

HISTORY OF SCIENCE 323 / HISTORY 323

The Scientific Revolution

Spring 2013

2:30–3:45 pm MW

984 Memorial Library (Mondays)

B223 Van Vleck (Wednesdays)

Florence Hsia

229 Bradley Memorial

1:30–3:30 pm Tu & by appt.

262-3971

fhsia@wisc.edu

Robin Rider

990 Memorial Library

1:30–2:30 pm M & by appt.

262-2809

rrider@library.wisc.edu

COURSE SUMMARY

An investigation of renaissance and revolution in European science, beginning in 1543 with the heliocentric astronomy of Nicolaus Copernicus and ending with Isaac Newton's death in 1727. The course pays particular attention to issues of tradition and novelty in natural knowledge, institutional settings for scientific activity, the multifaceted relationship between science and religion, as well as manuscript traditions and the transition to print. Topics covered include the Copernican cosmology and Galileo's trial, the mechanical philosophy, Newtonianism, the significance of new scientific organizations like the Royal Society of London and the Paris Academy of Sciences, the role of science in European exploration and expansion, public perceptions of science and its practitioners, and scientific writing and communication. Many classes will be held in the seminar room in Special Collections (984 Memorial Library), where class participants will have the opportunity to work with materials from the fifteenth through the eighteenth centuries.

This class emphasizes the skills of analyzing historical documents and of constructing persuasive arguments about historical questions. **It is vital that you complete the readings assigned for each class session before coming to class. Bring the readings with you to all class sessions.**

COURSE REQUIREMENTS AND GRADING

1. Attend classes. **Please note that we are meeting in two different classrooms!**
2. Prepare assigned readings.
3. Grades will be based on two (2) take-home essay exams, one (1) in-class group presentation and one (1) final project. Grades will be calculated using the following rough guidelines:

exam 1 due in class, Feb 25 (Monday)	~25%
exam 2 due in class, April 22 (Monday)	~25%
one in-class presentation, April 29/May 1	~25%
final project due by 5:00 pm, May 15 (Wednesday)	~25%
4. Graduate students should also enroll in History of Science 623 (for assignments, see the HS 623 syllabus.)

COURSE POLICIES

We will make every effort to honor requests for reasonable accommodations made by individuals with disabilities. If you think you may qualify for accommodation, please contact the McBurney Disability Resource Center at 263-2741 <<http://www.mcburney.wisc.edu/>> to establish your eligibility for services. If you need such accommodation, please let us know as soon as possible in the semester. All requests are confidential.

Academic honesty is expected of students at the University of Wisconsin-Madison in compliance with the student code of conduct. All written work that you turn in under your name should be solely your work. Both paper and internet sources must be acknowledged; failure to understand what counts as plagiarism is not an adequate excuse. Plagiarism and other forms of academic misconduct carry penalties. Feel free to talk to us if you have any

questions about how to properly cite sources in your written work. Consult the Writing Center's guide to quoting sources < <http://writing.wisc.edu/Handbook/QuotingSources.html>>.

REQUIRED COURSE READINGS

Course readings are available via Learn@UW except for those in Peter Dear, *Revolutionizing the sciences* (2001 or 2009 edition). The Dear textbook can be purchased at the University Book Store or consulted on reserve at College Library, Helen C. White Hall.

SCHEDULE OF READINGS AND ASSIGNMENTS

- Jan 23 (W) **introduction** (B223 Van Vleck)
- Jan 28 (M) *WORKSHOP: HOW TO READ AN EARLY MODERN BOOK* (984 Memorial Library)
 Twyman, *The British Library guide to printing*, pp. 18–34
 Kusakawa, *Picturing the book of nature*, pp. 29–47 plus notes on pp. 262–265
- Jan 30 (W) **the Aristotelian cosmos** (B223 Van Vleck)
 Aristotle, *Physics*, book II, chaps. 3, 7–8
 Dear, introduction; chap. 1, section I (pp. 1–14 in 2009 edition)
- Feb 4 (M) **the Greek cosmological tradition** (984 Memorial Library)
 daily phenomena (photo, diagrams); Ptolemy, *Almagest*, book I, chaps. 2–4, 7
- Feb 6 (W) **the Greek astronomical tradition** (B223 Van Vleck)
 planetary phenomena (diagrams, photo); Ptolemaic models (diagrams)
 Ptolemaic model (Mars): <http://astro.unl.edu/classaction/animations/renaissance/marsorbit.html>
- Feb 11 (M) *WORKSHOP: FROM SCRIPT TO PRINT* (984 Memorial Library)
 astronomical renaissance
 Peurbach, *New theoricis of the planets* (c.1474), images
 Sacrobosco, *Sphere* (1482), images
 Sacrobosco, *Sphere* (1488), Tomash copy
 Dear, chap. 1, sections II–III and chap. 2, sections I–II (pp. 14–23, 29–36 in 2009 edition)
 Sacrobosco tour: <http://www.hps.cam.ac.uk/starry/sacrobosco.html>
 Sacrobosco survey: <http://www.ghc.usp.br/server/Sacrobosco/Sacrobosco-ed.htm>
- Feb 13 (W) **medical renaissance** (B223 Van Vleck)
 Mondino de' Luzzi, *Anatomy* (1316), in *Fascicolo di medicina* (1493), illustration
 Vesalius, *On the fabric of the human body* (1543), selections
 Dear, chap. 2, section III (36–40 in 2009 edition)
 Vesalius details: <http://hos.ou.edu/galleries/16thCentury/Vesalius/1543-det/>
 Vesalius initials: <http://hos.ou.edu/galleries/16thCentury/Vesalius/1543-initials/>
- Feb 18 (M) **heliocentrism** (984 Memorial Library)
 Copernicus, *On the revolutions* (1543), selections; diagrams
 Dear, chap. 2, section II (32–36 in 2009 edition)
 retrograde motion: <http://astro.unl.edu/classaction/animations/renaissance/retrograde.html>
- Feb 20 (W) **responses to heliocentrism** (B223 Van Vleck)
 Copernicus, *On the revolutions* (1543), 'To the reader concerning the hypotheses'
 Brahe, *Instruments [Mechanica]* (1602), illustrations; diagrams
 Tycho Brahe, *On the most recent phenomena* (1588/1610), selections
 Dear, chap. 2, section IV and chap. 6, section I (pp. 40–43, 99–101 in 2009 edition)

- Feb 25 (M) *WORKSHOP: COMPARING EDITIONS* (984 Memorial Library) | **Exam 1 due in class**
- Feb 27 (W) **heliocentrism** (B223 Van Vleck)
 Kepler, *Cosmographical mystery* (1596), illustration; diagrams
 Kepler, *Rudolphine tables* (1627), illustration
 Galileo, *Sidereal messenger* (1610), selections
 Dear, chap. 4, sections I–III + chap. 6, section II (pp. 64–77, 101–106 in 2009 edition)
- Mar 4 (M) **the Galileo affair (I)** (984 Memorial Library)
 timeline; Castelli-Galileo letters (1613)
 Council of Trent decrees
 Venus phases (geo): <http://astro.unl.edu/classaction/animations/renaissance/ptolemaic.html>
 Venus phases (helio): <http://astro.unl.edu/classaction/animations/renaissance/venusphases.html>
- Mar 6 (W) **the Galileo affair (II)** (B223 Van Vleck)
 timeline; Bellarmine-Foscarini letter (1615)
 Inquisition & Index documents (1616)
 Vatican letters (1631)
 Galileo, *Dialogue on the two chief world systems* (1632), selections
- Mar 11 (M) *WORKSHOP: PRINTING CONTROVERSIES* (984 Memorial Library), including visit to Silver Buckle Press
 Volker R. Remmert, “In the sign of Galileo: pictorial representation in the 17th-century Copernican debate,” *Endeavour* 27.1 (2003): 26–31
- Mar 13 (W) **the skeptical crisis** (B223 Van Vleck)
 Descartes, *Discourse on the method* (1637), selections
 Vespucci illustrations
Of two wonderful Popish monsters (1586), selections
 Paré, *On monsters and prodigies* (1573), selections
 Dear, chap. 5, section I (pp. 79–82 in 2009 edition)
- Mar 18 (M) **the Baconian project** (984 Memorial Library)
WORKSHOP: PRINTING FACTS
 Bacon, *Great instauration* (1620), title page; ‘Preparative’
 Bacon, *Sylva sylvarum* (1627), selections
 Dear, chap. 3, sections III–IV (pp. 55–63 in 2009 edition)
- Mar 20 (W) **experiment** (B223 Van Vleck)
 Galileo, *Dialogue on the chief two world systems* (1632), selection
 Boyle, “New experiments,” *Philosophical transactions* 3 (1668): 581–600
 Dear, chap. 7 (pp. 127–44 in 2009 edition)
- March 25–27 **spring break (no class meetings)**
- April 1 (M) *WORKSHOP: PRINTING GENRES* (984 Memorial Library)
 Charles Webster, *The great instauration* (London, Duckworth: 1975), 465–83, 546–48
- April 3 (W) **mechanical philosophies** (B223 Van Vleck)
 Descartes, *Principles of philosophy* (1644/1647), selection
 Dear, chap. 5, section II (pp. 83–85 in 2009 edition)

- April 8 (M) **the Cartesian world** (984 Memorial Library)
Descartes, *The world* (1633/1677), chaps. 5–7
Descartes, *Principles of philosophy* (1644), illustration
Descartes, *Discourse on the method* (1637), title page
Fontenelle, *Conversations on the plurality of worlds* (1686), selection
Dear, chap. 5, sections III–VI (pp. 85–98 in 2009 edition)
- April 10 (W) **the Newtonian world** (B223 Van Vleck)
Newton, *Mathematical principles* (1687/1729), book 3, selection; notes
Newton, “The system of the world” (1685), selection; notes
Newton, *Opticks* (1706/1717), “Query 31,” selection
Dear, chap. 8, sections I–II (pp. 145–60 in 2009 edition)
- April 15 (M) **Newtonianism** (984 Memorial Library)
Newton, *Mathematical principles* (2nd ed., 1713), “General Scholium” and reading guide
Dear, chap. 8, sections II–III (pp. 154–63 in 2009 edition)
- April 17 (W) **scientific societies** (B223 Van Vleck)
Sprat, *History of the Royal Society* (1667), title page and illustration
Le Clerc, ‘Louis XIV visits the Academy of Sciences’, illustration
[Woodward], *Brief instructions* (1696)
Cassini, ‘Voyages to Cape Verde’ (1684)
Dear, chap. 6, sections IV–V (pp. 109–26 in 2009 edition)
- April 22 (M) **WORKSHOP: SCIENTIFIC JOURNALS | Exam 2 due in class** (984 Memorial Library)
- April 24 (W) **WORKSHOP: SCIENTIFIC JOURNALS** (984 Memorial Library)
- April 29 (M) **PRESENTATIONS** (984 Memorial Library)
- May 1 (W) **PRESENTATIONS** (984 Memorial Library)
- May 6 (M) **WORK SESSION** (984 Memorial Library)
- May 8 (W) **science and society** (B223 Van Vleck)
Bacon, *Great instauration* (1620), *Sylva sylvarum* (1627), title pages
Bacon, *New Atlantis* (1627), selections;
Swift, *Gulliver’s travels* (1726/1727), part 3, selections
- May 15 (W) **Final project due Wednesday, May 15, by 5:00 pm**