

by Elizabeth Wason

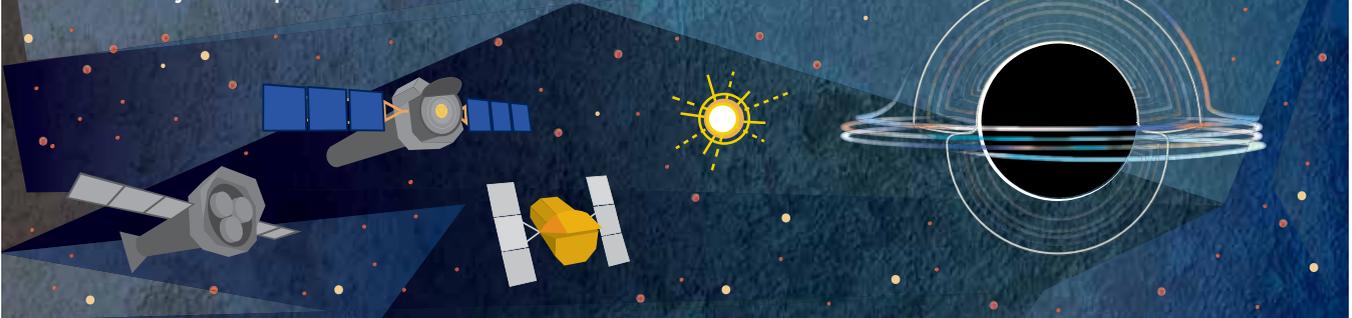
STARSLAUGHTER

FACULTY

A step-by-step illustrated explanation of Astronomy Professor Jon Miller's research.

1. A STAR VENTURES TOO CLOSE TO A BLACK HOLE.

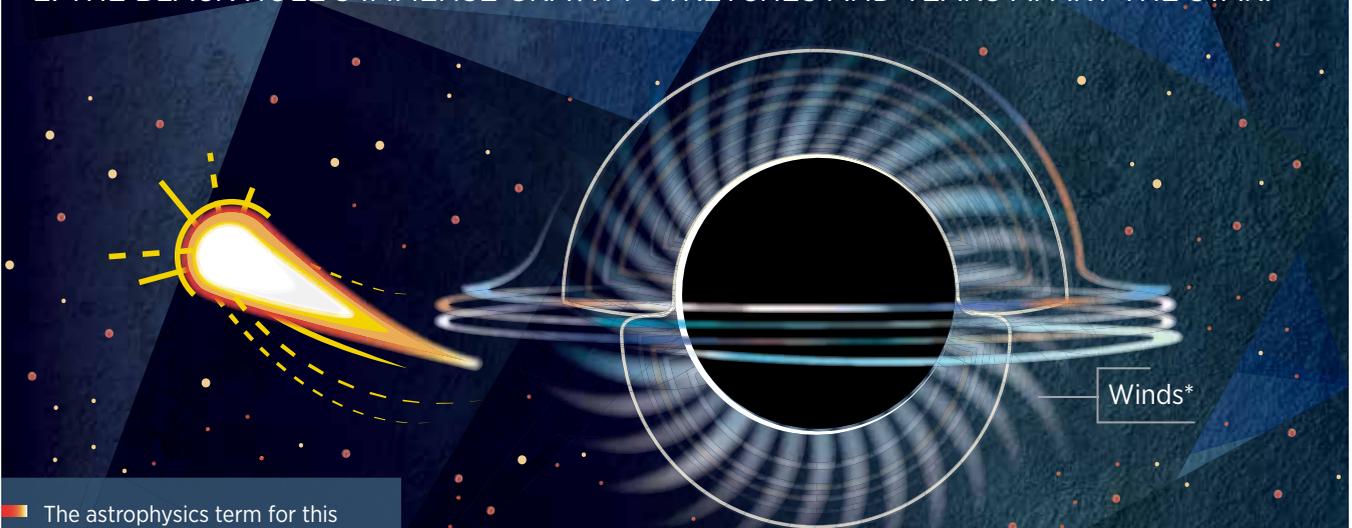
A trio of X-ray telescopes observed the destruction of a star called ASASSN-14li.



Black hole mass = a few million times greater than our sun.

This black hole is at the center of a galaxy about 290 million light years away from the Milky Way.

2. THE BLACK HOLE'S IMMENSE GRAVITY STRETCHES AND TEARS APART THE STAR.



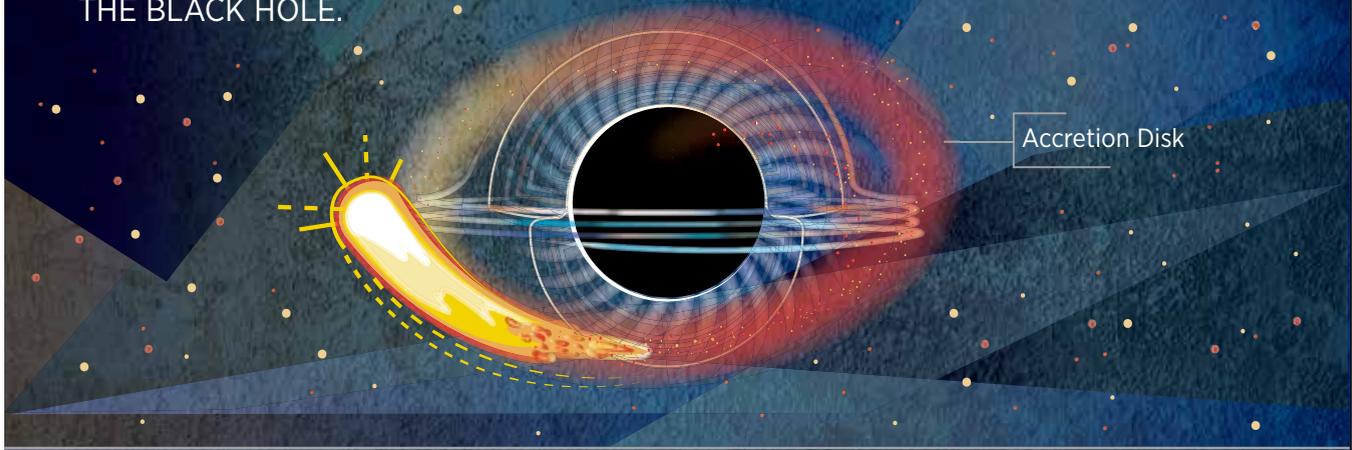
The astrophysics term for this phenomenon is *spaghettification*.

These events happen just once every 10,000 years in a typical galaxy.

Wind speeds at the edge of the black hole = 2-20 million mph.

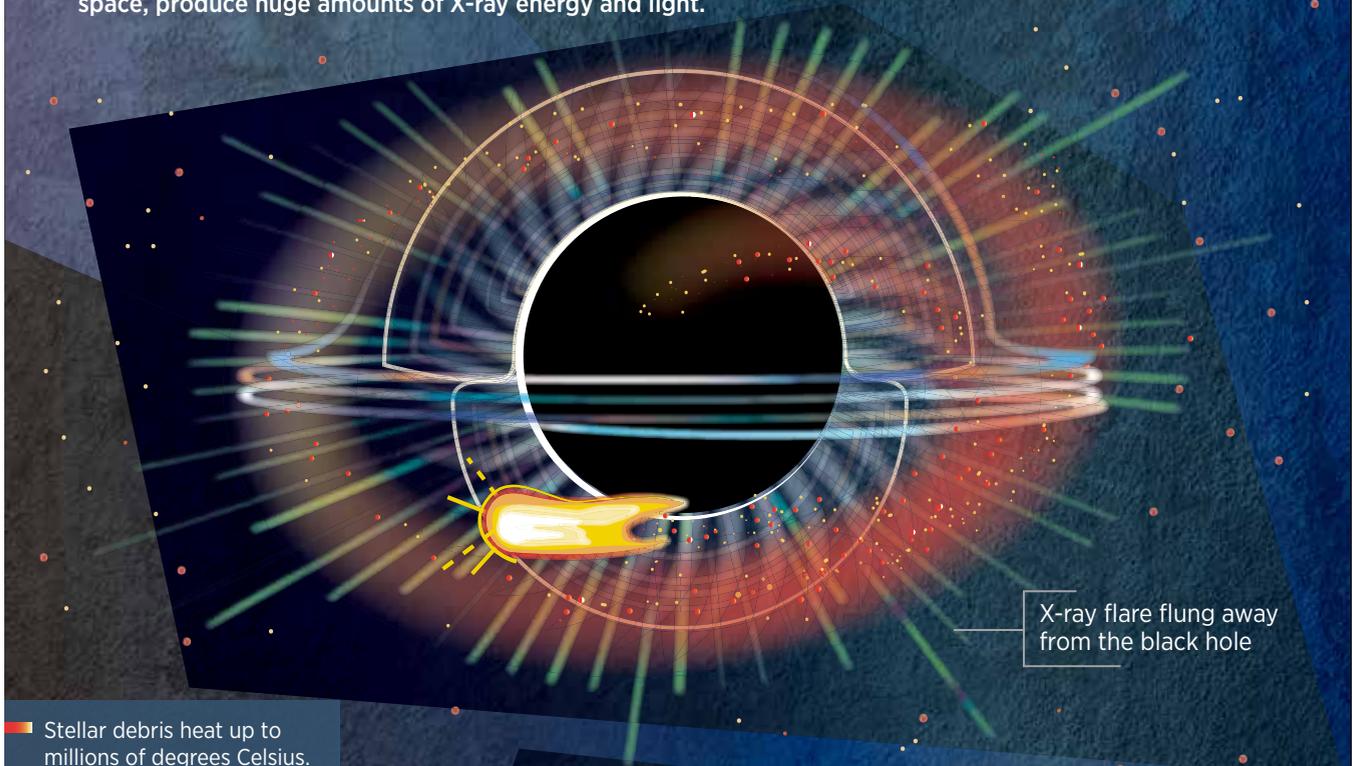
*Probably caused by radiation but could also arise due to magnetic fields or a spinning accretion disk.

3. AS THE BLACK HOLE SHREDS THE STAR, PIECES OF THE STAR SPIRAL INWARD TOWARD THE BLACK HOLE. STAR GAS AND DEBRIS FORM A DISK THAT ORBITS THE BLACK HOLE.



Accretion Disk

4. THE BLACK HOLE SWALLOWS MOST OF THE STAR. But winds at the edge of the black hole expel some of the debris at high speeds. The star debris, flung into space, produce huge amounts of X-ray energy and light.



X-ray flare flung away from the black hole

Stellar debris heat up to millions of degrees Celsius.

X-rays travel at the speed of light.

A black hole gets bigger each time it consumes a star.

In hours or days, the black hole shreds about half the star. Within months or years, the rest of the star and the accretion disk fall into the black hole.