Syllabus: ESM 217, Planetary Health (T/R 8:00-9:15, BH 1424 T/ 3035 GIS lab R)

Instructor: Dr. Andy MacDonald

Office hours: TBD

Planetary health: linkages between health and environment in an age of rapid environmental change – This course will introduce the multidisciplinary field of planetary health, which is concerned with the health of human civilization and the state of the natural systems on which it depends. The course will explore linkages and feedbacks between environmental degradation, global change and human health including infectious and non-infectious disease, diets and nutrition among other topics. Finally, the course will explore proposed solutions to jointly improve environmental and health outcomes.

Course objectives: the primary objective of this course is to develop the intuition and an understanding of how environment can be linked to health, through well researched case studies, and to be able to apply this intuition gained (through the lens of relevant disciplines) to novel scenarios. The other main objectives are to teach you how to think critically about complex systems and the many connections and interactions that influence the ultimate health outcomes of environmental change, and to gain experience synthesizing and doing that science and communicating it to a public audience.

Assignments/assessment:

- 1 written summary of weekly readings, including case studies, and discussion lead: (25 points) – googledoc to sign up to choose readings
- Participation in reading and case study discussions each week: (30 points)
- Labs 1, 2 and 3: (15 points each, 45 total)
- Final project proposal: due Thursday of week 4 (10 points)
- Final project preliminary analyses: due Thursday of week 7 (20 points)
- Final presentation: week 10 - googledoc to sign up for dates (40 points)
- Final project report: due Friday, March 13 (30 points)
- Total: 200 points

Academic conduct: It is expected that students attending the University of California understand and subscribe to the ideal of academic integrity and are willing to bear individual responsibility for their work. Any work (written or otherwise) submitted to fulfill an academic requirement must represent a student's original work. For more on UCSB policies surrounding plagiarism and academic (mis)conduct, please see the student code of conduct. Students are expected to interact with their peers in a professional and cordial manner; everyone's ideas and opinions are important and valued contributions to course dialog.

Late policies:

Late assignments will be docked 10% each full day beyond the due date they are not completed and turned in.

Weekly schedule and readings/assignments

Week 1:

- Tuesday: *Lecture 1* - Introduction to the course; causal diagram exercise
- Thursday: Lab 1 – quantifying health

    - Sources of data, data cleaning in R; sign up for GEE account

Week 2:

- Tuesday: *Lecture 2* - Introduction continued and COVID-19 case study; discussion of first readings
    - Readings for Tuesday: case study introduction (pg. 6-24); Myers 2017; Lancet commission (not required)
- Thursday: Lab 2 – quantifying the environment
    - An introduction to google earth engine
    - **Assignment due**: Lab 1 (Thursday)

Week 3:

- Tuesday: *Lecture 3* - Land use/cover change (topics – what is it and what drives it; where is it happening and where are effects felt; what are the planetary health impacts); case study and readings discussion
    - Readings for Tuesday: case study 6; MacDonald and Mordecai 2019; Lambin 2011 (not required)
- Thursday: Lab 3 – linking health and environment
    - Data cleaning and merging with environment data in R, analysis
    - **Assignment due**: Lab 2 (Thursday)

Week 4:

- Tuesday: *Lecture 4* - Changing food systems (topics – how are food systems changing and why; where is it happening and where are effects felt; what are the planetary health impacts); case study and readings discussion
    - Readings for Tuesday: case study 5; Carleton 2017; Bonvoisin 2020; von der Goltz 2020 (not required)
- Thursday: Final project proposal development and lab work time; project group check-ins with Andy
    - **Assignment due**: Lab 3 (Thursday); Final project proposal (Friday)

Week 5:

- Tuesday: *Lecture 5* - Biodiversity shifts (topics – how is global biodiversity changing and why; where is it happening and where are effects felt; what are the planetary health impacts); case study and readings discussion
    - Readings for Tuesday: case study 2; Sokolow 2017; Ostfeld 2000 (not required); MacDonald 2019 (not required)
- Thursday: project group check-ins with Andy; project work time

Week 6:

- Tuesday: *Lecture 6* - Climate change (topics – how is climate changing and why; where is it happening and where are effects felt; what are the planetary health impacts); case study and readings discussion
    - Readings for Tuesday: case study 3; Jones 2020; Xu 2020 (not required)
- Thursday: Work time on final projects

Week 7:

- Tuesday: *Lecture 7* - Natural disasters (topics – what are natural disasters and why are some increasing in frequency and severity and others aren't; where is it happening and where are effects felt; what are the planetary health impacts); case study and readings discussion

    - Readings for Tuesday: case study 9; Orata 2014; Goto 2021 (not required)
- Thursday: Work time on final projects
    - **Assignment due**: Final project preliminary analyses due (Friday)

Week 8:

- Tuesday: *Lecture 8* - Water quality and scarcity and global pollution (topics – how are water quality and scarcity/pollution changing and why; where is it happening and where are effects felt; what are the planetary health impacts); case study and readings discussion
    - Readings for Tuesday: case study 1; Perrone 2019; Faizan 2019 (not required)
- Thursday: Work time on final projects

Week 9:

- Tuesday: *Lecture 9* - Planetary health solutions (topics – how do we take what we know about the drivers of environmental change and the health impacts of that change to design solutions?); case study and readings discussion
    - Readings for Tuesday: case study 8; Pongsiri 2019; Hopkins 2020
- Thursday: Work time on final projects

Week 10:

- Tuesday: Student presentations
- Thursday: Student presentations (as needed); Office hour for final project reports
    - **Assignment due**: final project report due Friday