

UNIVERSITY OF MARYLAND

Life in the Universe - Astrobiology ASTR 380
Spring 2018

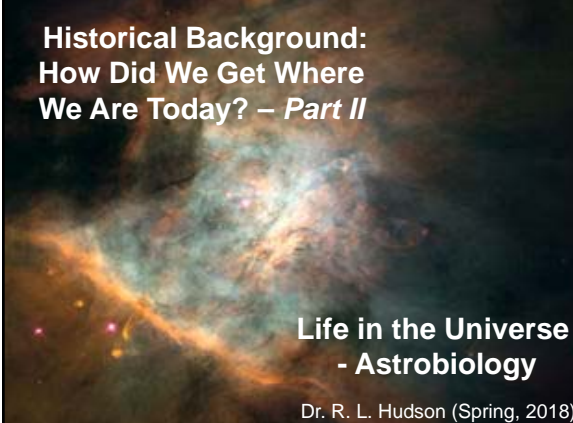
Home Course Description Instructor Textbook Your Work University Policies

Handouts, Answers, and More:	Welcome! Welcome to the syllabus and on-line material for ASTR 380, a 3-credit course designed primarily for non-science majors at the University of Maryland. Here you will find information about the course, the instructor, and the textbook. Study advice and why also are included.	Recent Changes Announcements, advice, practice work, and so on will be posted here.
Class Meetings		Disclaimer These pages are for educational purposes. Their content does not necessarily reflect endorsement by the University, by any state or federal agency, or by any commercial entity.
Study Advice		
Software and Maps	This semester the course is being taught in room AT2, 2400 on Tuesday and Thursday afternoons at 2:00 - 3:15 PM by Dr. Rogger L. Hudson, a lecturer in the Department of Astronomy.	
Astro-news		
Astro-links		
Easy Money!		

Pages maintained by Dr. Rogger Hudson
Last changed: January 20, 2018

<http://www.astro.umd.edu/~rhudson/ASTR380/>

**Historical Background:
How Did We Get Where
We Are Today? – Part II**



**Life in the Universe
- Astrobiology**



Dr. R. L. Hudson (Spring, 2018)



Long Been Known ...

Sun, Moon, planets and stars move about the sky.

Earth is spherical.

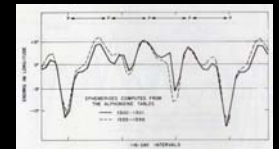
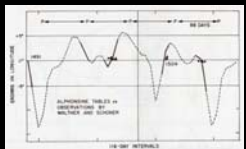
Its size is known too.

	
Claudius Ptolemy ca. 150 AD Geocentric System (Obvious!)	Nicholas Copernicus 1473 - 1543 Heliocentric System (Not so obvious!)

The Mercury Test

Which model makes the more-accurate predictions, that of Ptolemy (geocentric) or Copernicus (heliocentric)?

Ptolemy	Copernicus
	

Reference: O. Gingerich, The Eye of Heaven (1993)



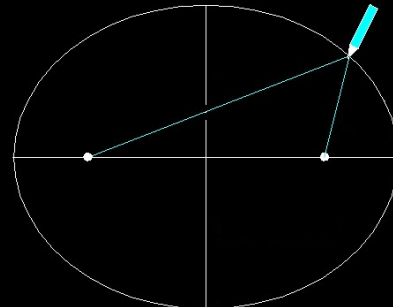
Tycho Brahe
1546 - 1601
Denmark



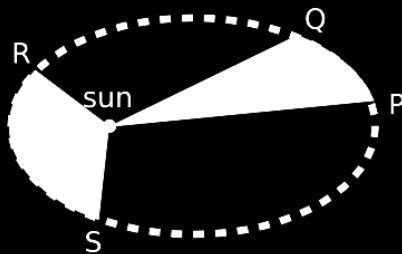
Johannes Kepler
1571 - 1630
Austria



Drawing an Ellipse



Ellipse Stuff



Kepler's Three Laws of Planetary Motion

Elliptical orbits

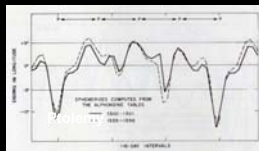
Orbital speed is **inversely** proportional to distance from the Sun

$$\frac{a^3}{P^2} = \left(\begin{array}{l} \text{a constant value for planets} \\ \text{in the Solar System} \end{array} \right)$$

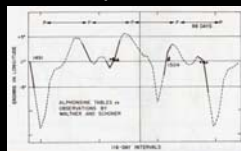
The Mercury Test

Which model makes the more-accurate predictions, that of Ptolemy (geocentric) or Copernicus (heliocentric)?

Ptolemy



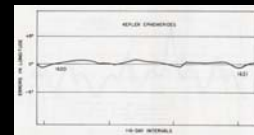
Copernicus



Reference: O. Gingerich, The Eye of Heaven (1993)

The Mercury Test

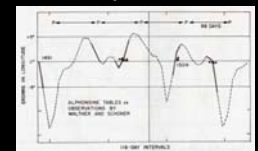
Kepler



Ptolemy



Copernicus



Reference: O. Gingerich, The Eye of Heaven (1993)



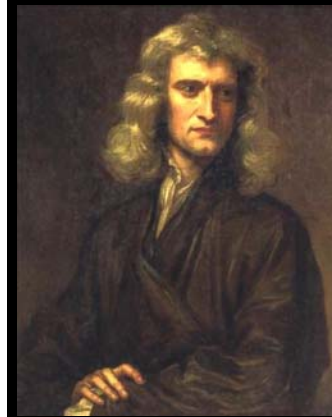
Galileo Galilei

1564 - 1642

Studies of Motion

**Early Telescope
Moon's Surface
The Milky Way**

**Sunspots
Moons of Jupiter
Phases of Venus**



**Isaac Newton
1642 - 1727**

**The Most
Influential
Scientist of
All Time**



**Isaac Newton -
born at
Woolsthorpe
Manor**

**Woolsthorpe
Manor - 1986**



**Trinity College
Cambridge University**



Newton's Law Of Gravity

$$F = G \frac{m_1 m_2}{r^2}$$

An Inverse Square Law

