

# THE WAGNER FREE INSTITUTE OF SCIENCE

Fall 2017 Course  
HISTORY OF SCIENCE SERIES  
**The Cosmos: A History of Modern Astronomy**  
Professor Darin Hayton

This course will be held at the **Independence Branch of the Free Library**, located at 18 S. 7th Street (7th and Market Streets), Philadelphia.

6 Wednesdays, September 27 - November 1, 2017

LECTURES ARE HELD FROM 6:15 to 7:30 PM

## Course Description

When astronomers in the early 17th century turned the newly-invented telescope at the heavens, they saw things people had never seen before. These new observations challenged accepted ideas about the size, age, and very nature of the universe, as well as our place in it. From Galileo's discovery of the moons of Jupiter, to Herschel's discovery of Neptune, to Hubble's discovery of the expanding universe, astronomers have challenged our comfortable assumptions about the universe. This course will focus on the work of some of these astronomers and the key problems they tried to solve. We will also see how astronomy promised to solve mundane, practical problems that were very important to governments, such as standardized time and commerce.

## Lectures

### 1. Wednesday, September 27, 2017 - Telescopes and the Shape of the Universe

In 1608 scholars invented a new device, the telescope, which not only revealed previously hidden parts of the universe, but also raised challenging philosophical problems. Over the next two centuries, craftsmen developed new and improved telescopes while astronomers pointed them at the heavens, discovering new celestial objects and reshaping our understanding of the universe.

### 2. Wednesday, October 4, 2017 - The Problem of Nebulae

One of the thornier problems that the telescope introduced were nebulae—indistinct, fuzzy, bright spots in the heavens. For nearly two centuries astronomers struggled to determine what these objects were and to fit them into a new and expanding view of the universe.

### 3. Wednesday, October 11, 2017 - Planets, Asteroids, and Vulcan

In the late 18th century William Herschel noticed a bright spot in the sky. At first, he thought it was a comet but after further observations by other astronomers accepted that he had discovered a planet. Soon astronomers were looking for and finding other objects, including planets, asteroids, and “planets.”

### 4. Wednesday, October 18, 2017 - Time, Commerce, and the Stars

Seemingly esoteric astronomy offered solutions to practical, economic problems that were particularly important for growing nations and expanding empires. Consequently, governments increasingly turned to astronomers to help standardize time, advance and maintain long-distance trade and commerce, and explore the world.

### 5. Wednesday, October 25, 2017 - The Great Debate and Our Expanding Universe

On April 26, 1920 Harlow Shapley and Heber Curtis debated the nature, size, and location of “spiral nebulae.” The debate raised once again questions about the nature and size of our universe. Edwin Hubble took up these questions

and by the end of the decade had revealed that the universe was not only much larger but also expanding at an incredible rate.

## **6. Wednesday, November 1, 2017 - Extraterrestrial Life**

Since the early seventeenth century people have hoped and worried that other planets are inhabited by sentient creatures. At times we have imagined that those creatures resemble humans. At times we assumed that they did not. In either case, the existence of extraterrestrial life has raised all sorts of thorny philosophical, religious, social, and scientific issues.

November 8, 2017 - make-up class (if needed)

### **Suggested Readings**

General Histories—

Michael Hoskins, *The History of Astronomy. A Very Short Introduction.*

Michael Hoskins, *The Cambridge Illustrated History of Astronomy.*

Michael Crowe, *Modern Theories of the Universe.*

Telescope—

Richard Dunn, *The Telescope. A Short History.*

Planetary Discovery—

Michael Hoskins, *William and Caroline Herschel*

Tom Levenson, *The Hunt for Vulcan.*

Extraterrestrial Life—

Steven Dick, *Plurality of Worlds: The Extraterrestrial Life Debate from Democritus to Kant.*

Michael Crowe, *Extraterrestrial Life Debate, 1750-1900.*

Steven Dick, *Many Worlds.*

**Dr. Darin Hayton** is a historian of science whose research focuses on the creation and dissemination of scientific knowledge, especially the science of the stars (astrology and astronomy) in pre-Modern Europe and the late Byzantine Empire. In addition to various articles on the history of early modern astronomy, he has published a book, *The Crown and the Cosmos. Astrology and the Politics of Maximilian I.* His new project examines the place of astronomy at the Byzantine imperial court in 14th-century Constantinople. Darin enjoys speaking at public events, such as the Philadelphia Science Festival, A Taste of Science, and Science on Tap. He is an Associate Professor of the history of science and Chair of the History Department at Haverford College. Learn more about him and his work at <http://dhayton.haverford.edu>.