



## Hist Sci 555/Hist 600: Labworlds: Past and Present Spring 2019

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Office Hours: F 9:45-11:45

Class meets:  
T 1:20-3:15 pm  
Van Vleck B231

It's an interesting word, laboratory. But what does it mean?

Associated with many sites of manipulative labor in the pre-modern period, the nineteenth century laboratory was made exclusively scientific – and predominantly chemical. Today, the tables have turned once more and labs are everywhere, not just in university science departments and research institutes. Look around and you'll see the UW-Madison campus is littered with laboratories: the Art Department has its Glass Lab, and even History has a History Lab. Beyond campus, labs are pervasive elements of popular culture, from TV crime shows populated by improbably glamorous wo/men in white coats to coffee-making equipment that wouldn't look out of place in a science lab. So, what are labs? What are they for? And why do they capture the mood of the present so well? Join this class to learn how historians and scholars in related fields understand the lab, today and in the past. And take this opportunity to have your say by writing your own lab history or contribution to lab studies.

This class serves as either **capstone research seminar for history of science majors** or **History 600 seminar for History majors** but is open to any undergraduate interested in the subject matter provided they have taken at least one previous history class at UW-Madison, subject to the consent of the instructor. This course will introduce you to the process of *doing* history, not just reading about it. It will guide you through the steps involved in writing an original research paper using primary sources. These steps include selecting a topic, finding and interpreting sources (secondary as well as primary), constructing an argument, and writing and revising your paper. Other assessed work will include a short formal presentation, making this course a good route to the modern historian's most important skills: reading, writing and presenting.

## Credit Policy

The credit standard for this **3-credit** course is met by 135 hours of expected student engagement with course learning activities (i.e. at least 45 hours per credit), to include regularly scheduled meetings with instructor outside normal class time, reading, research, and writing, and other student work as described in the syllabus.

## Course Requirements and Assessment:

**All readings listed in the accompanying schedule are required.** Your understanding of their main content, argument and significance will be assessed through a **max. 500-word response to each set of readings, due on the date they are listed** (i.e. before our classroom discussion). (Each response is worth 5% of your grade; I haven't miscalculated – your 6 best marks out of the 7 possible will count.)

Please be aware that to get the most out of the course, and to receive the highest grades, you will need to extend your reading beyond these required readings, as appropriate to your chosen research topic.

Completion of the course requires submission of all assignments, including the final paper. Final letter grades will be calculated according to the following formula:

- attendance and participation (20%);
- 6 written reading responses (30%);
- **due April 2** annotated bibliography (5%);
- **on April 9/16** 15-minute research presentation (15%);
- **due April 26** outline and draft introduction (10%);
- **due May 7** final paper, 3,500 (+/-10%) words (20%). **Late papers will not be accepted.**

Please make a note of these due dates and **let me know ASAP** if you anticipate any problem in meeting these deadlines. It is your responsibility to make ensure you meet course requirements and deadlines.

## **Plagiarism and Scholarly Integrity:**

As with any course of this kind, it is your responsibility to avoid plagiarism. In the first instance, you are directed to the University of Wisconsin guidelines concerning plagiarism and scholarly integrity. If you are unclear in any specific instance – for example when writing the research paper required for this course – please ask for advice. Learning how correctly to acknowledge the contribution of other scholars, and understanding what constitutes originality, are essential to sound historical practice and are therefore skills this course is designed to help you acquire.

## **Course Objectives:**

By the end of this course you should:

1. understand why and how the laboratory has become an iconic space of modern science and be able to summarize its development;
2. be able to outline key changes in how historians have approached lab history since the late 1970s: how these were set in motion, why they mattered and what were their consequences;
3. appreciate lab studies as a field of study (distinct from institutional history);
4. be prepared to indicate what goals might be addressed by historical studies of the laboratory.

This course will also help you develop transferable skills in:

1. analyzing and criticizing written argument (reading the secondary literature);
2. evaluating and synthesizing information derived from a range of sources (reading, lectures, and informal discussions);
3. constructing and defending written and verbal arguments (your contributions in the classroom; your presentation; and your written work, especially your essay);
4. developing (historical) ideas of your own and positioning these with respect to the work of others (avoidance of plagiarism and more);

You will also gain experience in:

1. planning and executing mid-scale projects (your research paper);
2. working with others (mainly in class discussion);
3. interpreting historical sources (reading primary as well as secondary literature)

### **Guidance on Essay Writing:**

The course as a whole is designed to develop your essay-writing skills but you may find some or all of these additional resources useful:

Pearce, Robert. 2012. "How to Write a Good History Essay." *History Review*. Also available from me as a PDF.

Storey, William K. 2013. *Writing History: A Guide for Students*, 4<sup>th</sup> ed. Oxford: Oxford University Press.

"Writing a Research Paper" from the UW Writing Center. Available online at [wisc.edu](http://wisc.edu).

### **Schedule and Reading List**

#### **1. (1/22/19) Introduction: Writing History of Science**

**Come prepared to discuss your interests** so that I may begin to tailor some of the later parts of the course to suit you.

For some ideas about why we might write history of science, and how historians generally go about doing this, you may find it helpful to dip into:

Cahan, David. 2003. *From Natural Philosophy to the Sciences: Writing the History of Nineteenth-Century Science*. Chicago: Chicago University Press. Pick the chapter that appeals to you most.

#### **2. (1/29/19) Understanding the History of the Laboratory**

The main goal of this week's class is to provide an outline understanding of the historical development of the laboratory. But it will also begin to alert us to some of the major questions

historians have tried to address by writing laboratory history, the methods and approaches they have used, and the kinds of answers their studies have produced. Understanding matters such as these is important in defining a research question so that it engages the wider scholarly field as well as our own, individual interest.

Jackson, Catherine M. 2017. "The Laboratory." In *Companion to the History of Science*, ed. Bernard Lightman. New York: Blackwell-Wiley.

Kohler, Robert E. 2008. "Lab History: Reflections." *Isis*, 99: 761-768.

Smith, Pamela H. 2006. "Laboratories." In *The Cambridge History of Science: Volume 3, Early Modern Science*, edited by Roy Porter, Katherine Park and Lorraine Daston, 290-305. Cambridge: Cambridge University Press.

### **3. (2/5/19) Defining the Field: Primary and Secondary Literature**

This session follows up on the important issues raised in week 2. Our objective is to learn more about what defines a field of historical research – in our case, laboratory history.

**Come prepared to present a piece of secondary literature about any laboratory within the scope of the course that you find interesting. Your presentation should explain how you selected the study you have chosen and why you think it is interesting. This informal presentation should be no more than 3-5 minutes long. Visual aids are not required but feel free to use them if you find them helpful.**

An article will probably be most straightforward, though you may choose a collective volume or monograph if this suits your interests better. **You should email me ([cjackson8@wisc.edu](mailto:cjackson8@wisc.edu)) your chosen reading by lunchtime on Monday before class.** If your reading is an article, you should attach a copy as a PDF file. In the case of book length studies, you should provide a physical copy of the book, which I will return to you in class.

If you are having difficulty selecting a piece of writing, **email me by the Friday before class** so that I can provide you with a few pointers.

#### **4. (2/12/19) What are Lab Studies and what are they good for?**

This session examines the development of lab studies, in order to explain the kinds of questions this strand of scholarship was intended to address. The section “Lab Studies as a Field: Past, Present and Future” in Jackson (2017) provides a brief summary of these changes.

**By this week’s session you should give an indication of which aspects of lab history you find most interesting, so I can help you begin to define your research topic. If you wish to meet with me to discuss your ideas, please contact me to arrange a meeting.**

Collins, Harry. 1985. *Changing Order: Replication and Induction in Scientific Practice*. Chicago: University of Chicago Press. Chapter 3.

Latour, Bruno. 1983. “Give me a Laboratory and I will Raise the World”. pp. 141-170 in Knorr-Cetina, Karin K. and Michael Mulkay, eds. 1983. *Science Observed: Perspectives on Social Studies of Science*. London: Sage Publications.

Latour, Bruno and Steven Woolgar. 1979. *Laboratory Life: The Social Construction of Scientific Facts*. London: Sage Publications. Read as much as you find interesting.

#### **5. (2/19/19) Workshop I: Building a Bibliography; Academic Style and Citation; Using the Library**

This week we will address the practicalities of executing a research project, including:

building and managing a bibliography;  
appropriate academic style;  
acceptable forms of citation.

Dr Robin Rider, Curator of Special Collections at UW-Madison Memorial Library, has kindly agreed to host an introduction to the Library, its collections and services, and the assistance available to you as library users.

#### **6. (2/26/19) The Laboratory Revolution: Going Beyond Institutional History**

Last week laid out the driving force behind the lab studies movement. This week’s session is intended to show you in very practical terms how this affected laboratory history.

**As well as discussing the readings, you should be ready to give a 2-minute progress report on your own research.**

Cahan, David. 1985. "The institutional revolution in German physics, 1865-1914."

*Historical Studies in the Physical Sciences*, 15: 1-65.

Gooday, Graeme. 1990. "Precision Measurement and the Genesis of Physics Teaching Laboratories in Victorian Britain." *British Journal of the History of Science*, 23: 25-51.

Schaffer, Simon. 1992. "Late Victorian metrology and its instrumentation: a manufactory of Ohms." in Bud and Cozzens 1992, pp. 23-5.

### **7. (3/5/19) Marx, Labor, and the Laboratory**

This week's class will explore the relationship between lab studies and Marx. According to Marx's labor theory of value, the value of commodities is intrinsically related to the labor involved in their production. Our readings show how this idea has been used to revise our understanding of the Industrial Revolution in 18<sup>th</sup> century Britain and of the introduction of labor-saving devices in homes across 20<sup>th</sup> century America. Similar ideas applied to the production of scientific knowledge are an important foundation of studies of laboratory practice.

Berg, Maxine. 1994. *The Age of Manufactures, 1700-1820: Industry, Innovation, and Work in Britain*. London: Routledge. Chapter 8: Machines and Manual Labour, pp. 146-161; Chapter 9: The Rise of the Factory System, pp. 162-179.

Mackenzie, Donald. 1984. "Marx and the Machine" *Technology and Culture* **25**: 473-502.

Schwartz Cowan, Ruth. 1983. *More Work for Mother: The Ironies of Household Technology from the Open Hearth to the Microwave*. Basic Books.

### **8. (3/12/19) Primary Sources I: Pedagogy and the Laboratory**

**This week is the final class before Spring Break – a good time to review progress so far and see what we might like to do differently in future. Let me know your views.**

This week's class and the one that follows address the question of what kinds of primary sources might be useful in historical lab studies. Following up on the relationship between Marx's theory of labor and laboratory work, this week's session highlights the relationship between

studies of laboratory practice and pedagogy, and the writings of two 20<sup>th</sup> century philosophers: Thomas Kuhn and Michel Foucault.

Warwick, Andrew C. 2003. *Masters of Theory: Cambridge and the Rise of Mathematical Physics*. Chicago: Chicago University Press. pp 1-48 (Chapter One: Writing a Pedagogical History of Mathematical Physics)

Warwick, Andrew C. and David Kaiser. 2005. "Kuhn, Foucault, and the Power of Pedagogy." pp. 393-409 in Kaiser, David, ed. 2005. *Pedagogy and the Practice of Science: Historical and Contemporary Perspectives*. Cambridge, MA: MIT Press.

## **SPRING BREAK: A great time to do research!**

### **9: (3/26/19) Primary Sources II: Notebooks and Material Culture**

This week's session examines how the study of lab notebooks and material culture can transform our understanding of laboratory practice, helping us move beyond published primary sources in our quest to understand science in action.

Holmes, Frederic L. 1987. "Justus Liebig and the Construction of Organic Chemistry." pp. 119-134 in Traynham, James G. ed. 1987. *Essays on the history of organic chemistry*. Baton Rouge: Louisiana State University Press.

Jackson, Catherine M. 2008. "Visible Work: The role of students in the creation of Liebig's Giessen research school." *Notes and Records of the Royal Society* **62**: 31-49.

Usselman, Melvyn C., Christina Reinhart, Kelly Foulser and Alan J. Rocke. 2005. "Restaging Liebig: A study in the replication of experiments." *Annals of Science* **62**: 1-55.

### **10. (4/2/19) Workshop II: identifying a Research Question; Planning an Essay**

**Your annotated bibliography is due in this class.**

Come ready to discuss your area of interest; what has already been written about this topic (the secondary literature); what specific questions have piqued your interest and why do you think they are important; what sources you have located to help you address these questions (including

appropriate, available primary sources). Our class discussion is intended to help you clarify the scope of your essay and refine the question(s) it will address.

**11. (4/9/19) Individual Presentations.**

This week's class is reserved for your **15-minute presentations**. More information to follow.

**12. (4/16/19) Individual Presentations.**

This week's class is reserved for your **15-minute presentations**. More information to follow.

**13. (4/23/19) Workshop III: Structuring an Essay; Making an Argument**

This week offers a structured opportunity to examine and develop skills in essay writing and to follow up on last week's presentations.

**14. (4/30/19) Course Review**

**You must submit your essay outline and draft introduction to me by 7pm the Friday before our final class, i.e. April 26. I will provide you with written feedback by 7pm the following Wednesday, May 1. Final research papers are due by 7pm on Tuesday, May 7.**