# Human and Planetary Health

(SUSTAIN 103, MED 103, PUBLPOL 183, SOC 103 | WAY-SMA, WAY-SI)

## Syllabus: Fall Quarter 2023

*September 25, 2023*

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***Summary***


Two of the biggest challenges humanity has to face – promoting human health and halting environmental degradation – are strongly linked. Gains in health metrics in the last century have coincided with dramatic and unsustainable planetary-level degradation of environmental and ecological systems. Now, climate change, pollution, and other challenges are threatening the health and survival of communities across the globe. In acknowledging complex interconnections between environment and health, this course highlights how we must use an interdisciplinary approach and systems thinking to develop comprehensive solutions. Through a survey of human and planetary health topics that engages guest speakers across Stanford and beyond, students will develop an understanding of interconnected environmental and health challenges, priority areas of action, and channels for impact. Students enrolling in just the lecture should enroll for 3 units. Students enrolling the lecture and weekly discussion sections should enroll for 4 units.

***Schedule & attendance***
Class meets in person in STLC 114 on Tuesday and Thursday, 12-1:20 pm Pacific Time, beginning September 26 and ending December 7, 2023. For students enrolled in 4 units, discussion sections will take place Monday, Tuesday, Thursday, 4:30-5:20 pm, and Friday, 11:30am-12:20pm. In-person attendance is required.

Some lectures engaging online speakers may be conducted entirely online by Zoom. A link will be provided, and students will be required to have cameras active. No Zoom option is available for in-person lectures.

We understand that sometimes students may experience emergencies that prevent them from attending class. In this case, we ask that students email their assigned TA to explore options to make up for missed class.

***Instructors***
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*Office hours weekly: Thursdays, 3PM-4PM, and Fridays, 2:30PM - 3:30PM at Tresidder Memorial Union.*

***Librarian***
Alma Parada (aparada@stanford.edu)
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Stanford Law School Policy Lab Program Director
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***Background***
This course explores the conceptual framework of human and planetary health. In acknowledging complex interconnections between environment and health, we will see that we must use interdisciplinary, systems-thinking lenses to develop comprehensive solutions. Human and planetary health builds on medicine and public health by integrating environmental sciences. Likewise, it strengthens environmental and sustainability disciplines by calling attention to the health impacts of

global environmental change. If we are to preserve the health, livelihoods and ultimate survival of future generations, we need to address the impacts of current industrial paradigms, demographic trends, and norms of consumption and production. In evaluating problems and potential solutions, we consider technological innovations, policy, environmental justice, governance, and cultural paradigms.
We identify four basic principles of human and planetary health:

**1. Urgency and scale:** We must contend with the scale of global environmental change and the breadth of impacts on human health. These drive our sense of the urgency in taking action to safeguard against dire consequences for human civilization.

**2. Systems thinking:** Human and planetary health requires engagement with scientists and stakeholders across a wide range of disciplines and backgrounds. A systems-thinking lens is essential in examining the complexity of interactions involving health and environment.

**3. Social dimensions and values:** Both anthropogenic environmental changes and their impacts on health are heterogenous, mediated by geographical and temporal scale, socioeconomics, politics, and culture. It is thus important to examine critically issues of inequality and inequity, historical and current global values, cultural identity and bias.

**4. Knowledge-to-action**: Human and planetary health is intrinsically action-oriented, with emphasis on communicating with leaders, policymakers, and governments at all levels and across sectors to protect and improve human health and environmental sustainability.

***Course structure***

This course is suitable for students at all levels and from all disciplines. A series of lectures, discussions, and interactive opportunities offer the opportunity to gain an in-depth understanding of the concepts of human and planetary health, its goals and theoretical foundations, and most significant challenges. Each class session focuses on one topic, with related readings and activities. For students enrolled for 4 units, weekly discussion sections will expand on content covered in class.

***Learning outcomes***

- Recognize the holistic, multifaceted and complex nature of the relationship between human health and the environment and the challenges we face now and in the future
- Investigate the origins of human and planetary health challenges – and possible solutions – through systems thinking and interdisciplinary approaches
- Understand environmental degradation, growing health impacts, equity considerations, and mitigation and adaptation strategies through engagement of historical, structural, social, political, cultural, and economic factors
- Acquire knowledge of indices, metrics, and approaches used to characterize health, ecological integrity, and environmental degradation and describe positive and negative feedbacks between human health and ecosystem integrity
- Develop skills in understanding and influencing policy to advance human and planetary health goals
- Explore actionable interventions across multiple disciplines and sectors that can benefit health and the environment directly and measurably

***Assignments***

- *Readings:* Assigned readings typically include 1-3 articles or chapters related to the day's topic. These will be posted on Canvas. Students may be called on to discuss the main points and raise questions about each reading.
    - No textbook is required for this course. For those who would like to have a comprehensive textbook as a reference, we recommend the following resource:

*Planetary Health: Safeguarding Human Health and the Environment in the Anthropocene*, 1st Edition, by Andy Haines, Howard Frumkin, Cambridge University Press 2021. Please note that this is optional.

- *Reflections:* Students will write weekly short reflection papers (400-800 words) integrating readings and class content. Prompts will be provided on Mondays. Reflection papers will be due the following Sunday at 11:59pm. These will be graded on a 10-point scale.
- *Policy brief:* Each student will research and write a 2-page policy brief for a specific human and planetary health solution as a final project. Proposal due in Week 4, project update Week 7, and final product Week 10. Instruction and readings on how to develop a policy brief will be provided.
- *Research proposal (4-unit students only):* Students enrolled for 4 units will write a preliminary research proposal due at the end of the quarter. The proposal will include only a problem statement, research question, and specific aims for a proposed study investigating a specific human and planetary health solution. Problem statement and research question due Week 5, draft of specific aims in Week 8, and final product Week 10. Instruction and readings on developing a research proposal will be provided in sections.

**No assignments can be produced by using ChatGPT/MS Bing or any other generative AI tools. Please note that we will use an AI detector to validate assignments. Assignments will be constructed in a way that minimizes the usefulness of AI tools.*

***Key dates & deadlines***

| | | |
|---|---|---|
| ● Week 1 | Reflection #1 | due Sun Oct 1, 11:59pm |
| ● Week 2 | Reflection #2 | due Sun Oct 8, 11:59pm |
| ● Week 3 | Reflection #3 | due Sun Oct 15, 11:59pm PT |
| ● Week 4 | Policy brief: topic memo | due Sun Oct 22, 11:59pm PT |
| | Reflection #4 | due Tues Oct 24, 11:59pm PT |
| ● Week 5 | Research question *(4-unit students only)* | due Fri Oct 27, 11:59pm PT |
| | Reflection #5 | due Sun Oct 29, 11:59pm PT |
| ● Week 6 | Reflection #6 | due Sun Nov 5, 11:59pm PT |
| ● Week 7 | Policy brief: findings memo | due Sun Nov 12, 11:59pm PT |
| ● Week 8 | Research aims *(4-unit students only)* | due Fri Nov 17, 11:59pm PT |
| | Reflection #7 | due Sun Nov 19, 11:59pm PT |
| ● Week 9 | Reflection #8 | due Sun Dec 3, 11:59pm PT |

- Week 10 Policy brief: options memo due Fri Dec 8, 11:59pm PT

  Research proposal *(4-unit students only)* due Sun Dec 10, 11:59pm PT

Deadlines are designed to help students and instructors pace their work and allow time for feedback and revision. Students are expected to complete assigned readings before the lectures and submit assignments by the due dates listed above. Based on experience, the teaching team strongly recommends that students keep up with the course flow. We will discourage extensions and strongly resist granting incompletes at the end of the quarter.

***Grading***

| Assignment | 3-unit weighting | 4-unit weighting |
|---|---|---|
| Attendance, readings & participation | 15% | 12% |
| Reflections | 60% | 48% |
| Policy brief | 25% | 20% |
| Research proposal | n/a | 20% |

**Late assignments will be graded down 20% per day unless other arrangements have been made with the teaching team at least 24 hours in advance of the due date.*

***Honor code***

Violating the Honor Code is a serious offense, even when the violation is unintentional. The Honor Code is available here. Students are responsible for understanding University rules regarding academic integrity. In brief, conduct prohibited by the Honor Code includes all forms of academic dishonesty, among them copying from another's exam, unpermitted collaboration, and representing the work of another as one's own. If students have any questions, they should contact their teaching fellow.

***Access & accommodations***

Stanford is committed to providing equal educational opportunities for disabled students. Disabled students are a valued and essential part of the Stanford community. We welcome you to our class.

If you experience disability, please register with the Office of Accessible Education (OAE). Professional staff will evaluate your needs, support appropriate and reasonable accommodations, and prepare an Academic Accommodation Letter for faculty. To get started, or to re-initiate services, please visit oae.stanford.edu. The OAE is located at 563 Salvatierra Walk.

If you already have an Academic Accommodation Letter, we invite you to share your letter with instructor Erika Veidis and teaching assistant Aneeqa Abid. Academic Accommodation Letters should be shared at the earliest possible opportunity so we may partner with you and OAE to identify any barriers to access and inclusion that might be encountered in your experience of this course.

***Schedule***

- *Week 1*
    - **Tues Sep 26: Welcome**
      Overview of human and planetary health and course structure.

    - **Tues Sep 28: Introduction to human and planetary health**
      *Speaker: Stephen Luby, Professor of Medicine (Infectious Diseases), Professor of Epidemiology and Population Health (by courtesy), Senior Fellow at the Stanford Woods Institute for the Environment and the Freeman Spogli Institute*
      Introduction to core concepts in human and planetary health – including structural drivers, environmental changes, health impacts, and approaches to solutions.

      Course materials:
        - Haines, Andy, and Howard Frumkin, eds. 2021. "Preface." *In Planetary Health: Safeguarding Human Health and the Environment in the Anthropocene*, xi–xv. Cambridge: Cambridge University Press. https://www.cambridge.org/core/books/planetary-health/preface/883EFFEEB714B695F76C7ABD1DB9398F.
        - Haines, Andy, and Howard Frumkin, eds. 2021. "Our Changing Planet." In *Planetary Health: Safeguarding Human Health and the Environment in the Anthropocene*, 1–33. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781108698054.001.

- *Week 2*
    - **Tues Oct 3: Systems thinking for human and planetary health**
      *Speaker: Banny Banerjee, Director of ChangeLabs*
      Overview of systems thinking approaches for understanding and addressing human and planetary health challenges.

      Course materials:
        - Banerjee, Banny. 2021. "The ABC of Planetary Insecurity: A Crisis in Need of System Acupuncture." *Environmental Conservation* 48 (2): 71–74. https://doi.org/10.1017/S0376892921000072.
        - Meadows, Donella. n.d. "Leverage Points: Places to Intervene in a System." *The Academy for Systems Change* (blog). Accessed September 13, 2023. https://donellameadows.org/archives/leverage-points-places-to-intervene-in-a-system/.

    - **Thurs Oct 5: Indigenous perspectives in human and planetary health**
      *Speaker: Nicole Redvers, Associate Professor, Director of Indigenous Planetary Health, Western University*
      Discussion of human and planetary health concepts and challenges through the lens of Indigenous knowledge systems.

      Course materials:
        - Redvers, Nicole, Anne Poelina, Clinton Schultz, Daniel M. Kobei, Cicilia Githaiga, Marlikka Perdrisat, Donald Prince, and Be'sha Blondin. 2020. "Indigenous

Natural and First Law in Planetary Health." *Challenges* 11 (2). https://doi.org/10.3390/challe11020029.
    - Redvers, Nicole, Yuria Celidwen, Clinton Schultz, Ojistoh Horn, Cicilia Githaiga, Melissa Vera, Marlikka Perdrisat, et al. 2022. "The Determinants of Planetary Health: An Indigenous Consensus Perspective." *The Lancet Planetary Health* 6 (2): e156–63. https://doi.org/10.1016/S2542-5196(21)00354-5.

- *Week 3*
    - **Tues Oct 10: Engaging stakeholders across sectors**
      *Speaker: Jim Leape, Co-Director of Stanford Center for Ocean Solutions, William and Eva Price Senior Fellow in the Stanford Woods Institute for the Environment*
      Exploration of opportunities to engage the private sector and policymakers in addressing human and planetary health challenges.

      Course materials:
        - Lambin, Eric F., Hajin Kim, Jim Leape, and Kai Lee. 2020. "Scaling up Solutions for a Sustainability Transition." *One Earth* 3 (1): 89–96. https://doi.org/10.1016/j.oneear.2020.06.010.
        - **EXPLORE:** The Blue Food Assessment. 2023. https://bluefood.earth.

    - **Thurs Oct 12: How to write a policy brief**
      *Speaker: Luciana Herman, Program Director, Stanford Law and Policy Lab*
      Overview of developing a policy brief in the context of influencing human and planetary health policy – with attention to students' final projects.

      Course materials (Canvas > Files > Reading Assignments > Week 3):
        - Stanford Law & Policy Lab Theories of Change, Logic Models and Heuristics to Define Options
        - Eugene Bardach, "The Eightfold Path"

- *Week 4*
    - **Tues Oct 17: Climate, extreme heat, and health**
      *Speaker: Kathy Burke, Human and Planetary Health Lead, Woods Institute for the Environment*

      Course materials:
        - Haines, Andy, and Howard Frumkin, eds. 2021. "Climate Change." In *Planetary Health: Safeguarding Human Health and the Environment in the Anthropocene*, 34–76. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781108698054.002.
        - Haines, Andy, and Howard Frumkin, eds. 2021. "Adaptation and Resilience to Planetary Change." In *Planetary Health: Safeguarding Human Health and the Environment in the Anthropocene*, 148–77. Cambridge: Cambridge University Press. https://doi.org/10.1017/9781108698054.005.

    - **Thurs Oct 19: Climate, displacement, and refugee health**
      *Speakers: Paul Wise, Richard E. Behrman Professor of Child Health and Society and Professor of Pediatrics and Health Policy, Stanford University School of Medicine; and*

*Julia Neusner, Director, Human Security Initiative*
Exploration of the impacts of climate change on human migration and displacement – with an eye on refugee health.

Course materials:

- U.S. Committee for Refugees and Immigrants, Human Security Initiative, and International Refugee Assistance Project. 2023. "Climate of Coercion: Environmental and Other Drivers of Cross-Border Displacement in Central America and Mexico." https://refugeerights.org/news-resources/climate-of-coercion-environmental-and-other-drivers-of-cross-border-displacement-in-central-america-and-mexico.
- Wise, Paul H. 2023. "Advocacy for Unaccompanied Migrant Children in US Detention." *Pediatric Clinics of North America* 70 (1): 103–16. https://doi.org/10.1016/j.pcl.2022.09.006.

- *Week 5*
  - **Tues Oct 24: Wildfires**
    *Speaker: Michael Wara, Senior Research Scholar at the Woods Institute for the Environment, Director of the Climate and Energy Policy Program*
    Discussion of wildfires as a key human and planetary health challenge – trends over the years, increasing vulnerabilities, and approaches towards solutions.

    Course materials:

    - Wara, Michael. 2021. "A New Strategy for Addressing the Wildfire Epidemic in California." White Paper. Stanford Woods Institute Climate and Energy Policy Program. https://woodsinstitute.stanford.edu/system/files/publications/New_Strategy_Wildfire_Epidemic_Whitepaper_1.pdf.
    - Burke, Marshall, Anne Driscoll, Sam Heft-Neal, Jiani Xue, Jennifer Burney, and Michael Wara. 2021. "The Changing Risk and Burden of Wildfire in the United States." *Proceedings of the National Academy of Sciences* 118 (2): e2011048118. https://doi.org/10.1073/pnas.2011048118.

  - **Thurs Oct 26: Communications and movement building**
    *Speaker: Shannon Osaka, Environmental Reporter (Climate Zeitgeist), The Washington Post*
    How should we communicate about planetary health? Lessons from journalism and the social sciences.

    Course materials:

    - (Excerpt) Hulme, Mike. 2009. *Why We Disagree about Climate Change: Understanding Controversy, Inaction and Opportunity*. Cambridge: Cambridge University Press. https://doi.org/10.1017/CBO9780511841200. (ACCESS ON CANVAS)
    - Osaka, Shannon, Erin Patrick O'Connor, and John Muyskens. 2023. "Extreme Heat Poses Heightened Death Risk for Those with Schizophrenia." Washington Post. September 6, 2023. https://wapo.st/3QrPsKl.

        - Osaka, Shannon. 2021. “Can ‘the People’ Solve Climate Change? France Decided to Find Out.” *Grist*. November 15, 2021. https://grist.org/international/citizens-assembly-convention-climate-france-macron/.

- *Week 6*
    - **Tues Oct 31: Plastic: circular economy approaches for human and planetary health**
      *Speakers: Desiree LaBeaud, Professor of Pediatrics (Infectious Diseases), Senior Fellow at the Woods Institute for the Environment and Professor, by courtesy, of Epidemiology and Population Health, Stanford University; and Julia Novy, Professor of the Practice, ChangeX; Professor of the Practice, Stanford Woods Institute for the Environment, Stanford University*
      Exploration of circular economic approaches to human and planetary health challenges – with a focus on plastic pollution.

      Course materials:
        - Veidis, Erika, and Jamie Hansen. 2022. “Perspective | There’s Good Reason to Worry about the Health Risks of Plastics.” *Washington Post*, May 11, 2022. https://www.washingtonpost.com/health/2022/04/02/plastic-pollution-health-poverty/.
        - Vogel, Jefim, and Jason Hickel. 2023. “Is Green Growth Happening? An Empirical Analysis of Achieved versus Paris-Compliant CO2–GDP Decoupling in High-Income Countries.” *The Lancet Planetary Health* 7 (9): e759–69. https://doi.org/10.1016/S2542-5196(23)00174-2.
        - Positive Luxury, dir. 2019. “*The Circle” Webinar Series | Circular Economy with Julia W. Novy-Hildesley*. https://www.youtube.com/watch?v=kJdMdZ1oyqw.
        - **OPTIONAL**: Stanford Online, dir. 2022. *Stanford Webinar - Closing the Loop: The Circular Economy, Business & Sustainability.* https://www.youtube.com/watch?v=WDNhl0JxXBM.

    - **Thurs Nov 2: Neglected tropical diseases in Africa**
      *Speaker: Giulio De Leo, Professor of Oceans; Professor of Earth System Science; Senior Fellow, Woods Institute for the Environment*
      Discussion of infectious diseases in Africa and their intersections with environmental and social variables – and approaches towards solutions

      Course materials:
        - Ouyang, Zhiyun, Changsu Song, Hua Zheng, Stephen Polasky, Yi Xiao, Ian J. Bateman, Jianguo Liu, et al. 2020. “Using Gross Ecosystem Product (GEP) to Value Nature in Decision Making.” *Proceedings of the National Academy of Sciences* 117 (25): 14593–601. https://doi.org/10.1073/pnas.1911439117.
        - Daily, Gretchen C., and Mary Ruckelshaus. 2022. “25 Years of Valuing Ecosystems in Decision-Making.” *Nature* 606 (7914): 465–66. https://doi.org/10.1038/d41586-022-01480-x.

- *Week 7*
    - **Tues Nov 7: NO CLASS**

- **Thurs Nov 9: Food systems policy**
  *Speaker: David Hayes, Lecturer at Stanford Law School*
  Discussion of policy approaches to advancing food systems that support human health, the environment, and community resilience.

  Course materials:
  - Environmental Defense Fund. "Inflation Reduction Act Activation Guide: Climate-Smart Agriculture." 2023. *EDF+Business* (blog). https://business.edf.org/insights/inflation-reduction-act-activation-guide-climate-smart-agriculture/.
  - Hayes, David J., Stephen Ferruolo, Daniel Gajardo, Lisa Lu, Katelyn McEvoy, Karli Moore, Korey Mui, Siddharth Sachdeva, Angela Tsao, and Ben Zehr. 2023. Data Progress Needed For Climate-Smart Agriculture (*Policy Lab: Harvesting Climate Benefits from Agriculture and Forestry Practices (808Y); Teaching/Supervising Team: David J. Hayes).* https://law.stanford.edu/publications/data-progress-needed-for-climate-smart-agriculture/.

- *Week 8*
  - **Tues Nov 14: Agroecology and farming**
    *Speakers: Reginaldo Haslett-Marroquin, CEO of Tree-Range Farms, owner-founder of Regeneration Farms LLC, Founder, President of the Regenerative Agriculture Alliance; and Patrick Archie, Director, Stanford O'Donohue Educational Farm*
    Overview of regenerative agriculture and agroecological solutions for human and planetary health – featuring on-the-ground perspectives engaging science, Indigenous knowledge, and social justice considerations.

    Course materials:
    - Brondizio, Eduardo S., Stacey A. Giroux, Julia C. D. Valliant, Jordan Blekking, Stephanie Dickinson, and Beate Henschel. 2023. "Millions of Jobs in Food Production Are Disappearing — a Change in Mindset Would Help to Keep Them." *Nature* 620 (7972): 33–36. https://doi.org/10.1038/d41586-023-02447-2.
    - Greenaway, Twilight. 2023. "This Network of Regenerative Farmers Is Rethinking Chicken." Civil Eats. August 16, 2023. https://civileats.com/2023/08/16/this-network-of-regenerative-farmers-is-rethinking-chicken/.
    - McNulty, Anna. 2022. "A Return to Native Agriculture." Civil Eats. January 21, 2022. https://civileats.com/2022/01/21/a-return-to-native-agriculture/.

  - **Thurs Nov 16: Brick kilns**
    *Speaker: Stephen Luby, Professor of Medicine (Infectious Diseases), Professor of Epidemiology and Population Health (by courtesy), Senior Fellow at the Stanford Woods Institute for the Environment and the Freeman Spogli Institute*
    Case story of brick kilns in Southeast Asia as an example of leveraging a human and planetary health lens to develop integrated solutions engaging multiple stakeholders.

    Course materials:

        - Schmidt, Charles W. 2013. “Modernizing Artisanal Brick Kilns: A Global Need.” *Environmental Health Perspectives* 121 (8): a242–49. https://doi.org/10.1289/ehp.121-a242.
        - Balakrishnan, Kalpana, Sagnik Dey, Tarun Gupta, R. S. Dhaliwal, Michael Brauer, Aaron J. Cohen, Jeffrey D. Stanaway, et al. 2019. “The Impact of Air Pollution on Deaths, Disease Burden, and Life Expectancy across the States of India: The Global Burden of Disease Study 2017.” *The Lancet Planetary Health* 3 (1): e26–39. https://doi.org/10.1016/S2542-5196(18)30261-4.

    - **Tues Nov 21: NO CLASS**

    - **Thurs Nov 23: NO CLASS**

- *Week 9*
    - **Tues Nov 28: Mental health on a changing planet**
      *Speaker: Britt Wray, Lead of the Chair’s Special Initiative on Climate and Mental Health in the Department of Psychiatry and Behavioral Sciences of Stanford University School of Medicine*
      Exploration of climate anxiety, ecological grief, and other mental health impacts of climate change and environmental degradation – with a focus on how to build resilience.

      Course materials:
        - Lawrance, Emma L., Rhiannon Thompson, Jessica Newberry Le Vay, Lisa Page, and Neil Jennings. 2022. “The Impact of Climate Change on Mental Health and Emotional Wellbeing: A Narrative Review of Current Evidence, and Its Implications.” International Review of Psychiatry 34 (5): 443–98. https://doi.org/10.1080/09540261.2022.2128725.
        - Lawrance, Emma, Rhiannon Thompson, Gianluca Fontana, and Neil Jennings. 2021. “The Impact of Climate Change on Mental Health and Emotional Wellbeing: Current Evidence and Implications for Policy and Practice.” Briefing paper No 36. Grantham Institute - Institute of Global Health Innovation: Imperial College London. https://www.imperial.ac.uk/grantham/publications/all-publications/the-impact-of-climate-change-on-mental-health-and-emotional-wellbeing-current-evidence-and-implications-for-policy-and-practice.php
        - Wray, Britt. 2022. “Introduction.” In *Generation Dread: Finding Purpose in an Age of Climate Crisis*., 1–11. Knopf Canada.
        - **OPTIONAL:** Bratman, Gregory N., Christopher B. Anderson, Marc G. Berman, Bobby Cochran, Sjerp de Vries, Jon Flanders, Carl Folke, et al. n.d. “Nature and Mental Health: An Ecosystem Service Perspective.” *Science Advances* 5 (7): eaax0903. https://doi.org/10.1126/sciadv.aax0903.

    - **Thurs Nov 30: Legal levers for planetary health action**
      *Speaker: Benjamin Franta, Senior Research Fellow in Climate Litigation at the Oxford Sustainable Law Programme, Lead of Climate Litigation Lab*
      Overview of the growing field of climate litigation – and legal approaches to address human and planetary health challenges.

Course materials:

- Wentz, Jessica, and Benjamin Franta. 2022. “Liability for Public Deception: Linking Fossil Fuel Disinformation to Climate Damages.” *Sabin Center for Climate Change Law*, December. https://scholarship.law.columbia.edu/sabin_climate_change/195.
- United Nations Environment Programme. 2023. *Global Climate Litigation Report: 2023 Status Review.* United Nations Environment Programme. https://doi.org/10.59117/20.500.11822/43008.

- *Week 10*
  - **Tues Dec 5: Water, contamination, and environmental justice**
    *Speakers: Khalid Osman, Assistant Professor of Civil and Environmental Engineering and Center Fellow, by courtesy, at the Woods Institute for the Environment*
    Overview of degradation of water quality and health impacts – with a focus on disproportionate impacts on marginalized communities and solutions that center environmental justice.

    Course materials:

    - Hernandez, Ariana, and Gregory Pierce. n.d. “The Geography and Socioeconomic Characteristics of U.S. Households Reliant on Private Wells and Septic Systems.” *JAWRA Journal of the American Water Resources Association n/a (n/a).* Accessed December 4, 2023. https://doi.org/10.1111/1752-1688.13135.
    - Albright, Elizabeth A., Catherine Coleman Flowers, Randall A. Kramer, and Erika S. Weinthal. 2023. “Failing Septic Systems in Lowndes County, Alabama: Citizen Participation, Science, and Community Knowledge.” *Local Environment 0* (0): 1–8. https://doi.org/10.1080/13549839.2023.2267066.

  - **Thurs Dec 7: Conclusion**
    Wrapping up and integrating human and planetary health learnings throughout the quarter in our final class.