

# one

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SOMETHING  
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GRUMMAN



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**NORTHROP  
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*Correction:*  
 A photograph accompanying last issue's  
 "Innovation on All Fronts" was incorrectly  
 attributed; the photograph was taken by  
 Alan Radecki.

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# 25 Years of COSMIC REVELATION

By Nestor Vences

**F**ar exceeding its original five-year design life, the Chandra X-ray Observatory is celebrating its 25th year in space in July 2024. Designed and built by Northrop Grumman, it is the most powerful X-ray telescope ever launched and one of NASA's four Great Observatories launched between 1990 and 2003, alongside the Hubble Space Telescope, Spitzer Space Telescope and Compton Gamma Ray Observatory.

Since 1999, Chandra has observed X-ray emissions from very hot regions of the universe such as colliding galaxies and black holes, helping scientists answer fundamental questions about the origin and evolution of the universe. Its discoveries have impacted virtually every aspect of astrophysics, including proving dark matter's existence.

Today, Northrop Grumman employees continue to support Chandra from Burlington, Massachusetts, overseeing day-to-day planning and execution of science observations and more. Their efforts keep Chandra safe and operating at peak efficiency, ready to provide more years of science.

continued on pages 8-9



# TAKE A LOOK AT THE NUMBERS THAT HAVE DEFINED CHANDRA'S FIRST 25 YEARS IN SPACE.



**70** trillion bytes of raw data generated since the beginning of its mission, the equivalent of streaming over **9.8** million songs.

**7** million seconds, equal to two-and-a-half months, of total exposure time — so far. The deepest X-ray image ever obtained is from Chandra's observation of a region of the cosmos known as the Chandra Deep Field-South. The image released after this observation contained the highest concentration of black holes ever seen.



Leading astronomers to estimate that there are over **1** billion black holes over the entire sky.

**11,219**

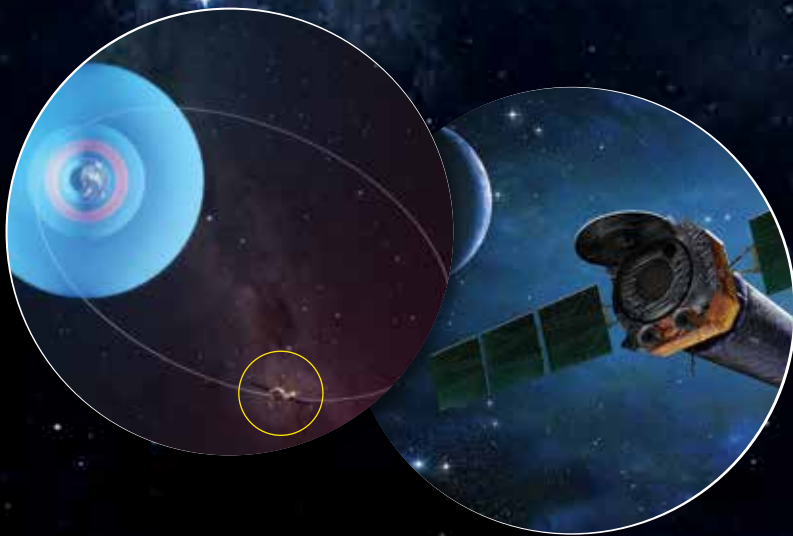
research papers have been published thanks to Chandra's findings, an average of more than **500** per year.

**18**

new PhDs are minted each year, on average, with Chandra's research, observations and discoveries pushing them across the academic finish line.

At **10,560** lbs.

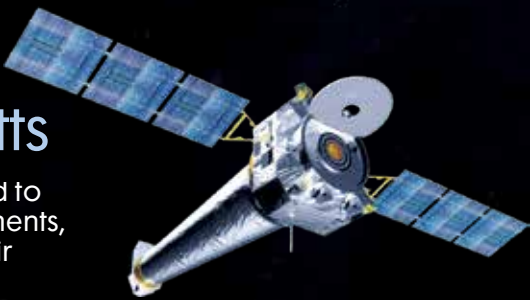
Chandra is heavier than the average killer whale.



Taking approximately **64** hours **18** minutes to complete, Chandra's elliptical orbit typically sees the spacecraft reach an altitude of around **86,400** miles.

**600** watts

of electrical power are required to operate Chandra and its instruments, less power than an average hair dryer.



**1<sup>st</sup>**

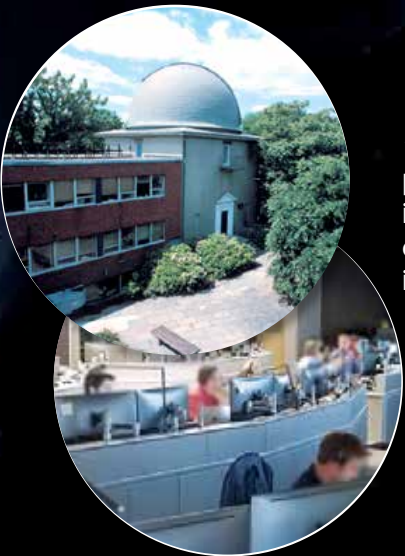


Named after Nobel Prize winner Subrahmanyan Chandrasekhar, Chandra is the first space telescope named after a person of color. It was launched in 1999 aboard NASA's Columbia, the first space shuttle commanded by a woman, astronaut Eileen Collins. **1**



**225**

people support the observatory — including more than **30** Northrop Grumman employees — at the Chandra X-ray Center in Massachusetts.



Scan the QR code to read more about NASA's Great Observatories.