



EMORY

ROLLINS
SCHOOL OF
PUBLIC
HEALTH

DEPARTMENT: Gangarosa Department of Environmental Health (EH)

COURSE NUMBER: EH590R

SECTION NUMBER: 5084

CREDIT HOURS: 2

SEMESTER: Spring 2021

COURSE TITLE: Planetary Health

TIME AND FORMAT: Fridays 10:15 – 12:10 PM, Online Course

INSTRUCTOR'S NAME: Matthew Gribble

INSTRUCTOR'S CONTACT INFORMATION

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SCHOOL ADDRESS OR MAILBOX LOCATION: CNR 2023

OFFICE HOURS: By Appointment

COURSE DESCRIPTION

Human beings are profoundly altering the natural systems of the planet, resulting in a variety of unintended population health consequences. This course explores several of the mechanisms by which humans are influencing the physical, chemical, and ecological conditions on the planet, and some of the potential consequences of those ongoing changes in systems for human societies. Although all topics presented in this course are intersectional, the impacts can be broadly grouped into planetary health impacts of ecosystem changes (“biosphere”), and planetary health impacts of geological and atmospheric changes (“geosphere”). Successful completion of this course will refine skills in systems thinking and regard for planetary challenges.

Prerequisites: EH520, EH582 or permission of instructor

MPH/MSPH FOUNDATIONAL COMPETENCY: Apply systems thinking tools to a public health issue

EVALUATION:

- 1. Writing Responses: **75%**
- 2. Final Exam: **25%**

Grading:

≥ 92 %	A	75 – 77 %	B
85 – 92 %	A-	70 – 74 %	B-
78 – 84 %	B+	50 – 69 %	C
		< 50 %	F

COURSE STRUCTURE:

This course is primarily a guest speaker series introducing a variety of planetary health themes, from a diverse set of geographically and disciplinarily informed perspectives. Although these seminars are informal presentations, after which you are encouraged to ask questions and talk with the presenter, and we intend for there to be additional time each week for a bit of classroom discussion, due to time constraints the majority of your response to the material will be shared through the writing responses submitted after each week’s presentations, rather than in-class discussions.

The final exam may cover any material on lecture slides, assigned readings, or points raised in in-class discussion, so it is important that you complete all readings and pay attention in class. (Caveat: if a guest speaker specifically requests their presentation not be recorded, then their in-class presentation will not be considered testable material; however, any reading related to their

presentation will still be fair game). In addition to testing your knowledge of planetary health topics covered in the class, these exams will also evaluate your ability to hypothesize plausible connections between environmental changes and public health outcomes (“apply systems thinking tools”), and come up with study designs suitable for evaluating the hypothesized relationships. We will be providing many examples of integrative research and talking in class about how the course themes bridge; on successful completion of the course it is expected you will also be able to construct “big picture” hypotheses grounded in a planetary health / systems perspective.

You are encouraged to make appointments for office hours to discuss course material, in particular possible connections between the multiple changes to planetary systems discussed in class. However, given the online modality and varying time zones of classroom participants, there will not be a fixed office hour time this semester. The course Canvas site will have a Discussion Board where you are encouraged but not required to share your thoughts on the material.

Writing Responses: 75% of grade

Writing Responses – Each topic selected for this course pertains in some way to system-level environmental processes relevant for human and ecological communities. After reading each article, please write a short (e.g., 1 page) summary of that paper’s main message, noting the most surprising thing in the paper for you, and noting at least one question that based on this reading you think might remain unanswered, or a key limitation of the study that you think might be addressed in future work. Propose a study that could address the question (or one of the questions if you had several) – may be epidemiological or another kind of study. The goal is to get you thinking about these systems in specific, tangible ways, and imagine how you could concretely extend this body of knowledge. These summaries may be helpful to you as class notes as you review for the final exam, so you may also (but do not have to) incorporate any salient thoughts on related material presented in class that week.

How the MPH Competency is addressed: *Students in their writing response apply systems thinking tools to identify and suggest ways to address knowledge gaps in planetary health.*

Final Exam: 25% of grade

Final exam – This test has a multiple-choice component that will test subject-matter knowledge pertaining to the content of assigned readings and/or in-class presentations, as well as a short-answer format exercise in applying systems thinking tools. This will be administered online.

How the MPH Competency is addressed: *Students apply systems thinking tools to identify connections between changes in planetary systems and human population outcomes as part of the exam.*

COURSE POLICIES

This class will not have extra credit opportunities.

Assignments are due at the start of class. For example, the writing assignment in response to the class session on January 29 is due before class on February 5. **The reading responses will not be accepted late,** except in case of emergency (e.g., you were in the hospital). This weekly deadline to be up-to-date on course content is intended to help you maintain steady progress through the material despite the online course format. You may receive written feedback on some, but not necessarily all, of your writing responses. These writing responses are intended as knowledge-consolidation exercises to help you reflect on what was covered in class each week.

I endeavor for the classroom to be an inclusive and supportive learning environment. To that end, I will begin the course by establishing (via a Google Doc) our **“Ground Rules” for a safe space** in which to discuss potentially sensitive topics as they come up over the course of the class. This class will have days where the material may be sensitive for some students, and we have a collective responsibility to **keep the (online) classroom civil** and avoid making offensive and overly simplistic statements. This course will be discussing a variety of environmental problems caused by unsustainable human behaviors that are increasing globally, and so this classroom needs to be a safe space for discussing issues of global justice, sustainability, and the consequences of aggregated human behaviors.

In the event that you experience any barriers to learning in this course, do not hesitate to contact your instructor and the Office for Equity and Inclusion, 404-727-9867.

RSPH POLICIES

Accessibility and Accommodations

Accessibility Services works with students who have disabilities to provide reasonable accommodations. In order to receive consideration for reasonable accommodations, you must contact the Department of Accessibility Services (DAS). It is the responsibility of the student to register with DAS. Please note that accommodations are not retroactive and that disability accommodations are not provided until an accommodation letter has been processed.

Students who registered with DAS and have a letter outlining their academic accommodations are strongly encouraged to coordinate a meeting time with the instructor to discuss a protocol to implement the accommodations as needed throughout the semester. This meeting should occur as early in the semester as possible.

Contact Accessibility Services for more information at (404) 727-9877 or accessibility@emory.edu. Additional information is available at the DAS website at <https://accessibility.emory.edu/students/index.html>

Honor Code

You are bound by Emory University's Student Honor and Conduct Code. RSPH requires that all material submitted by a student fulfilling his or her academic course of study must be the original work of the student. Violations of academic honor include any action by a student indicating dishonesty or a lack of integrity in academic ethics. *Academic dishonesty refers to cheating, plagiarizing, assisting other students without authorization, lying, tampering, or stealing in performing any academic work, and will not be tolerated under any circumstances.*

The RSPH Honor Code states: "Plagiarism is the act of presenting as one's own work the expression, words, or ideas of another person whether published or unpublished (including the work of another student). A writer's work should be regarded as [their] own property."

(http://www.sph.emory.edu/cms/current_students/enrollment_services/honor_code.html)

Course Textbook

There is no required textbook for this course.

If you find yourself inspired by any of the material in the class, please feel free to make an office hours appointment to discuss why you found the specific topic interesting, and during that office hour I will try to point you toward additional resources targeted to that interest.

The following textbooks are not required for the course but may be of general interest for further exploration of some of the topics discussed in class:

Gilbert and Epel, 2009. *Ecological Developmental Biology: Integrating Epigenetics, Medicine, and Evolution*. Published by Sinauer Associates, Inc. (Sunderland, MA, USA). 480 pages. ISBN: 978-0-87893-299-3.

Crume, 2018. *Environmental Health in the 21st Century: from Air Pollution to Zoonotic Diseases*. Published by ABC-CLIO, Inc. (Santa Barbara, CA, USA). 700 pages (2 volumes). ISBN: 978-1-4408-4364-8.

COURSE CALENDAR (Note: topics and dates may be updated as the semester progresses)

Date	Speaker	Presentation Topic	Readings
January 29, 2021	Matthew Gribble (Emory University)	Introduction to Planetary Health	Zhu, C. <i>et al.</i> (2019). Carbon dioxide (CO ₂) levels this century will alter the protein, micronutrients, and vitamin content of rice grains with potential health consequences for the poorest rice-dependent countries. <i>Science Advances</i> 4(5): eaaq1012.
	Jesse Bell (University of Nebraska Medical Center)	Public health implications of drought	Lynch, K.M. <i>et al.</i> (2020). Drought severity and all-cause mortality rates among adults in the United States: 1968-2014. <i>Environmental Health</i> 19:1-14.
February 5, 2021	Ryan Smith (Missouri Science & Technology)	Drought impacts on arsenic in groundwater	Smith, R.; Knight, R.; and Fendorf, S. (2018). Overpumping leads to California groundwater arsenic threat. <i>Nature Communications</i> 9:2089.
	Scott Fendorf (Stanford University)	Water security challenges under a changing climate	Report: Protecting Groundwater Quality in California: Management Considerations for Avoiding Naturally Occurring and Emerging Contaminants. (You are responsible for content up through the end of section 4.2 on page 13, but are encouraged to read the full report).
February 12, 2021	Konstantinos Makris (Cyprus University of Technology)	Temperature effects on hormones in Cyprus: a clinical trial	Makris, K.C. <i>et al.</i> (2020). Contrasting short-term temperature effects on the profiling of metabolic and stress hormones in non-obese healthy adults: A randomized cross-over trial. <i>Environmental Research</i> 182: 109065.
	Amruta Nori-Sharma (Boston University)	Heat-related mortality in northern India	Nori-Sarma, A. <i>et al.</i> (2019). The impact of heat waves on mortality in northern India. <i>Environmental Research</i> 176: 108546.
February 19, 2021	Chris Whitehead (Sitka Tribe of Alaska)	Tribal planning for harmful algal blooms	Harley, J.R. <i>et al.</i> (2020). The Southeast Alaska Tribal Ocean Research (SEATOR) Partnership: Addressing Data Gaps in Harmful Algal Bloom Monitoring and Shellfish Safety in Southeast Alaska. <i>Toxins</i> 12(6): 407.

	John Harley (University of Alaska)	Oceanographic data science to predict algal poisoning risks	Harley, J.R. <i>et al.</i> (2020). Random forest classification to determine environmental drivers and forecast paralytic shellfish toxins in Southeast Alaska with high temporal resolution. <i>Harmful Algae</i> 99: 101918.
February 26, 2021	Chris Suffridge (Oregon State University)	B-vitamins influence marine microbial community structure and the global carbon cycle	Tang, Y.Z.; Koch, F.; and Gobler, C.J. (2010). Most harmful algal bloom species are vitamin B1 and B12 auxotrophs. <i>Proceedings of the National Academy of Sciences of the United States of America</i> 107: 20756-20761.
	Lora Fleming (University of Exeter)	Oceans and Human Health in Europe	Fleming, L.E, <i>et al.</i> (2019). Fostering human health through ocean sustainability in the 21 st century. <i>People and Nature</i> . 1: 276-283.
March 5, 2021	Anders Goksøyr (University of Bergen)	Marine systems ecotoxicology	Kidd et al. 2014. Direct and indirect responses of a freshwater food web to a potent synthetic oestrogen. <i>Philosophical Transactions of the Royal Society B</i> 369: 20130578.
	Heli Routti (Norwegian Polar Institute)	Contaminant exposures and effects in Arctic ecosystems	Kalia, V <i>et al.</i> (2020). Relationship between the Pacific Decadal Oscillation (PDO) and persistent organic pollutants in sympatric Alaskan seabird (<i>Uria aalge</i> and <i>U. lomvia</i>) eggs between 1999 and 2010. <i>Chemosphere</i> 262: 127520.
March 19, 2021	Abu Mohd. Naser Titu (Emory University)	Sea-level rise and cardiovascular disease risks	Scheelbeek, P.F.D. <i>et al.</i> (2016). Drinking water salinity and raised blood pressure: evidence from a cohort study in Coastal Bangladesh. <i>Environmental Health Perspectives</i> 125(5): 057007.
	Mathew Hauer (Florida State University)	Sea-level rise and mass migration	Chen, J. and Mueller, V. (2018). Coastal climate change, soil salinity and human migration in Bangladesh. <i>Nature Climate Change</i> 8: 981-985.
March 26, 2021	Tarik Benmarhnia (University of California, San Diego)	Wind and PM2.5 air pollution, with and without wildfire	Aguilera, R. <i>et al.</i> (2020). Santa Ana winds of Southern California impact PM2.5 with and without smoke from wildfires. <i>GeoHealth</i> 4: e2019GH00022.

	John Mulrow (Georgia Institute of Technology)	Prediction of offensive odors from meteorological data	Mulrow, J. <i>et al.</i> (2019). Prediction of odor complaints at a large composite reservoir in a highly urbanized area: a machine learning approach. <i>Water Environmental Research</i> 92: 418-429.
April 2, 2021	Meghan Davis (Johns Hopkins University)	Antibiotic resistance and global change	Davis, M.F. <i>et al.</i> (2017). Checklist for One Health Epidemiological Reporting of Evidence (COHERE). <i>One Health</i> 4: 14-21.
	Ricardo Castillo Neyra (University of Pennsylvania)	Urban ecology of zoonotic disease	Raynor, B. <i>et al.</i> (2020). The impact of the COVID-19 pandemic on rabies reemergence in Latin America: the case of Arequipa, Peru. Preprint available at medRxiv.
April 16, 2021	Emily Gurley (Johns Hopkins University)	Nipah virus and bat populations: zoonotic outbreak investigation	Epstein, J.H. <i>et al.</i> (2020). Nipah virus dynamics in bats and implications for spillover to humans. <i>Proceedings of the National Academy of Sciences of the United States of America</i> . In Press.
	Donghai Liang (Emory University)	Air pollution and susceptibility to COVID-19	Liang, D. <i>et al.</i> (2020). Urban air pollution may enhance COVID-19 case-fatality and mortality rates in the United States. <i>Innovation</i> 1(3): 100047.
April 23, 2021	Joseph Lewnard (University of California, Berkeley)	Zoonotic infectious disease transmission dynamics (e.g., COVID)	Laxminarayan, R. <i>et al.</i> (2020). Epidemiology and transmission dynamics of COVID-19 in two Indian states. <i>Science</i> 370(6517):691-697.
	Trevor Sorrells (Rockefeller University)	How mosquitoes find people	Tucker Lima et al. 2017. Does deforestation promote or inhibit malaria transmission in the Amazon? A systematic literature review and critical appraisal of current evidence. <i>Philosophical Transactions of the Royal Society B</i> 372(1722): 20160125.
April 30, 2021	Dorothy Jane Dankel (University of Bergen)	Radical Interdisciplinarity	Aderibigbe A.D., Stewart A.G., and Hursthouse A.S. (2018). Seeking evidence of multidisciplinary in environmental geochemistry and health: an analysis of arsenic in drinking water research. <i>Environmental Geochemistry and Health</i> . 40(1):395-413.

	Matthew Gribble (Emory University)	Closing Remarks and Final Exam Review Session	Redshaw, C.H. <i>et al.</i> (2013). Potential changes in disease patterns and pharmaceutical use in response to climate change. <i>Journal of Toxicology and Environmental Health Part B: Critical Reviews</i> 16(5): 285-320.
Final Exam Online			