Foreword

Taken from:  
*Hubble 2009: Science Year in Review*

Produced by NASA Goddard Space Flight Center  
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The full contents of this book include *Hubble* science articles, an overview of  
the telescope, and more. The complete volume and its component sections are  
available for download online at:  

[www.hubblesite.org/hubble_discoveries/science_year_in_review](http://www.hubblesite.org/hubble_discoveries/science_year_in_review)
Foreword

In 1609, visionary Italian scientist Galileo Galilei turned the newly invented optical device of his day—the telescope—to view the heavens for the first recorded time. His observations showed conclusively that there were astronomical bodies (the moons of Jupiter) that did not revolve around Earth, thus validating a radical, new model of the solar system. He also discovered craters on the Moon, spots on the Sun, and wrote that “the Milky Way is nothing else but a mass of innumerable stars planted together in clusters.”

Four hundred years later, in celebration of these achievements, the United Nations designated 2009 as the International Year of Astronomy. Activities were held by many organizations around the globe “to help the citizens of the world rediscover their place in the universe through the day- and night-time sky, and thereby engage a personal sense of wonder and discovery.”

In this celebratory year, the astronomical community also observed another landmark: the final on-orbit refurbishment of the Hubble Space Telescope, the remarkable descendent of Galileo’s elementary, but transformative, instrument. Five days of spacewalks by astronauts aboard the Space Shuttle Atlantis during Servicing Mission 4 (SM4) achieved all the mission’s ambitious goals. Among these were: replacing a broken command and science data formatter; installing new gyro, batteries, and insulation; repairing two malfunctioning science instruments, and installing two new, more powerful ones—a wide-field camera and an ultraviolet spectrograph. Hubble is now equipped with more sensitive scientific instrumentation than at any point in its history.

To honor the historic significance of the mission and the year, the crew of Atlantis carried a replica of one of Galileo’s first telescopes onboard the Shuttle. Separated by centuries but joined in the timeless quest for knowledge, both instruments share the distinction of transforming their times. With over 900,000 observations taken to date and over 8,600 peer-reviewed scientific papers published with its data, Hubble has indeed claimed a legacy as one of the most significant and productive science instruments of the modern age.

This volume recounts the events and results of the servicing mission, highlights a small portion of the science released this year, and profiles various behind-the-scenes individuals representing the thousands whose contributions have made Hubble the present fulfillment of Galileo’s far-reaching dreams.
More than 12 billion years of cosmic history are shown in this panoramic view of thousands of galaxies in various stages of development. This Hubble image was made from mosaics taken in September and October 2009 with the newly installed Wide Field Camera 3 and in 2004 with the Advanced Camera for Surveys. The view covers a portion of the southern field of a large galaxy census called the Great Observatories Origins Deep Survey, a deep-sky study by several observatories conducted to trace the evolution of galaxies.
“All truths are easy to understand once they are discovered; the point is to discover them.”

— Galileo Galilei