

ENR 8785: Research Paradigms, Spring 2023
T/R 2:20 to 3:40, KH 460

Instructor: Dr. Greg Hitzhusen Kottman 469E, 292-7739, hitzhusen.3@osu.edu

Course Description and Objectives

Catalog description:

An examination of science philosophy, scientific method, and contemporary paradigms applied to problems in environmental and natural resources management.

Full Description:

The objective of this course is to broaden your understanding of science in your discipline and introduce you to research and management paradigms for the natural resources and environmental sciences. We seek broader understanding of science as it is applied to the unique value-laden problems of environment and natural resources. Throughout this course, you will be exposed to wide-ranging literature dealing with social studies of science, bridges between quantitative and qualitative methods of inquiry, comparisons of natural and social sciences, approaches that emphasize stakeholder participation in science and management, and aspects of the interface between science and society. A thorough knowledge of readings will provide a basis for seminar discussions, some short lectures, and student writings/presentations.

Our goal is to help you as students (and us as instructors) break down the disciplinary barriers that inhibit a comprehensive understanding of environmental and natural resources science and management. We will explore concepts and discuss readings under a variety of subject headings, some representing concepts that have achieved “buzzword” status (e.g., everyone in our field has used, at one point or another, the term “sustainability,” but, in all likelihood, have not paused to consider what the term means or was intended to mean). Because of the format for this course, we expect that students will thoughtfully read all of the assigned readings and come to class prepared to lead and participate in probing and insightful discussions.

Student Performance Objectives

As a consequence of this course, the student will demonstrate the ability to:

1. Describe the philosophical underpinnings of science as a way of knowing;
2. Compare and contrast natural and social science, as well as quantitative and qualitative research methods;
3. Incorporate concepts of scientific method and/or philosophy into the student’s own research,
4. Explain concepts related to management paradigms of sustainability, coupled human-ecological systems, adaptive management, and civic science;
5. Understand the role of science in policy making;
6. Identify key components of the “post-modern” paradigm and its challenge to traditional science;
7. Integrate social and natural science into the student’s own research.

Recommended Textbooks:

Required readings from journal articles, books, and other sources will be made available electronically through the Carmen/Canvas course website (<https://carmen.osu.edu/#>). Basic concepts and arguments from the following will be included:

Bauer, H.H. 1992. *Scientific Literacy and the Myth of the Scientific Method*. Illini Books Edition, 1994. University of Illinois Press, Urbana and Chicago, IL. (ISBN 0-252-06436-4 PBK)

Godfrey-Smith, P. *Theory and Reality*. University of Chicago Press, Chicago, IL. (ISBN-13: 978-0226300634; ISBN-10: 0226300633)

Kimmerer, R. W. 2013. *Braiding Sweetgrass*. First edition. Milkweed Editions, Minneapolis, MN. (ISBN-10: 1571313567; ISBN-13: 978-1571313560)

McGilchrist, I. 2019. *The Master and His Emissary: The Divided Brain and the Making of the Western World*, Second Edition. Yale University Press, New Haven, CT. (ISBN-10: 0300245920; ISBN-13: 978-0300245929)

Rosenberg, A. 2012a. *Philosophy of Science: A Contemporary Introduction*. 3rd edition. Routledge Press, New York, NY. (ISBN 978-0-415-89177-6 PBK)

Rosenburg, A. 2012b. *Philosophy of Social Science*. 4th edition. Westview Press, Boulder, CO. (ISBN 978-0-8133-4592-5 PBK)

Insights will also be gleaned from guest discussants from the SENR Seminar Series: <https://senr.osu.edu/about-us/events/spring-2021-seminar-series>

Assignments and Grading:

Your final grade will be out of a total of 150 possible points that will be assigned as follows:

1. Class Participation = 30 points

Participation scores will be based on participation and leadership in classroom discussions. Regular attendance is a necessary, but not sufficient, condition for meaningful participation. Students will also take turns leading a discussion on a topic of interest and selecting accompanying readings. Students will prepare discussion materials and presentation slides to facilitate and frame class discussion of the readings. On some weeks we will hold a supplemental Thursday session to engage in informal discussion with visiting scholars and OSU faculty. Participation is expected at these sessions.

2. Autobiographical writing assignment, 1-2 pages, single spaced = 20 points (Due 11:59pm, Tuesday, Jan. 24)

Explain on the questions we raised in the first week of class. You should focus your writing around the following questions: What is a world view, and what is yours? How do you define science? How do you differentiate the natural and social sciences, and what is the relationship between the two? What does your worldview have to do with how you understand or practice science? What led you to pursue a doctoral degree, and in environment and natural resources, no less?

Note: you will give a **presentation** in week two of class (5-7min powerpoint via Zoom, ungraded) that should complement (and help you prepare) your autobiographical essay. These presentations provide a chance to share images, re-introduce yourself to reinforce our in-class introductions from week one, and share additional details or images or figures from your research. Highlight any philosophical underpinnings of your work that you might describe in your autobiographical essay. Feel free to keep it casual – these powerpoints are just visual aids to help more deeply introduce yourself to our whole group.

3. Mid-term Writing Assignment = 50 points (Due Thursday, Mar. 9, 11:59pm)

The historian of science Thomas Kuhn used the word *paradigm* to refer to the set of practices that define a scientific discipline at any point in time. Thus, the paradigm of a particular scientific discipline comprises:

- *what* is to be observed and scrutinized
 - the kind of *questions* that are supposed to be asked and probed for answers in relation to this subject
 - *how* these questions are to be structured
 - *how* the results of scientific investigations should be interpreted
 - *how* is an experiment (or research in general) to be conducted, and *what* equipment is available to conduct the experiment.
- 1) Think about the specific scientific discipline where your dissertation research is or will be centered and attempt to identify what elements in your area of study might satisfy the criteria listed above and thereby constitute the paradigm under which you work.
 - 2) Thinking more closely about your particular research problem, briefly identify and explain the theory or theory set that will guide your research.
 - 3) To the extent that you are able at this stage of your doctoral program, identify questions or deduce testable hypotheses from your theory base. These hypotheses do not necessarily have to be those that you will test with your dissertation research project, although it would be advantageous if they were.
 - 4) Discuss how you might apply various modes of inquiry such as inductive or deductive-nomological model or hypothetico-deductive scientific method or critical theory to your dissertation or a research problem in your field. What might be the benefits and limitations you would encounter in using these approaches to doing science in your discipline?
 - 5) How do you imagine that your research will connect with other disciplines or contexts of environment and natural resources?

3. End-term communication assignment = 50 points – Group project, TBD.

The minimum point percentages to achieve a given grade are as follows:

		87	B+	77	C+	67	D+
93	A	83	B	73	C	63	D
90	A-	80	B-	70	C-	60	D-

Class Meetings: We will meet on Tuesdays and Thursdays, from 2:20 to 3:40, to discuss readings as described in the course outline below. In addition, we may occasionally meet on Thursdays at a time to be arranged, to interact with invited guests and learn about their approaches and philosophies related to science and management. Some of the guest speakers will be presenting at the School's Thursday seminar series.

Availability of Accommodations: If you need an accommodation based on the impact of a disability, you should contact one of the course instructors to arrange an appointment as soon as possible. At the appointment we can discuss the course format, anticipate your needs and explore potential accommodations. We rely on the Office For Disability Services for assistance in verifying the need for accommodations and developing accommodation strategies. If you have not previously contacted the Office for Disability Services, we encourage you to do so.

Method of Dealing with a Language Barrier: This course will be conducted in English. Students who have difficulty communicating in English are encouraged to seek assistance from sources outside the classroom. Arrangements can be made for enabling students with speech, hearing, or visual impairment to participate in the course, e.g., through assistance of transcribers or readers.

Academic Misconduct: Submitting plagiarized work to meet academic requirements, including the representation of another's works or ideas as one's own; the unacknowledged use and/or paraphrasing of another person's work; and/or the inappropriate unacknowledged use of another person's ideas; and/or the falsification, fabrication, or dishonesty in reporting research results, shall be grounds for charges of academic misconduct.

Seminar Schedule for SP2023:

Thursday, January 19, 2023: Dr. Richard Dick, Ohio State University

Thursday, February 2, 2023: Joel Oliphint, Columbus Monthly

Thursday, February 16, 2023: Dr. Sara Sweeten, Virginia Tech University

Thursday, March 23, 2023: Dr. Alexis Mychajliw, Middlebury College

Thursday, April 6, 2023: Dr. Amy Alford, Lake Erie Islands Nature and Wildlife Center

Thursday, April 13, 2023: Dr. Than Boves, Arkansas State University

Thursday, April 20, 2023: EPN Speaker (TBD)

Course Schedule (under construction)

UNIT 1: Starting Points – Setting a Platform for Dialogue and Understanding

Week 1 (Jan 10/12): Introduction

Tue: Class organization and general discussion about who we are, why we are here, and what we are doing (at multiple levels of inquiry).

Thur: Worldviews discussion; Miro Board introduction

Readings: Sire, J. W. 2009 (Chapter 1, A World of Difference); Kimmerer, 2013 (Braiding Sweetgrass: Preface, Skywoman Falling, Asters and Goldenrod)

For next week, we'll develop a schedule of presentations, 5-7min each student, to present your background, past research, current research and future plans. Answer the questions: Why are you here? Why did you decide to pursue a doctoral degree? What are the key details of your past, current and anticipated research? How will you use your degree? See the assignment prompt above for further description of the purposes of this presentation.

Week 2 (Jan 17/19): Introducing Ourselves and Our Work

Tue: student bio presentations

Thur: student bio presentations;

Guest seminar discussant: Dr. Richard Dick, Ohio State University (soil science)

Week 3 (Jan 24/26): The Idea of the University: Critiques and Challenges

Tue: Scientific Knowledge and Indigenous Wisdom; Higher Education and Community; Critique of Rationalism ... *plus attention to worldviews material from week 1*

Readings: Kimmerer, Braiding Sweetgrass (The Gift of Strawberries, *Mishkos Kenomagwen: The Teachings of Grass*); Berry, W. (The Need to be Whole: Introduction; Home Economics: Higher Education and Home Defense; The World Ending Fire: A Native Hill)

Thur: The spectrum of disciplines in the University

Readings: Hallanger, N. J. 2012. Ian G, Barbour, Chapter 52. The Blackwell Companion to Science and Christianity. Blackwell Publishing Ltd. Pp. 600-610.

Wood (2002) Unsettling Obligations: Relativism

Brabant (2016) More than Meets the Eye: Toward a Post-Materialist Consciousness (Time for a New Paradigm)

Week 4 (Jan 31/Feb 2): Paradigms and disciplines; The Meaning and Domains of Science

First day questions:

Why is it called Ph.D.? What is science? What are the limits, divisions, and contexts of scientific inquiry? What is your philosophy of science? Read the following to help you answer these questions:

Godfrey-Smith, P. 2003. *Theory and Reality*, Chapter 1. Introduction. University of Chicago Press. Pp. 1-18.

Philosophy of Science reading TBA

Rosenburg, A. 2012b. *Philosophy of Social Science*, Chapter 1. What is the Philosophy of Social Science? Westview Press, Pp. 1-9.

Related Reading:

Rosenburg, A. 2012a. *Philosophy of Science*, Chapter 1. Philosophy and Science. Routledge. Pp. 1-20.

Rosenburg, A. 2012a. *Philosophy of Science*, Chapter 2. Why is Philosophy of Science Important? Routledge. Pp. 21-37.

Second day questions:

Guest seminar discussant: Joel Oliphint, *Columbus Monthly* (Sr. Editor)

Do social scientists and natural scientists approach science differently? What do you have in common with scientists in other disciplines? How does society view scientists, the scientific process, and the outcomes of science? What do asymmetrical brain hemispheres have to do with approaches to science? Read the following to help you answer these questions:

Rosenburg, A. 2012b. *Philosophy of Social Science*, Chapter 2. The Methodological Divide: Naturalism Versus Interpretation. Westview Press, Pp. 11-33.

Bauer, H.H. 1992. *Scientific Literacy and the Myth of the Scientific Method*, Chapter 2 (The So-Called Scientific Method). Illini Books Edition, 1994. University of Illinois Press, Urbana and Chicago, IL, Pp. vii-41.

McGilchrist, 2018 (The Master and His Emissary: Prologue, Introduction, 133-141 (rest of ch 4 is optional), 330-335)

Week 5 (Feb 7/9): Scientific Method, Philosophy and Epistemology; transition to SENR Paradigms

First day readings: GSC Guest Discussant, 3:00-3:40pm: Dr. Nicole Sintov, Environmental Social Sciences specialization

Readings related to research paradigms in Environmental Social Sciences

Bauer, H.H. 1992. *Scientific Literacy and the Myth of the Scientific Method*, Chapter 3 (How Science Really Works), Chapter 4 (Other Fables About Science), Chapter 5 (Imperfections of the Filter). Illini Books Edition, 1994. University of Illinois Press, Urbana and Chicago, IL, Pp. 42-102.

Second day readings:

Kofman, A. (2018). "Bruno Latour, the Post-Truth Philosopher, Mounts a Defense of Science." 10-25-2018, The New York Times Magazine:

<https://nyti.ms/2JeiObb>

Examining Paradigms in SENR:

Guest Discussant 2:50pm →: Eric Toman, SENR Interim Director and Professor of Environmental Social Sciences (and former Chair of Graduate Studies Committee)

UNIT 2: Research Paradigms in SENR

Week 6 (Feb 14/16): Paradigms in SENR – Ecosystem Science, Ecological Restoration, and Wildlife Science

First day:

GSC Guest Discussant 2:20pm: Matt Davies, GSC Chair

GSC Guest Discussant 3:10pm: Rachel Gabor, specialization: Ecosystem Science and Ecological Restoration

Readings related to research paradigms in Ecosystem Science and Ecological Restoration

Second day: Guest seminar discussant: Dr. Sara Sweeten, Virginia Tech University (fish and wildlife conservation)

GSC Guest Discussant Dr. Bob Gates, Specialization: Fisheries and Wildlife Science

Readings related to research paradigms in Fisheries and Wildlife Science

Week 7 (Feb 21/23): Paradigms in SENR – Soil Science and Fisheries and Rural Sociology

First day:

GSC Guest Discussant, Dr. Scott Demyan, Specialization: Soil Science

Readings related to research paradigms in Soil Science

Second day:

GSC Guest Discussant Dr. Jeffrey Jacquet, Specialization: Rural Sociology

Readings related to research paradigms in Rural Sociology

Week 8 (Feb 28/Mar 2): ... Paradigms in SENR – Environmental Social Science and Forest Science

First day:

GSC Guest Discussant Dr. Steve Matthews, Specialization: Forest Science

Readings related to research paradigms in Forest Science

Second day:

SENR Guest Discussant Dr. Doug Jackson-Smith, interdisciplinary research in SENR

Readings related to interdisciplinary research paradigms

Week 9 (Mar 7/9): Stretching the Paradigms in SENR –The scholar-activist balance

First day: scholar activism

Possible Guest Discussant

*Thursday end of day (11:59 pm) mid-term paper is due.

Second day: Review of Topics and wrap day for first half of class

Week 10 (Mar14/16) : Spring Break – no class

UNIT 3: Additional Topics

Week 11 (Mar 21/23) - Begin Student-Led Discussions according to schedule below, to be determined by class. Past topics have included the following, and an archive of readings related to past topics can be found in the Carmen site:

Sustainability and Resilience

Civic Science and Adaptive Management

Religion and Science

Indigenous/Traditional Ecological Knowledge (TEK) and Science

Values and Ethics

Environmental Justice

Equity, Inclusion, and Diversity
 Activism and Academia
 Work/Life Balance
 Post-Colonial Science
 Others possible...

Date	Topic	Discussion Leaders	Readings
Week 11: 3/21/23			
Week 11: 3/23/23 Dr. Alexis Mychajliw, Middlebury College (biology and env studies, paleontology)			
Week 12: 3/28/23			
Week 12: 3/30/23			
Week 13: 4/04/23			
Week 13: 4/06/23 Dr. Amy Alford, Lake Erie Islands Nature and Wildlife Center (FFW, education)			
Week 14: 4/11/23			
Week 14: 4/13/23 Dr. Than Boves, Arkansas State University (wildlife ecology)			
Week 15: 4/18/23			
Week 15: 4/20/23 April 20, 2023: EPN Speaker (TBD)			
Finals Week: 4/##/23	Group project presentations, TBD		

Final Exam time slot: Group project presentations and discussion