

HISTORY OF SCIENCE 323 / HISTORY 323

The Scientific Revolution

Fall 2013

2:30–3:45 pm TTh

B223 Van Vleck (Tuesdays)

984 Memorial Library (Thursdays)

Florence Hsia

229 Bradley Memorial

1:00–3:00 pm Wed. & by appt.

262-3971

fchsia@wisc.edu

Robin Rider

990 Memorial Library

1:00–2:00 pm Thurs. & 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This class emphasizes the skills of analyzing historical documents and of constructing persuasive arguments about historical questions.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. Participate in workshops.
3. Grades will be based on six (6) short written assignments, one (1) in-class group presentation and one (1) final project. Grades will be calculated using the following rough guidelines:

six (6) short written assignments	~60%
one in-class presentation, December 3/5	~15%
final project due by 5:00 pm, December 19 (Thursday)	~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

- Sept 3 (T) **introduction** (B223 Van Vleck)
- Sept 5 (Th) **WORKSHOP 1: HOW TO READ AN EARLY MODERN BOOK** (984 Memorial Library)
Twyman, *The British Library guide to printing* (1998), pp. 18–34
- Sept 10 **the Aristotelian cosmos** (B223 Van Vleck)/**written assignment 1 due**
Aristotle, *Physics*, book II, chaps. 3, 7–8
Dear, introduction; chap. 1, section I (pp. 1–14 in 2009 edition)
- Sept 12 **the Greek cosmological tradition** (984 Memorial Library)
daily phenomena (photo, diagrams); Ptolemy, *Almagest*, book I, chaps. 2–4, 7
- Sept 17 **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>
- Sept 19 **WORKSHOP 2: TRADITIONS** (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.ghsc.usp.br/server/Sacrobosco/Sacrobosco-ed.htm>
- Sept 24 **medical renaissance** (B223 Van Vleck)/**written assignment 2 due**
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/>
- Sept 26 **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>
- Oct 1 **responses to heliocentrism** (B223 Van Vleck)
Copernicus, *On the revolutions* (1543), 'To the reader concerning the hypotheses'
Brahe, *Instruments [Mechanica]* (1602), illustrations; diagrams
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)
- Oct 3 **WORKSHOP 3: IMAGES** (984 Memorial Library)
Kusukawa, *Picturing the book of nature* (2012), pp. 29–47 plus notes on pp. 262–265
- Oct 8 **heliocentrism** (B223 Van Vleck)/**written assignment 3 due**
Kepler, *Cosmographical mystery* (1596), illustration; diagrams
Kepler, *Rudolphine tables* (1627), illustration
Galileo, *Sidereal messenger* (1610), selections

- Oct 10 Dear, chap. 4, sections I–III + chap. 6, section II (pp. 64–77, 101–106 in 2009 edition)
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>
- Oct 15 **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
- Oct 17 **WORKSHOP 4: CONTROVERSIES** (984 Memorial Library)
 Remmert, “In the sign of Galileo: pictorial representation in the 17th-century Copernican debate,” *Endeavour* 27.1 (2003): 26–31
- Oct 22 **the skeptical crisis** (B223 Van Vleck)/**written assignment 4 due**
 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)
- Oct 24 **WORKSHOP 5: BACONIANISM** (984 Memorial Library)
 Bacon, *Great instauration* (1620), title page; ‘Preparative’
 Bacon, *Sylva sylvarum* (1627), selections
 Webster, *The great instauration* (1975), pp. 465–83, 546–48
 Dear, chap. 3, sections III–IV (pp. 55–63 in 2009 edition)
- Oct 29 **experiment** (B223 Van Vleck)/**workshop 5 analysis due**
 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)
- Oct 31 **experiment** (984 Memorial Library)/tour of Silver Buckle Press
 Shapin, “The invisible technician,” *American scientist* 77.6 (1989): 554–63
- Nov 5 **mechanical philosophies** (B223 Van Vleck)
 Descartes, *Principles of philosophy* (1644/1647), selection
 Dear, chap. 5, section II (pp. 83–85 in 2009 edition)
- Nov 7 **WORKSHOP 6: Fontenelle and 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)
- Nov 12 **the Newtonian world** (B223 Van Vleck)/**written assignment 6 due**
 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)
- Nov 14 **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)

- Nov 19 **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)
- Nov 21 **WORK SESSION: SCIENTIFIC JOURNALS** (984 Memorial Library)
- Nov 26 **WORKSHOP: SCIENTIFIC JOURNALS** (984 Memorial Library)
- Nov 28 (Th) **Thanksgiving recess**
- Dec 3 **PRESENTATIONS** (984 Memorial Library)
- Dec 5 **PRESENTATIONS** (984 Memorial Library)
- Dec 10 **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
- Dec 12 **WORK SESSION** (984 Memorial Library)
- Dec 19 (Th) **Final project due Thursday, December 19 by 5:00 pm**