

BSC 3402
Theory and Practice in the Biological Science
Fall 2024

Prof. Vassiliki Betty Smocovitis

Class Meeting: Tuesdays 3:00-4:55 pm Room 222 Carr Hall

Office Hours: Tuesdays 12:00-2:00 pm, or by appointment

Contact: Please use Canvas Tool but also bsmocovi@ufl.edu

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COURSE DESCRIPTION

This course is intended to introduce students to historical, sociological, and philosophical perspectives on the doing of biology, becoming a biologist, and to a range of issues that highlight the complex relationship between biology and society. The goals of the course are three-fold: first, we will explore how biological theories are actively made by scientists whose individual and social values can shape their science and how that science can then in turn shape individual and social values that may guide policies. Second, we will explore the practice of science, and how that practice in turn can shape the kind of science that is done. Third, we will examine the interplay of biology and society through some well known controversies in the biological sciences that include the “race” for the discovery of the structure of the double helix. Additional readings will allow us to explore the complex linkages between biomedical science, corporate culture and industry. When possible, the course also highlights the concerns of bioethicists: research ethics, medical ethics, environmental ethics, and policy. The course closes by considering the future of life on earth.

STRUCTURE OF COURSE AND EVALUATION

This is a two-credit seminar that places **heavy emphasis on reading and discussion of assigned material in class.** Students are expected to have completed **all** assigned reading or viewing material before class discussion. Evaluation is based on class participation (including attendance) for a total of 40% of the grade. Students are allowed two legitimate absences only. The remaining 60% is based on six class assignments called reaction/response papers out of a possible eight due the day **before** class discussion. These will be given grades of check plus, check, check minus or “U” (or unsatisfactory). Students are expected to have completed assigned readings, or viewed material, and to have submitted their 2-page reaction/response papers on Canvas by noon on the Monday before the Tuesday class on the topic. If so wished, students may rewrite papers immediately after class discussion if they find their views have changed or if they wish to improve their grades. Rewritten papers must be submitted within one week **after** the discussion. There is no final exam. The course follows standard UF grade scales and policies:
<https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies>.

BOOKS (Available in Campus Store)

1. Stephen J. Gould, *The Mismeasure of Man*, revised and expanded edition, 1996.
2. Rebecca Skloot, *The Immortal Life of Henrietta Lacks*, 2010.
3. James. D. Watson, *The Double Helix*, Norton Critical Edition, 1996.
4. Naomi Oreskes and Erik Conway. *The Merchants of Doubt*. Bloomsbury, 2010.
5. John Carreyrou, *Bad Blood: Secrets and Lies in a Silicon Valley Start-Up*, Knopf, 2018.
6. E. O. Wilson, *The Future of Life*, 2002.

TENTATIVE SCHEDULE OF TOPICS, READINGS, AND ASSIGNMENTS

Week One (Aug. 27)-ZOOM Meeting:
Introduction to Course, Readings and the Class.

I: Historical and Philosophical Perspectives

Week Two (Sept. 3):
Historical and Philosophical Perspectives.
Objectivity in the Biological Sciences? A Famous Case Study
Reading: Stephen J. Gould, *The Mismeasure of Man*, revised and expanded edition, 1996, pp. 15-142.

Week Three (Sept.10):
Historical and Philosophical Perspectives.
Objectivity in the Biological Sciences? A Famous Case Study
Reading: Stephen J. Gould, *The Mismeasure of Man*, revised and expanded edition, 1996, pp. 142-425.
Assignment #1 (two-page reaction paper due on Canvas by Monday at noon on *The Mismeasure of Man*):
Directed Essay: According to Stephen J. Gould, how is scientific knowledge made? To what extent is it shaped by social and individual values? How can we guard against injecting those values in science?

II. The Practice and Ethics of Research

Week Four (Sept. 17):
The Practice of Research, I. Case Study: Informed Consent and the Extraordinary Story of HeLa Cells
Reading: Rebecca Skloot's *The Immortal Life of Henrietta Lacks* Parts 1 and 2

Week Five (Sept. 24):
The Practice of Research, II. Case Study: Informed Consent and the Extraordinary Story of HeLa Cells
Reading: Rebecca Skloot's *The Immortal Life of Henrietta Lacks* Part 3.
Assignment #2 (two-page reaction paper due on Canvas by Monday at noon on *The Immortal Life of Henrietta Lacks*)

Week Six (Oct. 1):

The Practice of Research, III. Ethics of Authorship and Publication. Case Study: the
Discovery of the Structure of the DNA Molecule

Reading: James D. Watson, *The Double Helix*, Norton Critical Edition.

Assignment #3 (two-page reaction paper due on Canvas by Monday at noon on entire book *The Double Helix*)

Week Seven (Oct. 8):

The Practice of Research: IV. Ethics of Authorship and Publication
Discussion of film in class and comparison with book accounts (Please view on your
own): *The Race for the Double Helix* (available on) <https://vimeo.com/179934156>

Assignment #4: (two-page reaction paper due on Canvas by Monday at noon)

III: Biology, Current Controversies, and Policy

Week Eight (Oct. 15)

Biology and Social Concerns I. Protecting the Public, Selling Science

Viewing film and discussion in class: Frontline “Supplements and Safety”
<https://www.pbs.org/wgbh/frontline/documentary/supplements-and-safety/>

Week Nine (Oct. 22) – ZOOM Meeting

Biology and Social Concerns II: Concealing Evidence and the Manufacture of Doubt

Readings: Chapter 8 of Greif and Merz (Electronic Copy on Canvas); *The Merchants of
Doubt*

Film: *Climate of Doubt* (PBS Frontline) available here:

<https://www.pbs.org/wgbh/frontline/film/climate-of-doubt/>

Assignment #5 (two-page reaction paper due on Canvas by Monday at noon)

Week Ten (Oct. 29)

Biology and Social Concerns I. Protecting the Public, Selling Science

Current Controversies in the Biological Sciences (Who Owns the Genome?

Manufacturing Children and Stem Cells)

Readings: Chapters 3 and 4 of Greif and Merz (Electronic Copy on Canvas)

Assignment #6 (two-page reaction paper due on chapters on Canvas by Monday at
noon)

Week Eleven (Nov. 5)

Biology and Social Concerns IV: Greed, Deceit and Innovation in Silicon Valley

Biomedical Science

Reading: *Bad Blood: Secrets and Lies in a Silicon Valley Start-Up*

Film: *The Inventor* <https://watchdocumentaries.com/the-inventor-out-for-blood-in-silicon-valley/>

Assignment #7: (two-page reaction paper on book and film due on Canvas by Monday at noon)

III: Biology and the Future of Life

Week Eleven (Nov. 12)

Climate Change, Doubt, and Corporations (no class, home viewing of three part series)

Three part documentary series: <https://www.pbs.org/wgbh/frontline/documentary/the-power-of-big-oil/>

Week Twelve (Nov. 19)

Climate Change and Pandemics. Biodiversity Loss and its Consequences.

Film: *Racing Extinction* viewing at home: <https://archive.org/details/2015-racing-extinction-1280x-720>

Week Fourteen (Nov. 26) Thanksgiving Break. No Class

Week Fifteen (Dec. 3):

Climate Change and Pandemics. Biodiversity Loss and its Consequences.

Reading: E.O Wilson. *The Future of Life*

Assignment #8 (two-page reaction paper on *The Power of Big Oil*, *Racing Extinction* and *The Future of Life* due on Canvas by Monday at noon)

GUIDELINES FOR ASSIGNMENTS AND REACTION PAPERS

You are required to write six class assignments out of the possible eight designated on your syllabus. The goal of the assignment is to encourage students to engage critically the issues raised by the readings assigned, and to come to class prepared for class discussion. I suspect that there will be some similarities in points of view, but each paper will (I hope) reflect the opinions of each reader and author. I cannot therefore give you a fixed set of standards or any formula for writing papers, though I can help refine the goals of the assignment and offer the following as guidelines.

Length: Each paper should be a minimum of 2 double-spaced typewritten pages (regular font or 12 points). You may extend the length of your paper to no longer than 3 pages.

Structure: This paper *is not a review* of the readings or any of the books assigned. Do not attempt to write a full-fledged description of the books. Somewhere in the text, you should, however, summarize the "point" of the book. In other words, try to interpret the book in about one paragraph. This could be in your introduction. Your response or reaction to the texts should form the main body of the essay. Feel free to ask critical questions in these essays or point to any shortcomings in the readings or books. Keep in mind, however, that "critical" does not necessarily mean a negative assessment, but a

rigorous and thoughtful analysis that brings into relief the issues raised by a particular subject.

Style: Please feel free to use the "I" personal form if you so wish; but try to avoid over-personalized responses. The essay should maintain a scholarly tone, but should also avoid pedantic, pretentious academic-eze. Do not overuse the passive voice; this is not a laboratory write-up, but a critical essay.

Suggestions for reading the texts: Please do not engage the readings as you would standard textbooks in psychology, chemistry, biology, or astronomy. Jot down notes only when necessary; you do not need to highlight the text, although some notation or highlighting may help. Pay close attention to what the author is trying to achieve by reading the background material if it is included (e.g. preface, foreword, introduction etc.). Familiarize yourself with the author by doing additional research if necessary in the library (you may use any of the biographical sources in the science library or on the internet).

Include a bibliography or reference section if you have relied on additional sources. The formatting is flexible. Be judicious with your reliance on the internet as it is not peer-refereed information and can be very unreliable.

POLICIES

Conduct and Department

This course is designed to engage actively the complex issues raised by the readings with other students and with the instructor. Dialogue is considered a form of active learning as well as building communication skills. Students are encouraged to express their points of view, and to agree or disagree with each other but to always do so in a respectful manner. *Ad hominem*, or dismissive remarks are never acceptable, nor is uncivil language to be tolerated in the classroom. Students may work together on assignments and engage each other informally, but all assignments submitted are to be individually written reflecting original thought.

Policy on Course Content

Students in this course are especially encouraged to employ critical thinking and to rely on data and verifiable sources to interrogate all assigned readings and subject matter in this course as a way of determining whether they agree with their classmates and/or their instructor as well as authors. No lesson is intended to espouse, promote, advance, inculcate, or compel a particular feeling, perception, viewpoint or belief. Readings are chosen to provoke discussion; a diversity of opinion is especially encouraged in this class which engages in active dialogue in the service of learning.

Evaluations

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.aa.ufl.edu/students/>. Students will be notified when the evaluation

period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.aa.ufl.edu/public-results/>.

Your voice matters. Thank you for serving as a partner in this important effort.

References/Recommendations

Performance in this class will be reflected in the final grade, which will also appear on the UF official transcripts. If additional research, course-work, or honors theses are undertaken with the instructor, references may be requested.

Honesty Policy

- All students registered at the University of Florida have agreed to comply with the following statement: “I understand that the University of Florida expects its students to be honest in all their academic work. I agree to adhere to this commitment to academic honesty and understand that my failure to comply with this commitment may result in disciplinary action up to and including expulsion from the University.”
- In addition, on all work submitted for credit the following pledge is either required or implied: “*On my honor I have neither given nor received unauthorized aid in doing this assignment.*”
- If you witness any instances of academic dishonesty in this class, please notify the instructor or contact the Student Honor Court (392-1631) or Cheating Hotline (392-6999). For additional information on Academic Honesty, please refer to the University of Florida Academic Honesty Guidelines at: <http://www.dso.ufl.edu/judicial/procedures/academicguide.html>.

Accommodation for Students with Disabilities

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center. Click here to get started with the Disability Resource Center: <https://disability.ufl.edu/get-started/>. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

UF Counseling Services

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

Software Use

All faculty, staff and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate.

Academic Resources

Students are encouraged to make use of the following helpful resources on campus:

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352- 392-6420.

General study skills and tutoring: Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information. On-Line Students Complaints: View the Distance Learning Student Complaint Process.

