

# HPSC0139: History of Science 2

## Course Syllabus

2020-21 session | Simon Werrett | [s.werrett@ucl.ac.uk](mailto:s.werrett@ucl.ac.uk)

### Course Information

This course offers an in-depth exploration of current concerns and issues in the history of science. The course introduces students to recent work in the field through an investigation of a wide range of global locations and topics, which might come from any period between antiquity and the recent past. Indicative topics may include, for example, postcolonial approaches to the history of science; Islamic medicine; scientific instruments and material culture; historical anthropology and archaeology of science; relations of science and art; science and religion; and relations of science and the environment. Specific topics may change each year. Assessment is by two 2500 word essays.

### Basic course information

Assessment:	2 x 2500-word essays; 50% each
Timetable:	Go to the common timetable: <a href="http://www.ucl.ac.uk/sts/hpsc">www.ucl.ac.uk/sts/hpsc</a>
Prerequisites:	No prerequisites
Required texts:	None
Course tutor(s):	Simon Werrett
Contact:	<a href="mailto:s.werrett@ucl.ac.uk">s.werrett@ucl.ac.uk</a>
Web:	<a href="http://www.ucl.ac.uk/silva/sts/staff/werrett">www.ucl.ac.uk/silva/sts/staff/werrett</a>
Office location:	Home/ 22 Gordon Square
Office hours:	Mondays 10am; Tuesdays 9am; or by appointment (please email).

## Schedule

UCL Week	Topics	Date
20	Global Histories of Science	01/11
21	Zimbabwe: The Epistemology of the Hunt	01/18
22	The Medieval Islamic Hospital	01/25
23	Ten Thousand Things in Late Ming China	02/1
24	Essay Guidance session	02/08
25	<b>READING WEEK: No classes</b>	02/15
26	Istanbul: Ottoman Science in the Seventeenth Century	02/22
27	The First Russian Circumnavigation	03/01
28	Mexico's Materia Medica in the Eighteenth Century	03/08
29	Go-Betweens in Calcutta, 1770-1820	03/15
30	The Japanese Exploration of Sakhalin Island	03/22

## Global Histories of Science

The theme for 2020-21 is "Global Histories of Science". Much history of science has focused on Europe to the extent that surprisingly little has been written about science, or natural knowledge more generally, in other parts of the world. This is changing, as scholars from around the globe are beginning to assess in depth a variety of local natural knowledges, often in the framework of postcolonial studies of science. This module uses a series of case studies in locations ranging from precolonial Africa to nineteenth-century India to gain a sense of the diversity of scientific traditions around the world. In addition to a short lecture offering context, each class will focus on discussion of one required reading, with others for background and further exploration.

## Assessments

### Summary

	Description	Deadline	Word limit	Feedback returned by
Essay 1	50% of final mark	February 22	2500 words	

Essay 2	50% of final mark	April 19	2500 words	
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### ASSESSMENTS: ESSAY 1

You are required to write two essays of approximately and no more than 2500 words. Suppose you were asked to write a textbook entry on the history of science in a certain national, regional, or international context. "Science" can be interpreted to include technology and medicine, or whichever term is relevant for the place and time in question. The editor has asked you to choose **two** of the following options to write about. Each essay should be on a different option. Using the syllabus literature and other relevant sources you can find (they should ideally be texts and images from academic journals or books, or museum objects) describe (1) the principal events in the period in the place in question (2) persons who were involved in the use of natural knowledge (3) important theories, ideas, texts, objects, instruments or practices relating to the natural world used in this time and place, and (4) historiographical issues raised by the place and period in question. The definition of the regions below is open to interpretation and you may wish to address this in the essay. Include references and a bibliography. Please read the STS Student Handbook for advice on word counts and late penalties.

- (1) Precolonial Africa
- (2) The Arabic World in the Middle Ages
- (3) Late Ming China
- (4) Istanbul in the seventeenth century
- (5) Russia 1600-1850
- (6) South America 1700-1800
- (7) India in the eighteenth century
- (8) Tokugawa Japan

#### Criteria for assessment

The departmental marking guidelines for individual items of assessment can be found in the STS Student Handbook. In addition to the criteria indicated in the STS Student Handbook, the following are the main criteria on which your research essay will be marked. There are no set numbers/ percentages associated with these criteria but we will give you qualitative feedback based on them.

#### Referencing

You must reference all quotes and all references/ summaries of books, etc. Pick one system for referencing and stick to it. Refer to individual page numbers, not just whole texts, whenever possible. Make sure you are clear what plagiarism means and do not plagiarize in the essay.

#### Bibliography

You need to supply a bibliography of all works referenced. You must supply author, title, date, place of publication and publisher. Essays should prioritize use of the readings given in the syllabus.

#### Answers the Question

Read the question carefully and answer it specifically - do not give irrelevant material or drift into answering other questions.

### **Organisation**

Is the essay clearly laid out with relevant sections and headings?

### **Clarity**

We place great emphasis on clarity of argument and expression. Avoid ambiguity and vagueness. Do not assume your reader already knows what you are talking about. Try to keep your line of argument clear. Accurate spelling, grammar, and punctuation also improve clarity.

### **Argumentation**

Are the main claims of the essay clear, coherent and persuasive? Are they properly supported by the evidence available?

### **Reading/ use of sources**

How well have the readings and other resources been used? Does the essay reflect them accurately? Is the essay overly dependent on one source?

### **Independent critique?**

Does the essay offer some independent critique or thought on the question or does it merely report what is in the literature?

### **Historiography?**

How aware is the essay of assumptions and methods used to construct a history or to evaluate it? Does the essay discuss what historians have said about the topic and offer some critique of them? Note that some discussion of historiography is a requirement for all essays.

### **Aim of the course**

The aim of the course is to offer an introduction to thinking about the global history of science in a variety of times and places, but with a focus on the early modern period (16<sup>th</sup> to 18<sup>th</sup> centuries). Students should gain a sense of different approaches, uses, and understandings of nature in different places around the world, and be able to reflect on the ways historians have come to appreciate and make sense of global histories of science in recent years.

### **Objectives of the course**

By the end of the course, it is hoped that you will have acquired :

- \*an understanding of different approaches to the making and use of natural knowledge in a variety of global contexts.
- \* an in-depth knowledge of elements of this history, demonstrated in essay assessments.
- \* key essay writing skills; the ability to select the most important facts, to marshal those in argument and an awareness of the strengths and weaknesses of that argument.
- \* historiographical skills; an awareness of anachronism and the methods of writing the history of science.

### **Schedule of Classes.**

**January 11. Introduction**Essential

Clapperton Mavhunga, "Introduction," to Clapperton Mavhunga, (ed.), *What Do Science, Technology, and Innovation Mean from Africa?* (Cambridge, MA: The MIT Press, 2017), 1-29.

Optional

Sujit Sivasundaram, "Sciences and the Global: On Methods, Questions, and Theory," *Isis* 101, no. 1 (2010): 146-58.

Kapil Raj, "Beyond Postcolonialism... and Postpositivism: Circulation and the Global History of Science," *Isis* 104, no. 2 (2013): 337-47.

Fa-ti Fan, "The Global Turn in the History of Science," *East Asian Science, Technology and Society: An International Journal* 6 (2012): 249-58.

Rohan Deb Roy, 'Decolonize Science: Time to End Another Imperial Era', <http://theconversation.com/decolonise-science-time-to-end-another-imperial-era-89189>

Projit Mukharji, "Cultures of Fear, Technonationalism and the Postcolonial Responsibilities of STS," *East Asian Science, Technology and Society: An International Journal* 6 (2012): 267-74. (Project Muse)

Lissa Roberts (ed.), "Situating Science in Global History: Local Exchanges and Networks of Circulation," *Itinerario* 33 (2009): 9-30.

J. B. Shank, "After the Scientific Revolution: Thinking Globally about the Histories of the Modern Sciences," *Journal of Early Modern History* 21 (2017): 377-393.

Kerstin Knopf, "The Turn Toward the Indigenous: Knowledge Systems and Practices in the Academy," *American Studies* 60 (2015): 179-200.

**January 18. Zimbabwe: The Epistemology of the Hunt**Essential

Clapperton Chakanetsa Mavhunga, *Transient workspaces: technologies of everyday innovation in Zimbabwe* (Cambridge, MA: MIT Press, 2014), introduction and chapter 2 "The Professoriate of the Hunt."

Optional

Shadreck Chirikure, "The Metalworker, the Potter, and the Pre-European African "Laboratory"," in Clapperton Mavhunga, (ed.), *What Do Science, Technology, and Innovation Mean from Africa?* (Cambridge, MA: The MIT Press, 2017), 63-78.

Helen Tilley, "Global Histories, Vernacular Science, and African Genealogies," *Isis* 101 (2010)

Kalle Kananoja, "Infected by the Devil, Cured by *Calundu* : African Healers in Eighteenth-century Minas Gerais, Brazil," *Social History of Medicine* 29 (2016): 490–511.

Philip J. Havik. "Hybridising Medicine: Illness, Healing and the Dynamics of Reciprocal Exchange on the Upper Guinea Coast," *Medical History* 60 (2016): 181-205.

Jonathan Roberts, "Medical Exchange on the Gold Coast during the Seventeenth and Eighteenth Centuries," *Canadian Journal of African Studies* 45 (2011): 480-523.

### January 25. The Medieval Islamic Hospital

#### Essential

Ahmed Ragab, *The Medieval Islamic Hospital: Medicine, Religion, and Charity* (Cambridge: Cambridge University Press, 2015), Introduction and chapter 5.

#### Optional

F. Jamil Ragep, "Islamic Culture and the Natural Sciences," in D. Lindberg & M. Shank (eds.), *The Cambridge History of Science Volume 2: Medieval Science* (Cambridge: Cambridge University Press, 2013), pp. 27-61).

Toby Huff, *The Rise of Early Modern Science: Islam, China and the West* (Cambridge: Cambridge University Press, 1993), chapter 2.

Ahmed Ragab, "Making History: Identity, Progress and the Modern-Science Archive," *Journal of Early Modern History* 21 (2017): 433-444.

### February 1. Ten Thousand Things in Late Ming China

#### Essential

Dagmar Schäfer, "Things (Wu) and Their Transformations (Zaowu) in the Late Ming Dynasty: Song Yingxing's and Huang Cheng's Approaches to Mobilizing Craft Knowledge," In *Entangled Itineraries: Materials, Practices, and Knowledges across Eurasia*, edited by Pamela H. Smith (Pittsburgh: University of Pittsburgh Press, 2019), 63-78.

#### Optional

Nathan Sivin, "Why the Scientific Revolution Did Not Take Place in China – or Did it?" *Environmentalist* 5 (1985): 39–50.

Benjamin A. Elman, *A Cultural History of Modern Science in China* (Harvard University Press, 2006), chapter 1 "The Jesuit Legacy".

Toby Huff, *The Rise of Early Modern Science: Islam, China and the West* (Cambridge: Cambridge University Press, 1993), chapters 7 and 8.

Laura Hostetler, "Global or Local? Exploring Connections between Chinese and European Geographical Knowledge During the Early Modern Period," *East Asian Science, Technology, and Medicine* 26 (2007): 117-135.

Joseph Needham, "Science and Society in Ancient China," in Needham, *The Grand Titration: Science and Society in East and West* (London: Taylor and Francis, 1969), 154-176.

Kenneth Pomeranz, *The Great Divergence: China, Europe, and the Making of the Modern World Economy* (Princeton: Princeton University Press, 2000).

Simon Schaffer, "Instruments as Cargo in the China Trade," *History of Science* 44 (2006): 217–46.

Qiong Zhang, *Making the New World Their Own Chinese Encounters with Jesuit Science in the Age of Discovery* (Leiden: Brill, 2015).

Nathan Sivin and G. L. Lloyd, "The Fundamental Issues of the Chinese Sciences," In *The Way and the Word: Science and Medicine in Early China and Greece* (Yale University Press, 2002), 188-238.

Jami, Catherine, and Han Qi. "The Reconstruction of Imperial Mathematics in China during the Kangxi Reign (1662-1722)," *Early Science and Medicine* 8, no. 2 (2003): 88-110.

Jami, Catherine, "Revisiting the Calendar Case (1664-1669): Science, Religion, and Politics in Early Qing Beijing," *Korean Journal of History of Science* 27 (2015): 459-477.

He Bian, "Introduction," *Know Your Remedies: Pharmacy and Culture in Early Modern China* (Princeton University Press, 2020), 1-19.

### **February 8. Essay writing guidance session**

### **February 15. READING WEEK**

### **February 22. Istanbul: Ottoman Science in the Seventeenth Century**

#### Essential

Harun Kuçuk, "Introduction," in *Science without Leisure: Practical Naturalism in Istanbul, 1660-1732* (University of Pittsburgh Press, 2019), Introduction.

Harun Kuçuk, "Istanbul and her Sciences," in *Science without Leisure: Practical Naturalism in Istanbul, 1660-1732* (University of Pittsburgh Press, 2019), chapter 1.

### Optional

Harun Kuçuk, "Early Modern Ottoman Science: A New Materialist Framework," *Journal of Early Modern History* 21 (2017): 407– 19.

Harun Kuçuk, "The Calendar: Copernicus for Tax Collectors," in *Science without Leisure: Practical Naturalism in Istanbul, 1660-1732* (University of Pittsburgh Press, 2019), chapter 4.

Daniel A. Stolz, "Introduction," in *The Lighthouse and the Observatory: Islam, Science, and Empire in Late Ottoman Egypt* (Cambridge: Cambridge University Press, 2018).

Daniel A. Stolz, "The Deaf Shaykh: Scholarly Astronomy in Late Ottoman-Egyptian Society," in *The Lighthouse and the Observatory: Islam, Science, and Empire in Late Ottoman Egypt* (Cambridge: Cambridge University Press, 2018), chapter 1.

Daniel A. Stolz, "Astronomers and Pashas: Viceregal Imperialism and the Making of State Astronomy," in *The Lighthouse and the Observatory: Islam, Science, and Empire in Late Ottoman Egypt* (Cambridge: Cambridge University Press, 2018), chapter 2.

Giancarlo Casale, *The Ottoman Age of Exploration* (Oxford: Oxford University Press, 2010).

## **March 1. The First Russian Circumnavigation**

### Essential

Simon Werrett, "Technology on Display: Instruments and Identities on Russian Voyages of Exploration," *Russian Review*, Vol. 70, no. 2 (July 2011): 380-396.

### Optional

Clare Griffin, "Bureaucracy and Knowledge Creation: The Apothecary Chancery," in *Information and Empire: Mechanisms of Communication in Russia, 1600-1854*, edited by Franklin Simon and Bowers Katherine (Cambridge, UK: Open Book Publishers, 2017), 255-86.

Rachel Koroloff, "Juniper: From Medicine to Poison and Back Again in 17th-Century Muscovy," *Kritika* 19 (2018): 697-716.

Yuri Slezkine, *Arctic mirrors: Russia and the small peoples of the North* (Cornell University Press, 1994), Introduction and Chapter 2 "The Unenlightened".



Valerie A. Kivelson, "Unclean Spirits Unleashed: Flying Bricks, Demonic Possession, and Blackmail in Russia, 1636," *Russian History* 40, no. 3/4 (2013): 315-30.

Michael D. Gordin, "The Importation of Being Earnest: The Early St. Petersburg Academy of Sciences," *Isis* 91, no. 1 (2000): 1-31.

Simon Werrett, "The Schumacher Affair: Reconfiguring Academic Expertise across Dynasties in Eighteenth-Century Russia," *Osiris* 25, no. 1 (2010): 104-26.

### March 8. Mexico's *Materia Medica* in the Eighteenth Century

#### Essential

M. Achim, "From rustics to savants: Indigenous materia medica in eighteenth-century Mexico," *Studies in History and Philosophy of Biological & Biomedical Sciences* 42 (2011): 275-284.

#### Optional

Maria Portuondo, "Constructing a Narrative: The History of Science and Technology in Latin America," *History Compass* 7/2 (2009): 500-522.

Emily Walcott Emmart, "An Aztec medical Treatise: The Badianus Manuscript," *Bulletin of the Institute of the History of Medicine* 3, no. 6 (1935): 483-506.

Juan Pimentel, "Stars & Stones: Astronomy and Archaeology in the Works of the Mexican Polymath Antonio León y Gama, 1735–1802," *Itinerario* 33 (2009): 61-77.

Antonio Barrera-Osorio, "Communities of Experts: Artisans and Innovation in the New World," in Antonio Barrera-Osorio, *Experiencing Nature: The Spanish American Empire and the Early Scientific Revolution* (Austin, TX: University of Texas Press, 2010), 56-80.

Martha Few, "Medical Mestizaje and the Politics of Pregnancy in Colonial Guatemala, 1660–1730," In *Science in the Spanish and Portuguese Empires, 1500–1800*, edited by Bleichmar Daniela, De Vos Paula, Huffine Kristin, and Sheehan Kevin (Stanford, CA: Stanford University Press, 2009), 132-46.

Iris Montero Sobrevilla, "The Slow Science of Swift Nature: Hummingbirds and Humans in New Spain," in *Global Scientific Practice in an Age of Revolutions, 1750-1850*, eds. Patrick Manning and Daniel Rood (Pittsburgh: University of Pittsburgh Press, 2016), 127–146.

Mary Norton, "The Chicken or the legue: Human-Animal Relationships and the Columbian Exchange" *American Historical Review* (Feb 2015): 28-60.

Daniela Bleichmar, *Visible Empire: Botanical Expeditions and Visual Culture in the Hispanic Enlightenment* (Chicago: The University of Chicago Press, 2012).

Daniela Bleichmar, "A Visible and Useful Empire: Visual Culture and Colonial Natural History in the Eighteenth-Century Spanish World," In *Science in the Spanish and Portuguese Empires, 1500–1800*, edited by Daniela Bleichmar, Paula De Vos, Kristin Huffine, and Kevin Sheehan (Stanford: Stanford University Press, 2009), 290-310.

Alain Schnapp, "Ancient Europe and Native Americans: A Comparative Reflection on the Roots of Antiquarianism," in Daniela Bleichmar and Peter C. Mancall, eds. *Collecting Across Cultures: Material exchanges in the early modern Atlantic world* (Philadelphia: University of Pennsylvania Press: 2011), 58-80.

Londa Schiebinger, "Scientific Exchange in the Eighteenth-Century Atlantic World," in *Soundings in Atlantic History*, edited by Bernard Bailyn and Patricia L. Denault (Cambridge, MA: Harvard University Press, 2009), 294–328.

Hugh Cagle, *Assembling the Tropics: Science and Medicine in Portugal's Empire, 1450-1700* (Cambridge: Cambridge University Press, 2018).

Pablo Gómez, *The Experiential Caribbean: Creating Knowledge and Healing in the Early Modern Atlantic* (Chapel Hill: University of North Carolina Press, 2017).

### March 15. Go-Betweens in Calcutta, 1770-1820

#### Essential

Kapil Raj, "Mapping Knowledge: Go-Betweens in Calcutta 1770-1820," in Simon Schaffer et al. (eds.), *The Brokered World: Go-betweenes and Global Intelligence, 1770-1820* (Sagamore Beach, MA: Science History Publications, 2009), pp. 105-150.

#### Optional

Deepak Kumar, "India," in Roy Porter, ed., *The Cambridge History of Science vol. 4: The Eighteenth Century* (Cambridge: Cambridge University Press, 2003), 669-687.

David Arnold, "Science under the Company," in David Arnold, ed. *Science, Technology and Medicine in Colonial India* (The New Cambridge History of India) (Cambridge: Cambridge University Press, 2000), 19-56.

Kapil Raj, "Colonial Encounters and the Forging of New Knowledge and National Identities: Great Britain and India, 1760-1850." *Osiris* 15 (2000): 119–134.

Projit Bihari Mukharji, "Historicizing "Indian Systems of Knowledge": Ayurveda, Exotic Foods, and Contemporary Antihistorical Holisms," *Osiris: A Research Journal Devoted to the History of Science and Its Cultural Influences* (2020): 228-248.

Deepak Kumar, *Science and the Raj: A Study of British India* (Oxford, 2006).

Seema Alavi, "Medical Culture in Transition: Mughal Gentleman Physician and the Native Doctor in Early Colonial India," *Modern Asian Studies* 42, no. 5 (2008): 853-97.

David Arnold, "Nehruvian Science and Postcolonial India," *Isis* 104, no. 2 (2013): 360-70.

## March 22. The Japanese Exploration of Sakhalin Island

### Essential

Brett L. Walker, "Mamiya Rinzō and the Japanese exploration of Sakhalin Island: cartography and empire," *Journal of Historical Geography* 33 (2007): 283-313.

### Optional

Shigeru Nakayama, "Japan," in Roy Porter, ed., *The Cambridge History of Science vol. 4: The Eighteenth Century* (Cambridge: Cambridge University Press, 2003), 698-717.

Robert Liss, "Frontier Tales: Tokugawa Japan in Translation," in Simon Schaffer et al. (eds.), *The Brokered World: Go-betweens and Global Intelligence, 1770-1820* (Sagamore Beach, MA: Science History Publications, 2009), pp. 1-47.

Federico Marcon, "Inventorying Nature: Tokugawa Yoshimune and the Sponsorship of Honzōgaku in Eighteenth-Century Japan," In *Japan at Nature's Edge: The Environmental Context of a Global Power*, edited by Ian Miller et al (University of Hawai'i Press, 2013), 189-206.

Che-chia, Chang. "A Wooden Skeleton Emerges in the Knowledge Hub of Edo Japan." In *Entangled Itineraries: Materials, Practices, and Knowledges across Eurasia*, edited by Pamela H. Smith (Pittsburgh: University of Pittsburgh Press, 2019), 258-282.

Yulia Frumer, "Japanese Reverse Compasses: Grounding Cognition in History and Society," *Science in Context* 31 (2018): 155-187.

Marcia Yonemoto, "Maps and Metaphors of the "Small Eastern Sea" in Tokugawa Japan (1603-1868)," *Geographical Review* 89, no. 2 (1999): 169-87.

## Course expectations

Students are expected to attend all classes, and to be prepared to discuss the readings which they should bring to class either in hard copy or electronic format. Students should read and make notes on essential texts, thinking of questions to ask about them in class. If a student cannot attend, please let the module tutor know beforehand.

## Important policy information

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Details of college and departmental policies relating to modules and assessments can be found in the STS Student Handbook [www.ucl.ac.uk/sts/handbook](http://www.ucl.ac.uk/sts/handbook)

All students taking modules in the STS department are expected to read these policies.