

University of Wisconsin—Madison  
Bees, Trees, Germs and Genes: A History of Biology  
History / Hist Sci / Med Hist 132  
June 17 – July 14 (“DDD” summer term), 2024  
[canvas.wisc.edu/courses/400157](https://canvas.wisc.edu/courses/400157)



Images from Florentine Codex (background and Cuicatlachtli) & Wikimedia Commons ([karyotype](#), [plant culture](#), and [Maria Sibylla Merian drawing](#))

**Instructor**

Bennett McIntosh

PhD Candidate, History of Sci/Med/Tech

[bamcintosh@wisc.edu](mailto:bamcintosh@wisc.edu)

Office: Humanities 4260

Zoom: [uwmadison.zoom.us/j/98078540000](https://uwmadison.zoom.us/j/98078540000)

**Student drop-in hours**

Wednesday:

- 11am–3pm: In-office or on Zoom
- 7pm–9pm: Zoom-only

Fridays

- 9am–11am: Zoom-only

*I will always be available to meet students during drop-in hours; I am also more than happy to meet during other times — just email me!*

If you have questions about...

- ...what you'll learn in this course, turn to page 2
- ...how to succeed in this course, turn to page 3
- ...technology in this course, including readings and **generative AI**, turn to page 3-4
- ...deadlines and how to move through this course, turn to page 4
- ...assignments, grading, and late work policies, turn to page 5
- ...university policies and resources, turn to page 11

### Course Description

*Humans have been trying to make sense of life—our own vital processes, and those of other beings around us—since prehistory. But the discipline we call “biology” is much more recent, arising at some point in the 1800s. In this course we’ll ask:*

- *How did the field we know as biology come together from these disparate ways of knowing about nature?*
- *How is biology similar to, and different from, the ways of knowing about life that came before?*
- *How can historians—and students of history like yourselves—even answer these questions?*

*We’ll begin by examining how people around the world produced natural knowledge in the 16<sup>th</sup> century (1500s), well before the existence of a self-conscious discipline of biology. We’ll then use infrastructure, identity, and ways of knowing to examine two key moments in the prehistory of biology: bioprospecting by European maritime empires and Darwin’s theory of evolution by means of natural selection. The course will finish with a series of case studies of biology’s institutionalization in the late 19<sup>th</sup> and early 20<sup>th</sup> century (cell theory, germ theory, and genetics) and a discussion of the 20<sup>th</sup> century controversies that stem from this (environmentalism, eugenics, anti-Darwinism, and biopiracy).*

### Credit Information

**This is a 3-credit course.** The credit standard for this course is met by an expectation of a total of 135 hours of student engagement with the course learning activities, which include scheduled instructor–student meeting times, reading, writing, worksheets, and other student work as described in the syllabus.

### Learning outcomes:

- Appreciate the human influence on biology’s history, and how to use the lenses of infrastructure, identity, and ways of knowing to understand this history
- Identify key events in the social, institutional, and intellectual origins of modern biology
- Apply these modes of historical analysis to new empirical cases
- Examine primary texts and identify how their authors make meaning about and understand life

### Why study the History of Biology?

In this class we’ll meet unicorns and dragons, gods and magic rituals, and strange and disturbing theories about human difference. These may at first glance seem distant from the biology of today, but as we’ll see, the way scientists produced knowledge—even centuries before anyone called themselves a “biologist”—have consequences that are still with us. Though this course focuses on the past, you will develop the skills for thinking critically about the science of our own time: Why does biology work the way it does? Who benefits, and who is harmed? How can we understand biology as part of a long, ongoing project to understand ourselves and our place in the world?

### How to succeed in this course

I know many of you are coming to a summer course because you need flexibility — whether you're three credits away from graduating, working or living outside of Madison, or just need a course that you can fit around personal, family, health, or religious obligations, I'm glad you're here!

**Holidays, travel, and work commitments:** The “deadlines and scheduling” section below has some information about the different ways to shape this course's work around your scheduling needs. I expect to meet with you for a virtual synchronous discussion at least once, but that will be at a time of your choosing, and the course can otherwise be completed at the dates and time you want.

**If you need accommodations** for a disability, whether coordinated through the McBurney Disability Resource Center or otherwise, I am happy to work with you! You may also find the McBurney center useful for advice on which accommodations may be available or how to approach me for accommodations.

McBurney can also be very helpful for **mental health and well-being** matters of any severity, as can UW-Madison's mental health services at [uhs.wisc.edu](https://uhs.wisc.edu). There's more information about both of these resources at the end of this syllabus, but for now, know that I stand by ready to work with you should you be at all worried that they will affect your success in this course.

### Technology in this Course

#### Course Website:

<https://canvas.wisc.edu/courses/400157>

**Other technologies:** This course requires the use of your student email, and I expect to meet with you at least once through Zoom or a similar platform. Some lecture activities may also ask you to visit other websites, for instance Getty's virtual Florentine Codex (<https://florentinecodex.getty.edu>). You may also choose to collaborate with your partner for the peer feedback activity over a platform like Google Docs.

#### Course Forums (on Canvas):

Please share your thoughts, questions, or insights in the course forums. **These are ungraded (!)** and are designed to be a space to speak freely and meet each other—including to find partners to give feedback on the final project.

***If using any of these technologies will present any difficulty for you (for instance due to hardware constraints or geoblocking) please let me know so we can accommodate you.***

**Required texts:** All required readings for this course will be available on Canvas. We will be reading through most of Londa Schiebinger's book *Plants and Empire* over the duration of this course. The required chapters are available on Canvas, but the book is also available, as paperback or e-book, including for free [from the UW library](#). If you want to buy the book, you can make sure you have the right book by buying it from the UW bookstore, or following the links to Amazon, Apple Books etc. from [the publisher's website](#).

## Generative AI:

You may use generative AI to help you **refine your writing or your research questions** for assignments in this course. For example:

- (1) to help improve your **spelling and grammar**,
- (2) to **simplify your language** to make it clear and readable,
- (3) to help **trim down what you've written** to get under the word count limit,
- (4) to **brainstorm** more specific research questions based on a starting question

## You may not use generative AI...

- (1) ...to complete your course work for you. This includes answering module guide questions, writing entire sentences or paragraphs, or generating an outline for your final project. For more on why this is a bad idea, both for your success in this course and for your learning, see the intro video. In short, **if you are not submitting *your* ideas, you're not learning, and because of that, you probably won't succeed in this course.**
- (2) ...to make up plausible-sounding-but-fake quotes from the course readings or outside sources; doing so will be considered [academic misconduct](#) (under specifically UWS 14.03(1)b “(b) Uses unauthorized materials or fabricated data in any academic exercise”).

Generative AI tends to be good at generalities, but this course's assignments require you to be specific, so **be careful even when using generative AI for permissible uses; it may lead you astray** — check your work to make sure that your submission is correct and, more importantly, *your* ideas!

See the University's policies [on academic integrity](#) for more information.

## Deadlines & Scheduling

This course has some flexibility built in in terms of how you complete the assignments.

- If you're working a day job, you can do some work in the evenings, then catch up on weekends
- If you're travelling for the 4<sup>th</sup> of July or another holiday, you can work around it, for instance completing modules 1–4 before that July 4, then Module 5 the final week.
- If you're in a different time zone, you can watch the videos and even meet with me during student drop-in hours at odd times!

You can move through the course at your own pace, but the Skill Check deadlines are designed to let you finish the Final Project by **July 14** which is a deadline set by the University. **If something comes up and you need more time to complete a Skill Check please contact me** so we can plan how you'll complete the rest of the course on schedule.

The table on the next page shows three examples of how students with different timelines might proceed through this course:

		I want to take it a little easy to start, but I can work July 4 & 5	I'm traveling on July 4 & 5, but I can do a module a day 'til then	I have more time on the weekends than during the work week
Mon	6/17	Intro Module	Intro Module	Intro Module
<b>Fill out welcome survey by Mon. 6/17 at 11:59 PM Central Time</b>				
Tue	6/18	Unit 1, module 1	Unit 1, module 1	Unit 1, module 1
Wed	6/19	Unit 1, module 2	Unit 1, module 2	
Thu	6/20	Unit 1, module 3	Unit 1, module 3	Unit 1, module 2
Fri	6/21	[break for Skill Check 1]	Unit 2, module 1	
Sat	6/22			Unit 1, module 3
Sun	6/23			Unit 2, module 1

## Week 2

Mon	6/24	Unit 2, module 1	Unit 2, module 2	Unit 2, module 2 (start)
<b>Unit 1 Skill Check Due Mon. 6/24 at 11:59 PM Central Time</b>				
Tue	6/25	Unit 2, module 2	Unit 2, module 3	Unit 2, module 2 (finish)
Wed	6/26	Unit 2, module 3	Unit 3, module 1	Unit 2, module 3
Thu	6/27	[break for Skill Check 2]	Unit 3, module 2	
Fri	6/28	Unit 3, module 1	Unit 3, module 3	
<b>Unit 2 Skill Check Due Fri. 6/28 at 11:59 PM Central Time</b>				
Sat	6/29			Unit 3, module 1
Sun	6/30			Unit 3, module 2

## Week 3

Mon	7/1	Unit 3, module 2	Unit 4, module 1	Unit 3, module 3
Tue	7/2	Unit 3, module 3	Unit 4, module 2	Unit 4, module 1
Wed	7/3	Unit 4, module 1	Unit 4, module 3	
<b>Unit 3 Skill Check Due Weds. 7/3 at 11:59 PM Central Time</b>				
Thu	7/4	Unit 4, module 2		
Fri	7/5	Unit 4, module 3		Unit 4, module 2
Sat	7/6			Unit 4, module 3
Sun	7/7			Unit 5, module 1

## Week 4

Mon	7/8	Unit 5, module 1	Unit 5, module 1	
<b>Unit 4 Skill Check Due Mon. 7/8 at 11:59 PM Central Time</b>				
Tue	7/9	Unit 5, module 2	Unit 5, module 2	Unit 5, module 2
Wed	7/10	Unit 5, module 3	Unit 5, module 3	
<b>Exchange final project peer feedback with your partner</b>				
Thu	7/11	Unit 5, module 4	Unit 5, module 4	Unit 5, module 3
Fri	7/12	Complete final project	Complete final project	
Sat	7/13			Unit 5, module 4
Sun	7/14			Complete final project
<b>FINAL PROJECT DUE SUNDAY, JULY 14, AT 11:59 PM CENTRAL TIME</b>				

## Grades & Assignments

- 17 modules of Canvas-guided lectures (arranged into 5 units)* **35% of final grade**
- Watch each module's lectures and complete the Module Guide worksheet. Each module should be considered about a day worth of coursework. **2% × 17 modules**
  - There is no firm deadline, but **you should plan on completing each module at least a day or two before the associated skill check is due.** **+1% welcome survey**

- 4 "Skill Checks" at the end of the first four units* **35% of final grade**
- Each of these will help you practice the skills in historical research and analysis that each module introduces. They will also build towards the final assignment, due at the end of the course. **10% × best 3 scores**
  - These have firm deadlines, to ensure that you're not falling behind in the course. **+5% × worst score**  
**They are due at 11:59pm Central Time on the following dates:**
    - Unit 1: Monday, June 24
    - Unit 2: Friday, June 28
    - Unit 3: Wednesday, July 3,
    - Unit 4: Monday, July 8
  - Each of these counts for 10% of your final grade, except your worst grade, which will only be weighted half as much.

- Intro & brainstorm meeting* **5% of final grade**
- I require you to meet with me **at least once** during the **first two weeks** of class. We'll get to know each other, discuss how you want to approach this course, and brainstorm options for your final project.
  - If you show up to this meetings, are engaged and thoughtful during them, and integrate what we've discussed into your projects, these will be the easiest 5% you earn.

- Final Project* **20% of final grade**
- For this project (a paper of about 1000 words, or another medium of similar scale), you'll select one aspect of biology—past or present—and develop a historical argument that combines the different lenses (infrastructure, identity, and ways of knowing) that we've developed for thinking about the history of biology.
  - **Due on the last day of the course (Sat. July 14) at 11:59pm Central Time**

- Feedback report on one of your peers' final project* **5% of final grade**

All assignments will receive a numeric score (e.g., 19 out of 20), and your total numeric score will be converted into a final letter grade. There is no curve or rounding.

A	AB	B	BC	C	D	F
93.0% – 100%	88.0% – 92.99...%	83.0% – 87.99...%	78.0% – 82.99...%	70.0% – 77.99...%	60% – 69.99...%	0% – 59.99...%

### Late work

Here's an at-a-glance summary of all the deadlines in this course. All deadlines are at 11:59pm Central Time. Module guides do not have a deadline, but you should generally plan on completing them at least a day or two before that unit's skill check is due.

**Week 1:**

June 17 (Mon.): Introductory Survey

**Week 3:**

July 3 (Weds.): Skill Check 3

**Week 2:**

June 24 (Mon.): Skill Check 1

June 28 (Fri.): Skill Check 2

June 28 (Fri.): Intro/brainstorm meeting

**Week 4:**

July 8 (Mon.): Skill Check 4

July 10 (Weds.): Final Project Peer Feedback

July 14 (Sun.): Final Project

If you need flexibility on one of these deadlines, contact me well in advance of the deadline (as soon as you know you need flexibility!) and I may grant an extension.

Any of the above assignments submitted late without an extension will take a 10% per day grade penalty, with two exceptions:

- **Final Project:** This is the latest possible deadline I can set by college policy. Therefore, **I cannot accept late submissions for the final project.** More information is available on the [L&S knowledge base](#).
- **Peer Feedback:** The Wednesday deadline for this is a suggestion; if you and your peer think it would be useful, you can, by mutual agreement, extend this deadline up to Friday. Keep in mind, though, the later you get this feedback, the harder it will be to appropriately incorporate it into your final project.

### Lecture & Reading Schedule

*All readings and lectures are available in the associated module on Canvas!*

#### Unit 0 – Introduction: What is Biology?

Plan to complete all modules in this unit by **Monday, June 17**

##### *Module 1: Introduction*

- **Watch the lectures:** Studying the history of biology
- **Reading:** “Emblematic Natural History of the Renaissance” by William B. Ashworth Jr.
- **Introduce yourself** in the course forums!

**By 11:59pm on Monday, June 17:**

Complete the welcome survey on Canvas  
and

Sign up on Calendly or email me to  
schedule an intro/brainstorm meeting

**Unit 1: Global Naturalisms (1500 - 1700 CE)**

Plan to complete all modules in this unit by **between June 20 and June 22**

*Module 1: Medicine in China*

- **Watch the lecture:** Understanding Ming-era medicine
- **Reading:** “Here Be Dragons: A Reader’s Guide to the *Bencao gangmu*” by Carla Nappi

*Module 2: Curiosity, Courts, and Collections*

- **Watch the lecture:** “Power, patronage, and nostalgia”: Reading primary sources in-context
- **Reading:** “Courting Nature” by Paula Findlen

*Module 3: Imperial Encounters & Exchanges*

- **Watch the lecture:** “Knowledge outside the text”: Finding suppressed knowledge in primary sources
- **Reading:** “Indigenous Naturalists” by Iris Montero Sobrevilla

**By 11:59pm on Sunday, June 23:**

Complete the Unit 1 Skill Check  
(details on Canvas)

**Unit 2: Sorting (1700 - 1800 CE)**

Plan to complete all modules in this unit by **between June 25 and June 27**

*Module 1: Infrastructure: Bioprospecting or biopiracy?*

- **Watch the lecture:** “The global infrastructure of European botanical knowledge”
- **Reading:** Selections from “Voyaging Out” *Plants and Empire* by Londa Schiebinger, pp. 23–35, 38–45

*Module 2: Identities: Indigenous and fugitive knowledge*

- **Watch the lecture:** “What is social history?”
- **Reading:** Selections from “Exotic Abortifacients” and “The Fate of the Peacock Flower in Europe” in *Plants and Empire* by Londa Schiebinger

*Module 3: Intellectual history: Where do we get our categories?*

- **Watch the lecture:** “Imperial categories”
- **Reading:** “Linguistic Imperialism” in *Plants and Empire* by Londa Schiebinger, pp. 194–206, 211–214, 218–275

**By 11:59pm on Friday, June 28:**

Complete the Unit 2 Skill Check  
(details on Canvas)

**Unit 3: Selection (1800 - 1880 CE)**



Plan to complete all modules in this unit by **between June 28 and July 2**

*Module 1: Infrastructure: Darwin's Empire*

- **Watch the lecture:** "Darwin's Imperial Institutions"
- **Reading:** "Natural History and the Scientific Voyage" by Katharine Anderson

*Module 2: Identities: Darwin's Society*

- **Watch the lecture:** "Darwin, race, and abolition"
- **Reading:** Introduction to *Darwin and the Making of Sexual Selection* by Evelleen Richards

*Module 3: Ways of Knowing: Darwin's Theory*

- **Watch the lecture:** Reading *Origin of Species* in context
- **Reading:** Selections from *On the Origin of Species*, by Charles Darwin

**By 11:59pm on Wednesday, July 3:**  
Complete the Unit 3 Skill Check  
(details on Canvas)

**Unit 4: Institutionalizing Life (1850 - 1950 CE)**

Plan to complete all modules in this unit by **between July 3 and July 8**

*Module 1: Germs and colonies*

- **Watch the lecture:** Colonial Labs and Germ Theory
- **Reading:** Selections from *Colonial Pathologies: American Tropical Medicine, Race, and Hygiene in the Philippines*, by Warwick Anderson

*Module 2: Breeding and eugenics*

- **Watch the lecture:** "Agriculture as social structure and social metaphor"
- **Reading:** "No Scrubs: Livestock Breeding, Eugenics, and the State in the Early Twentieth-Century United States" by Gabriel Rosenberg

*Module 3: Cells and factories*

- **Watch the lecture:** "The first biotechnology?"
- **Reading:** "The Tissue Culture King" by Julian Huxley

**By 11:59pm on Monday, July 8:**  
Submit the Unit 4 Skill Check  
(details on Canvas)

Once you have submitted your Unit 4 skill check, you should find a mutually agreeable time to exchange peer feedback with your partner.

**Unit 5: Twentieth-century Controversies (1920 - 2020 CE)**

*These modules can be completed in any order; the order below is roughly chronological, but if one of them is more relevant to your final project, feel free to complete it first. Plan to complete them all by **Friday, July 12** unless you want to be catching up over the weekend.*

*Module 1: Anti-Darwinism*

- **Watch the lecture:** From Scopes to the Science Wars
- **Reading:** Introduction and Chapter 2 in *Summer for the Gods: The Scopes Trial and America's Continuing Debate over Science and Religion* by Edward J. Larson

**By 11:59pm on Wednesday, June 19:**  
Exchange peer feedback with your partner.

*Module 2: Environmentalism(s)*

- **Watch the lecture:** America's many environmental movements
- **Reading:** Selections from *Silent Spring* by Rachel Carson

*Module 3: The Return of Eugenics?*

- **Watch the lecture:** "Backdoor to Eugenics?"
- **Reading:** "The Last Children of Down Syndrome" by Sarah Zhang

*Module 4: Modern bioprospectors — or biopirates?*

- **Watch the lecture:** "Bitter Roots"
- **Reading:** "Peyote Is the Darling of the Psychedelics Renaissance. Indigenous Users Say It Co-Opts 'a Sacred Way of Life'" by Annette McGivney

**By 11:59pm on Sunday, July 14**  
Submit Final Project  
(details on Canvas)

### **Campus Policies**

*See “how to succeed in this course” on page 2 for more information on how I can work with you to help succeed in this course. The following provides more information on University policies around these matters, as well as such things as course evaluations and policy.*

#### **Accommodations for Students with Disabilities**

The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy ([UW-855](#)) require the university to provide reasonable accommodations to students with disabilities to access and participate in its academic programs and educational services. Faculty and students share responsibility in the accommodation process. Students are expected to inform faculty of their need for instructional accommodations during the beginning of the semester, or as soon as possible after being approved for accommodations. Faculty will work either directly with the student or in coordination with the McBurney Center to provide reasonable instructional and course-related accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA.

(See: [McBurney Disability Resource Center](#))

#### **Mental Health and Well-Being Statement**

Students often experience stressors that can impact both their academic experience and personal well-being. These may include mental health concerns, substance misuse, sexual or relationship violence, family circumstances, campus climate, financial matters, among others.

Students are encouraged to learn about and utilize UW-Madison's mental health services and/or other resources as needed. Visit [uhs.wisc.edu](http://uhs.wisc.edu) or call University Health Services at (608) 265-5600 to learn more.

#### **Academic Calendar & Religious Observances**

##### [Academic Calendar & Religious Observances](#)

Establishment of the academic calendar for the University of Wisconsin-Madison falls within the authority of the faculty as set forth in [Faculty Policies and Procedures](#). Construction of the academic calendar is subject to various rules and laws prescribed by the Board of Regents, the Faculty Senate, State of Wisconsin and the federal government. For additional dates and deadlines for students, see the [Office of the Registrar's pages](#). Students are responsible for notifying instructors within the first two weeks of classes about any need for flexibility due to [religious observances](#).

#### **Academic Integrity Statement**

By virtue of enrollment, each student agrees to uphold the high academic standards of the University of Wisconsin-Madison; academic misconduct is behavior that negatively impacts the integrity of the institution. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these previously listed acts are examples of misconduct which may result in disciplinary action. Examples of disciplinary [sanctions](#) include, but are not limited to, failure on the assignment/course, written reprimand, disciplinary probation, suspension, or expulsion.

**Course Evaluations**

Students will be provided with an opportunity to evaluate their enrolled courses and their learning experience. Most instructors use AEFIS a [digital course evaluation](#) survey tool. In most instances, students receive an official email two weeks prior to the end of the semester, notifying them that anonymous course evaluations are available. Student participation is an integral component of course development, and confidential feedback is important. UW-Madison strongly encourages student participation in course evaluations.

**Diversity & Inclusion Statement**

[Diversity](#) is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.

**Privacy of Student Records & the Use of Audio Recorded Lectures Statement**

View [more information about FERPA](#).

Lecture materials and recordings for this course are protected intellectual property at UW-Madison. Students in courses may use the materials and recordings for their personal use related to participation in class. Students may also take notes solely for their personal use. If a lecture is not already recorded, students are not authorized to record lectures without permission unless they are considered by the university to be a qualified student with a disability who has an approved accommodation that includes recording. [Regent Policy Document 4-1] Students may not copy or have lecture materials and recordings outside of class, including posting on internet sites or selling to commercial entities, with the exception of sharing copies of personal notes as a notetaker through the McBurney Disability Resource Center. Students are otherwise prohibited from providing or selling their personal notes to anyone else or being paid for taking notes by any person or commercial firm without the instructor's express written permission. Unauthorized use of these copyrighted lecture materials and recordings constitutes copyright infringement and may be addressed under the university's policies, UWS Chapters 14 and 17, governing student academic and non-academic misconduct.

**Students' Rules, Rights & Responsibilities**

[Rights & Responsibilities](#)

**Teaching & Learning Data Transparency Statement**

The privacy and security of faculty, staff and students' personal information is a top priority for UW-Madison. The university carefully reviews and vets all campus-supported digital tools used to support teaching and learning, to help support success through [learning analytics](#), and to enable proctoring capabilities. View the university's full teaching and learning [data transparency statement](#).