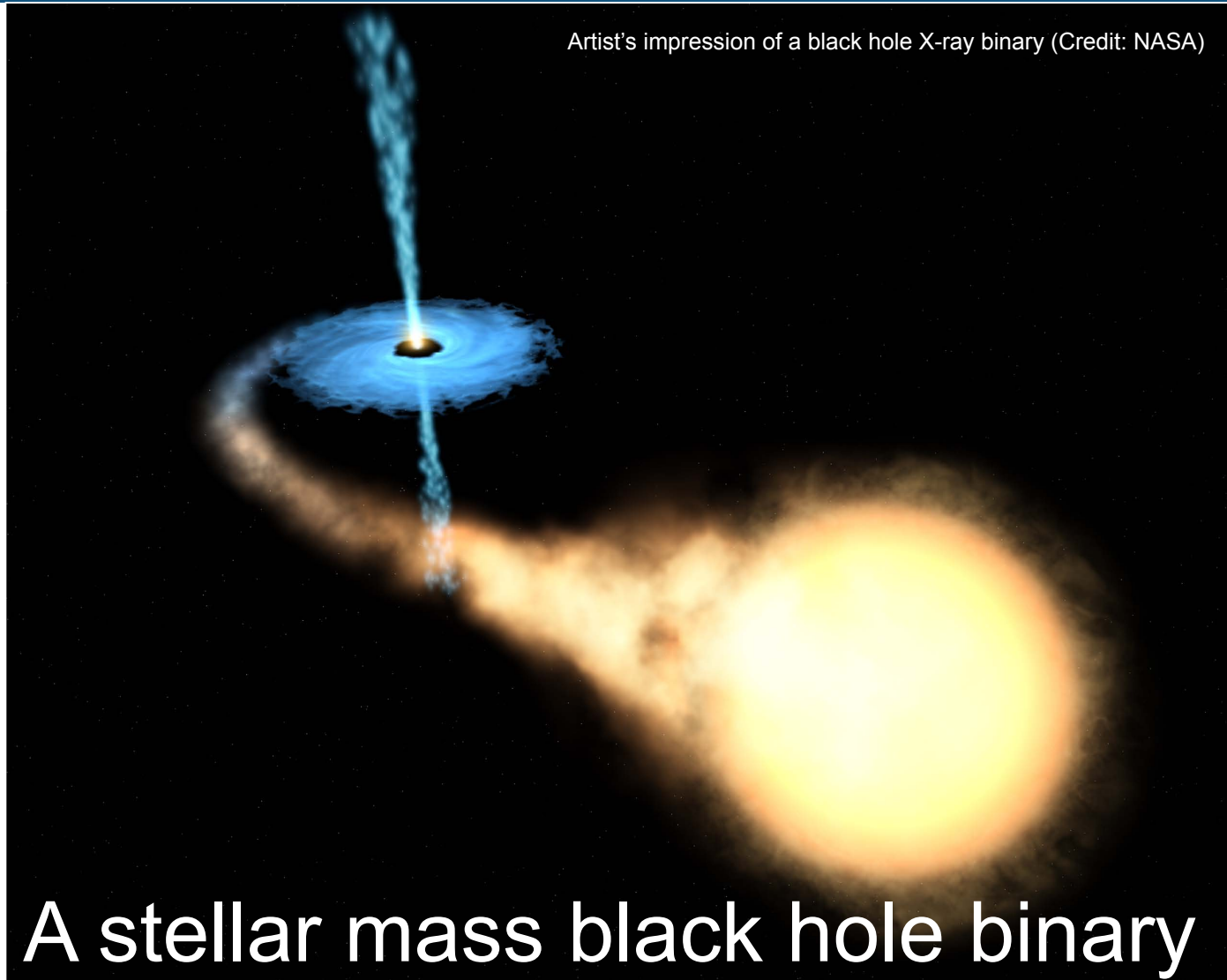


The affect on space-time produced by a black hole (Credit: Keck observatory)



Types of Black Holes

Artist's impression of a black hole X-ray binary (Credit: NASA)

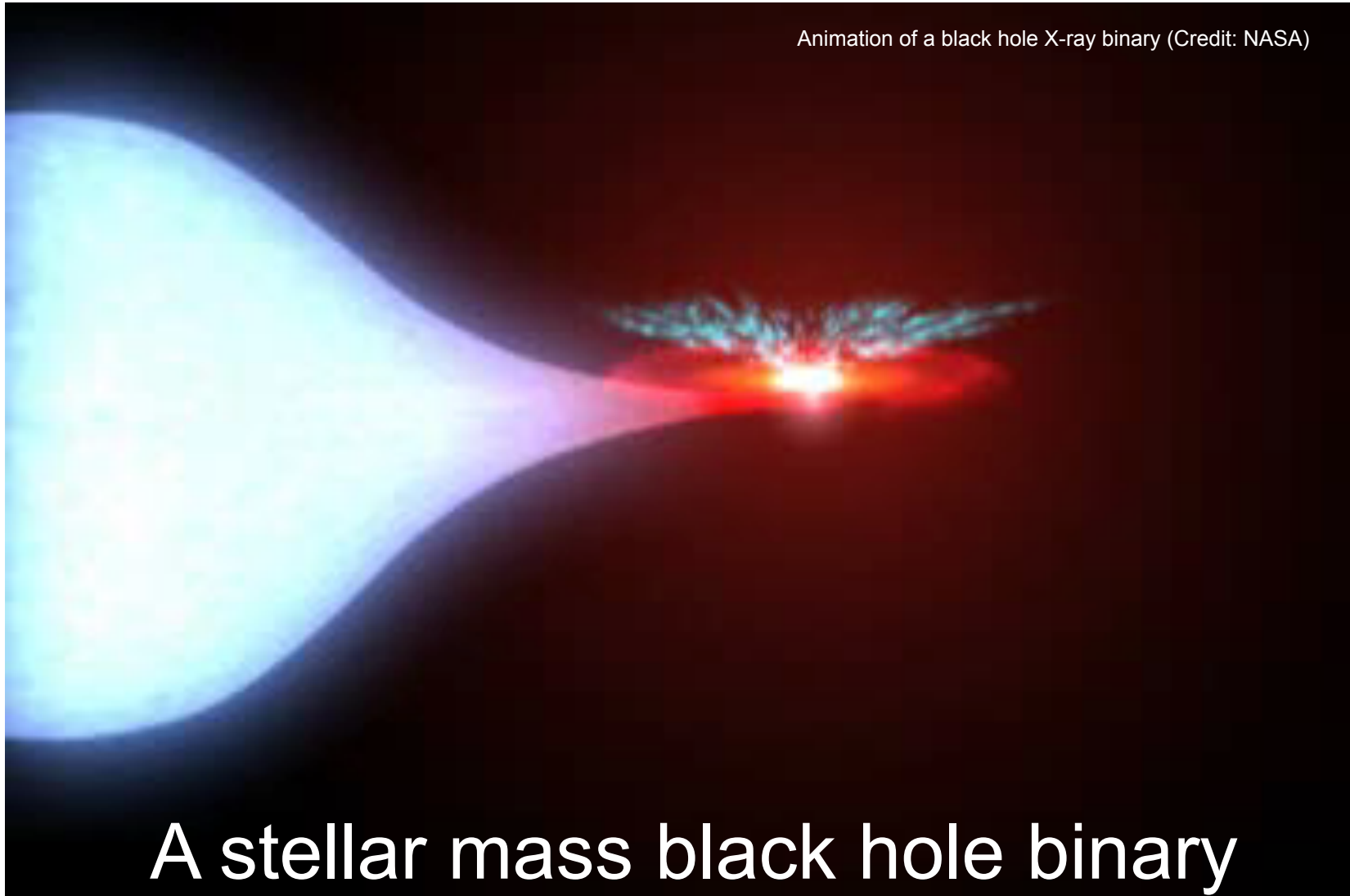


A stellar mass black hole binary



Types of Black Holes

Animation of a black hole X-ray binary (Credit: NASA)



A stellar mass black hole binary



Types of Black Holes



The Sombrero galaxy

(Credit: NASA/STSCi)

Types of Black Holes

Hubble image of the intermediate mass black hole HLX-1 in the galaxy ESO 243-49 (Credit: NASA/ESA/S. Farrell)



What about middle-weight black holes?



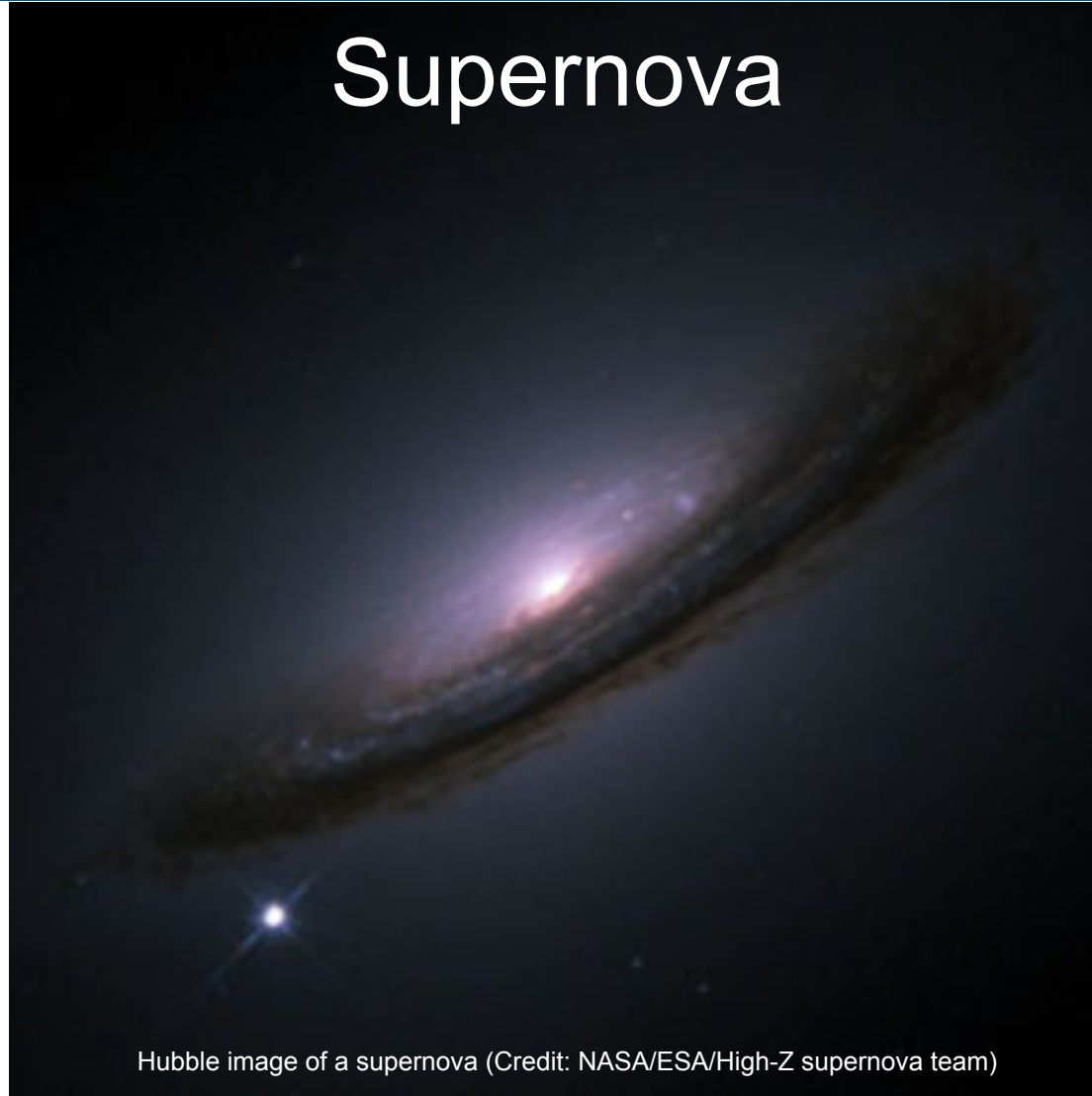
Black Hole Formation

Animation of a star going supernova (Credit: Hayden Planetarium)

Supernova explosion



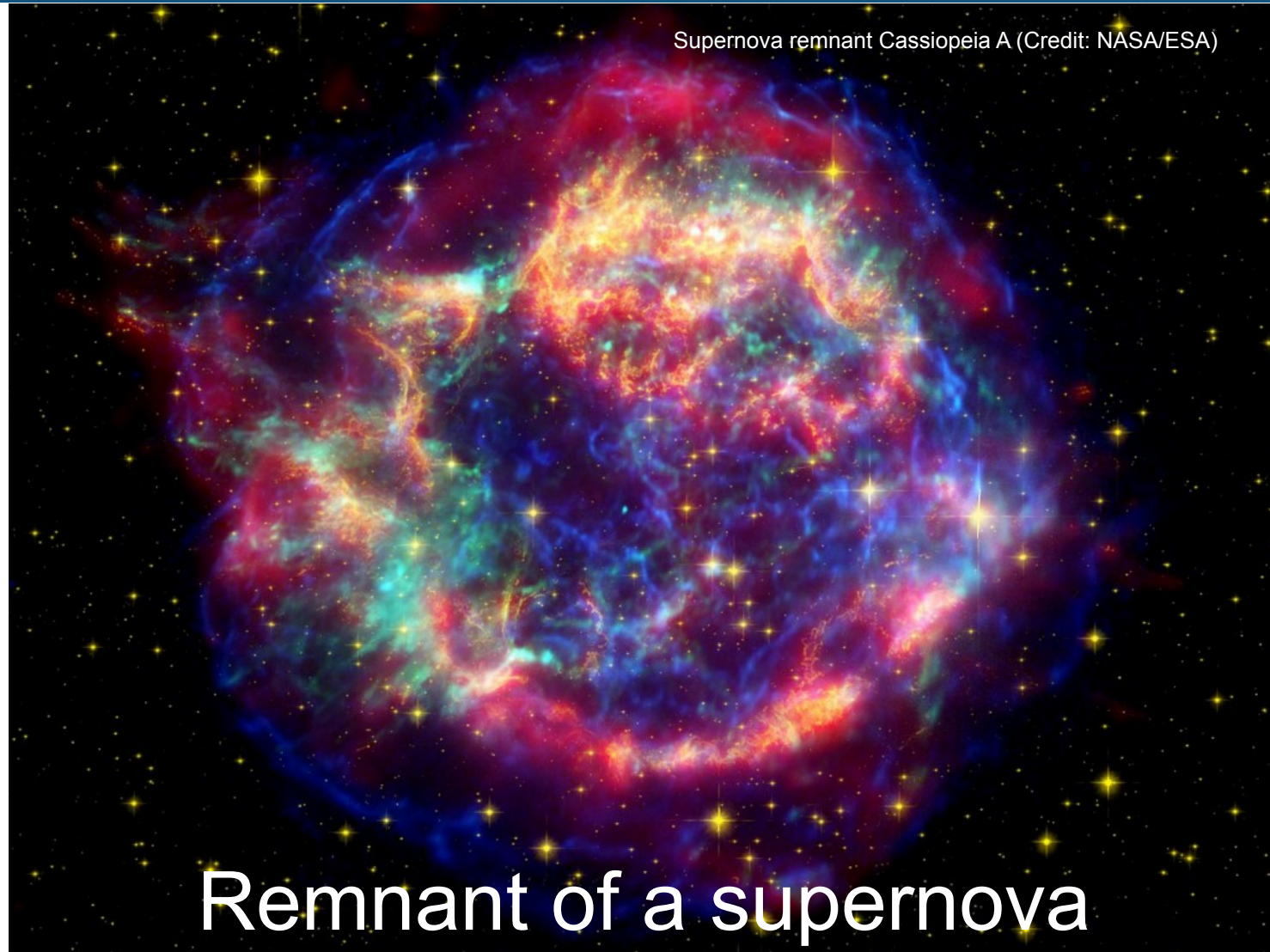
Supernova



Hubble image of a supernova (Credit: NASA/ESA/High-Z supernova team)



Black Hole Formation





Black Hole Formation

The merging galaxies NGC 2207 and IC 2163 (Credit: ESO)



Merging galaxies



Gravitational lensing



Simulation of a black hole in front of the Milky Way (Credit: U. Kraus)



Finding Black Holes

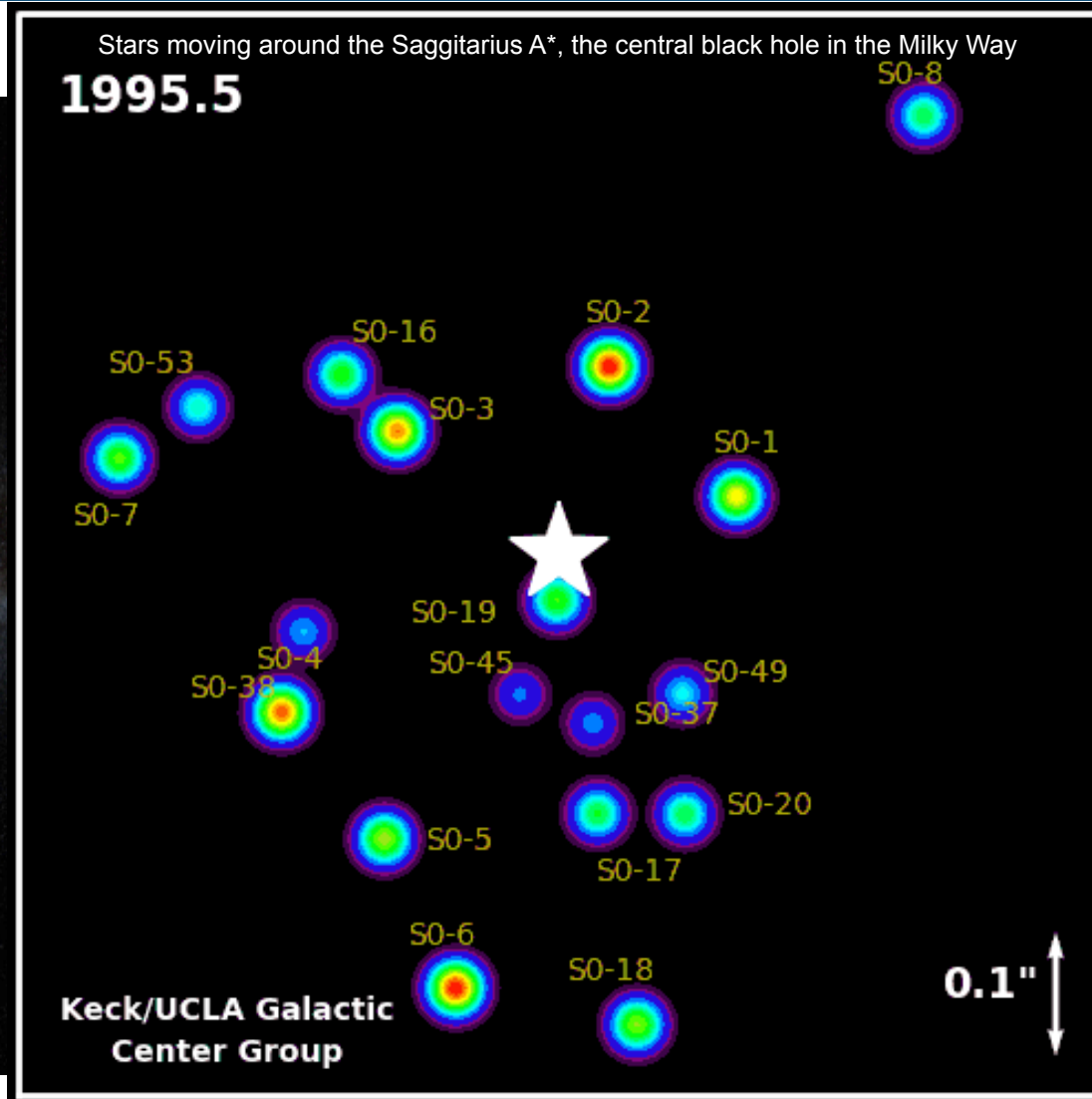
Gravitational lensing of a distant galaxy by a galaxy cluster (Credit: NASA/ESA)



Gravitational lensing



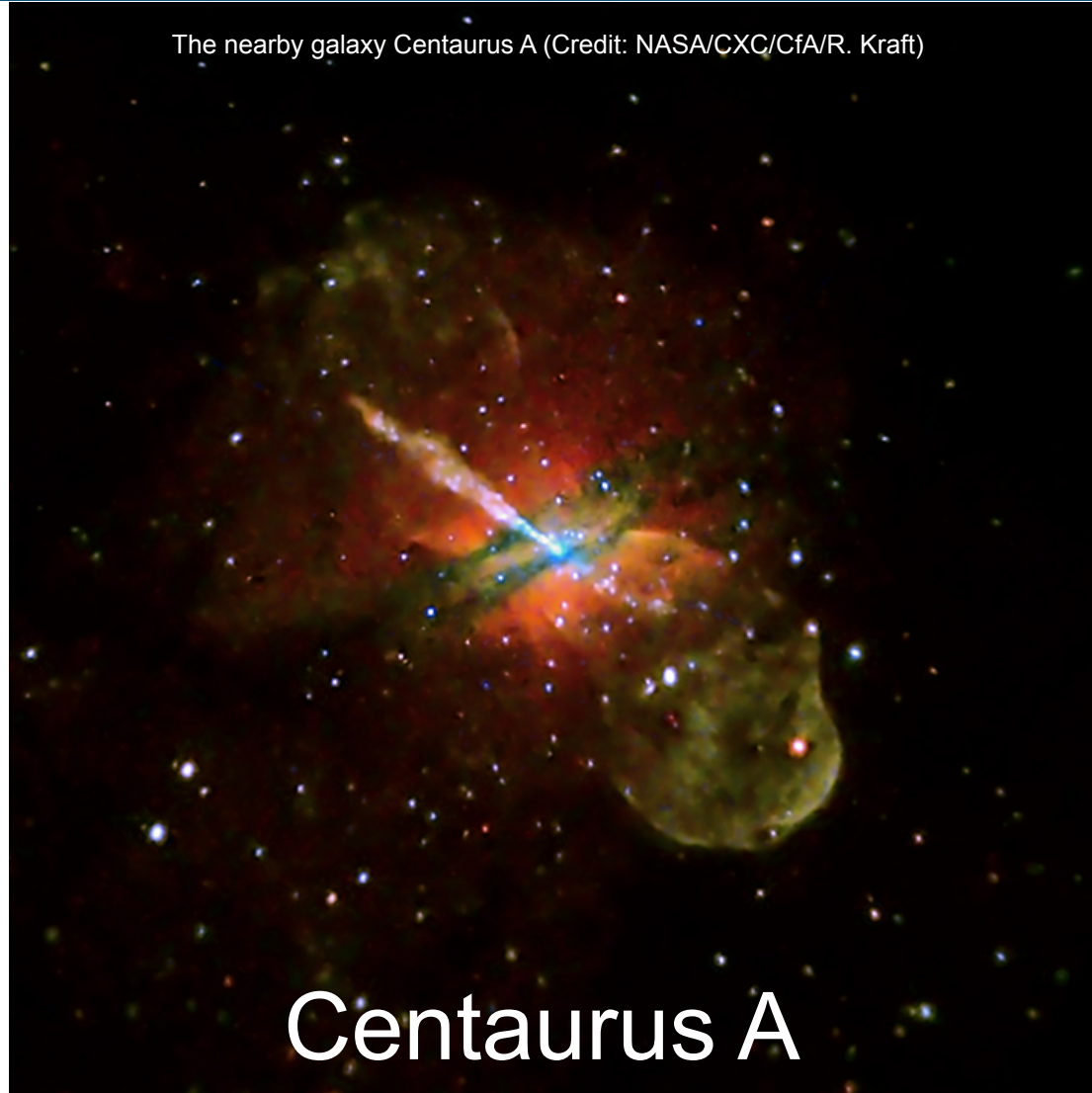
Finding Black Holes





Finding Black Holes

The nearby galaxy Centaurus A (Credit: NASA/CXC/CfA/R. Kraft)



Centaurus A

Animation of a star being torn apart by a black hole (Credit: NASA/GSFC)

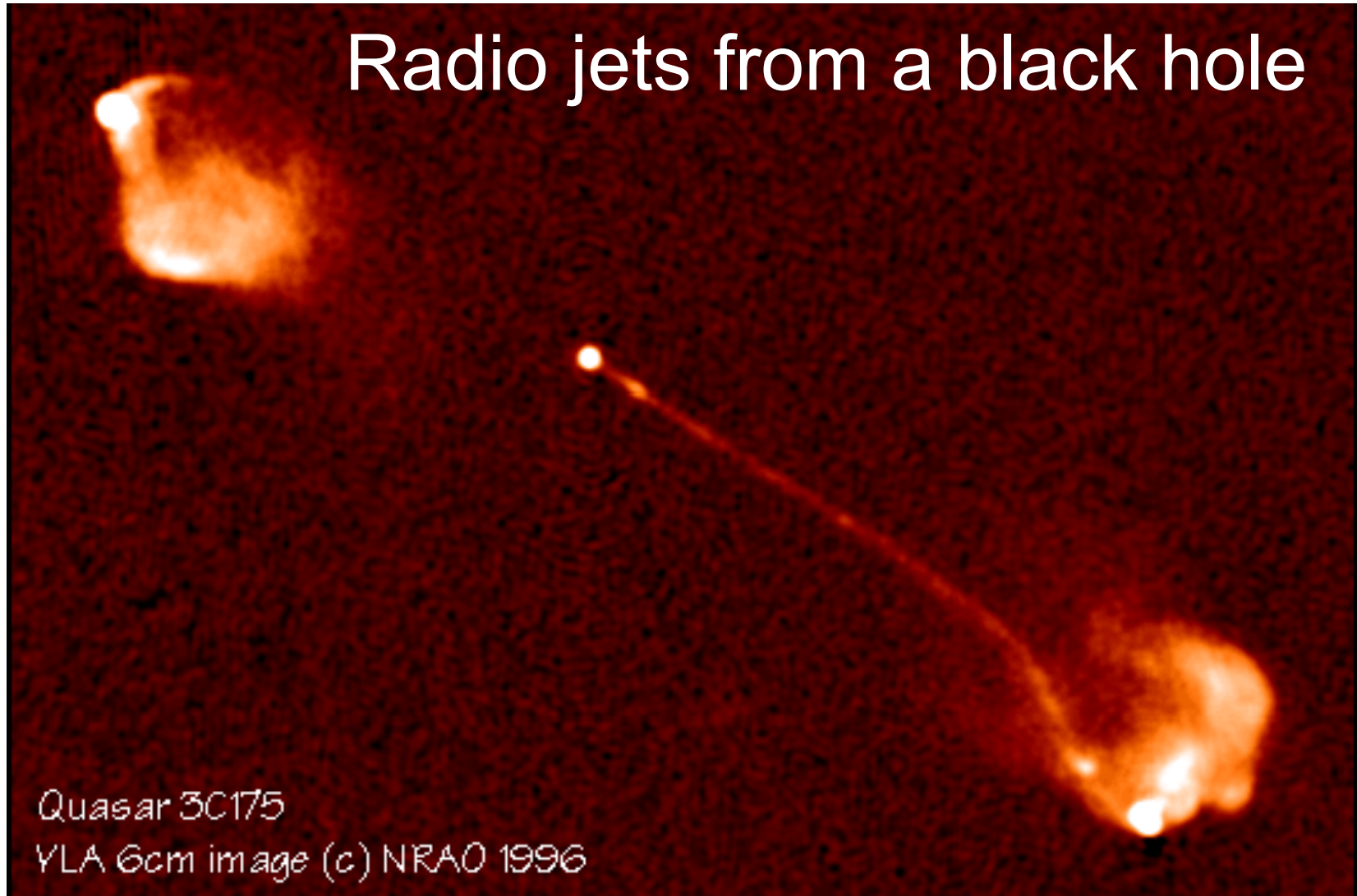


A star torn apart by a black hole

The image shows a black hole at the center, surrounded by a field of stars. A bright star is being pulled towards the black hole, and its light is being distorted and stretched into a long, thin filament as it is torn apart. The background is a dark field of stars.



Radio jets from a black hole



Quasar 3C175

YLA 6cm image (c) NRAO 1996

SS433
VLBA



Amy Mioduszewski
Michael Rupen
Craig Walker
Greg Taylor



Radio jets from a black hole