E1XP: Community Engaged Environmental Engineering: Impacts of Factory Farming on Community and Planetary Health
Two-week Summer Institute

Course Description:

This seminar course will examine the environmental impacts of industrialized animal agriculture from both a planetary health and community health perspective. Using data from the primary literature for various foods, we will calculate the environmental footprint of a range of dietary patterns in terms of greenhouse gas emissions, land use, and nitrogen loss. Using GIS-based research skills, including the acquisition of remotely sensed data, we will explore cases of environmental injustice related to proximity to factory farms. As a group, through collection of field samples and processing them in the laboratory, we will investigate the role of livestock in the spread of environmental antimicrobial resistance. Through class discussions, readings, and case studies, students will critically analyze the impacts of factory farming and its role in the food system.

Class Format:
Class will include:

- Lectures with Professor Jennifer Jay on planetary and community health impacts of industrialized animal agriculture
- Classroom activities to calculate carbon footprints of dietary patterns
- Demonstrations and hands on activities of water quality analysis and assessment of antimicrobial resistance.
- Field work to collect environmental samples near industrialized agriculture
- Laboratory work to process the samples and analysis of the results
- GIS-based research to investigate spatial relationships between industrialized agriculture, certain types of pollution, and demographics of surrounding communities
- Guest lectures from members of non-profit organizations dedicated to creating more sustainable food systems
- A field trip to a non-profit farmed animal sanctuary

Assessment:

Class engagement and follow up, including activities from group work: 40%
Reflections on readings and discussions: 20%
Individual GIS-based research project and StoryMap: 40%

SAMPLE SYLLABUS. Enrolled students will receive the finalized syllabus prior to the start of the institute.

Week 1 Schedule

		Monday	Tuesday	Wednesday	Thursday	Friday
Week 1	9-9:30	Sign in	Water planetary boundary	Climate change boundary, part 1	Drive in vans to field sampling	Nitrogen and phosphorus planetary boundary
	9:30-10	Course overview. Introduction to planetary boundaries concept				
	10-10:30		Introduction to water quality and fecal indicator bacteria	Dairy industry and community health impacts		Nitrogen footprint calculation activity
	10:30-11	Introduction to industrial food animal production				
	11-11:30		Environmental antibiotic resistance	Lynn Henning Guest Lecture	Sampling	Pig industry and community health impacts
	11:30-12	Demo of EJ Screen				
	12-12:30	Lunch	Lunch	Lunch		Lunch
	12:30-1					
	1-1:30	Set up Seasnet account. Look up case studies of communities facing health impacts due to factory farms	EJ Screen and CDC Public Health Tracker. GIS activities.	SRAP GIS portal of field area and area of interest for project	Drive back to lab and process samples. This evening, we may need until 8 PM.	Counting IDEXX and working with data
	1:30-2					
	2-2:30					
	2:30-3	Tour of lab. Pipetting practice. Field probes and turbidity kits	Sampling at Botanical garden and practicing field probes and *E. coli* with antibiotics added	Preparation for field trip		Story Map Activity
	3-3:30					
	3:30-4					

Week 2 Schedule

		Monday	Tuesday	Wednesday	Thursday	Friday
Week 2	9-9:30	Land use boundary	Farm Sanctuary Field Trip	Springmann and EAT Lancet	Group Presentations and feedback	July 4 Holiday
	9:30-10					
	10-10:30					
	10:30-11	Biodiversity loss		Solutions Workshop	Group Presentations and feedback	
	11-11:30					
	11:30-12					
	12-12:30	Lunch		Lunch	Lunch	
	12:30-1					
	1-1:30	Copernicus satellite data activity and choice of datasets		Work on StoryMap text	Lab and campus tours	
	1:30-2					
	2-2:30				Panel on college life	
	2:30-3	ArcGIS for project. Draft StoryMap		Work on StoryMap maps.		
	3-3:30				Poster session	
	3:30-4					

<u>Individual CAFO Impacts GIS-based Research Project and StoryMap Overview</u>

For this project, you will learn a series of research skills through classroom activities and computer labs. You'll then have the opportunity to explore health and environmental impacts due to CAFOs at an area of your choice.

Final Project Deliverables

By the end of the class, you will create a StoryMap detailing how industrialized animal agriculture has impacted your area of interest, using the articles, datasets, and skills you've developed throughout the program to support your story.

The full text for your StoryMap should be equivalent to a five-page, double-spaced paper **(1100-1300 words).**

Your final Storymap will encompass the following:

1. **Introduction to the issues an area has faced**, including evidence of those issues (please cite at least one article exploring this issue. Additionally, you can reference community forums, lawsuits, etc.) (4-5 paragraphs, 20%)
2. **Background of the area of interest**. Could include historic information on primary industries (for example, history of agriculture, dominant industries, or major relevant shifts from industries (ie., a community has moved from small community farms to big ag in recent years). (1 paragraph, 5%)
3. **Evidence for these issues**, including at least **3 highlighted datasets** from your previous labs embedded in your story map. These must be interactive maps. (5% per map up to 3, 15% total)
4. **A description of what is shown in each of your maps.** (5% per map, up to 3, 15% total)
5. **Background scientific information** on the parameters you plotted in your map and why communities might be interested in these data. **Must include 3-4 scientific article citations.** (15%)
6. **A summary of your findings** and an explanation of how these findings are relevant to the issues and how they could help support community action. (2-3 paragraphs, 15%)
7. **Next steps/call to action paragraph.** These paragraphs should include possible ways community members and readers can get involved in helping the community. For example, this could include government representatives they could reach out to, links to petitions, etc (5%).
8. **A Civic Engagement action.** Provide proof of sharing your findings with an interested party. This could involve a letter to an elected official with a link to your StoryMap, or you can share your map with a community group such as SRAP. (10%)

Objectives:

- Locate an area experiencing negative impacts from surrounding animal agriculture
- Explore pollution and health impacts on surrounding communities
- Form data-based evidence that is relevant to community concerns
- Develop ArcGIS skills that can be applied to community-engaged research
- Become confident in ArcGIS StoryMaps

By the time you are working in ArcGIS Online and creating your final project story map, you should be able to work with following datasets:

- SRAP GIS Portal - at least one dataset
- EJScreen - at least 2 datasets from Lab 3
- CDC Health - at least 2 datasets from Lab 3
- AG Census - at least 2 datasets
- Copernicus - at least 1 dataset from Copernicus Demo

You will have the opportunity to build skills with all of these online tools by completing guided activities. You must choose at least three datasets to work with in ArcGIS online and incorporate into your final project.

Preparation for the Project
Read Factory Farm Nation. Reading Guides #1 and #2 need to be completed at the start of Week 1.

Classroom Activity 1: Google maps and SRAP GIS portal demo

Lab 1: Exploring CAFOs, Pollution, and Health

You'll have the chance to look up articles online that are related to communities experiencing health impacts due to CAFOs. After reading an article about a particular area, you'll use Google maps and the SRAP GIS Portal to explore the area. What do the CAFOs look like with aerial imagery? Can you see where the waste is stored? What trends do you notice?

What to turn in:

1) The link for the article you chose.
2) A summary of the issue (related to factory farming)
3) Screenshots of aerial photos of the area from Google Maps.
4) At least 2 pieces of information about your area that you learned via the SRAP GIS Portal
5) Responses to questions (listed in the lab worksheet)

Classroom Activity 2: EJ Screen, CDC Health Tracker, and SRAP GIS Portal activity

We'll show you these websites in class, and you can do the activities on your own during computer lab time.

Lab 2: ArcGIS Online Activities and StoryMap Lab.

To get you started with ArcGIS Online, you'll run through three activities run from any browser (you don't need to log into your ArcGIS account). You'll also practice making a StoryMap while learning about the nitrogen cycle.

Lab 3: Interact with EJ Screen, CDC Health Tracker, and SRAP GIS portal for your area.

EJ Screen and CDC Health Tracker for your area. Choose datasets for environmental pollutants and/or health and write one paragraph summaries of why each of your datasets are important. These write ups will be used in your StoryMap to explain the value of what you are showing.

Classroom Demo: ArcGIS Online.

In class, we'll explore some of the datasets available on ArcGIS Online. We'll see the US Census of Ag layers for livestock density and other relevant layers.

Classroom Activity: Copernicus demo and hands on work.

(choose 1 dataset from Copernicus).

Lab 4: ArcGIS StoryMap for your area.

Find data (that you chose earlier from EJ screen, CDC, Enviromapper and Copernicus) in ArcGIS for your project and start your own StoryMap. You'll turn in the link to your draft StoryMap, which will include the maps you'd like to share from your earlier labs. Ideally you may be able to recreate the maps from EJ Screen and CDC mapping tool on ArcGIS, because then they will exist as interactive maps in your StorMap. However, it is totally fine, and you will receive full credit, for including static maps in your StoryMap from any of the data sources we covered.

In this class, all types of diversity are welcomed. Everyone is respected and valued. Please don't hesitate to tell me if there is anything I can do to improve the learning environment for you.

Campus Resources and Support Services around UCLA Available to Students:

- ***Student Resources for Remote Learning: https://www.teaching.ucla.edu/resources/student-remote-learning***
- ***Academic Achievement Program: AAP advocates and facilitates the access, academic success, and graduation of students who have been historically underrepresented in higher education; informs and prepares students for graduate and professional schools; and develops the academic, scientific, political, economic, and community leadership necessary to transform society. Learn more at http://www.aap.ucla.edu/***
- ***Academics in the Commons at Covel Commons: (310) 825-9315 free workshops on a wide variety of issues relating to academic & personal success www.orl.ucla.edu (click on "academics")***
- ***Bruin Resource Center: Includes services for transfer students, undocumented students, veterans, and students with dependents. http://www.brc.ucla.edu/***

- ***Career Center: Don't wait until you graduate – visit the career center today! http://www.career.ucla.edu/***
- ***Center for Accessible Education (Formerly Office for Students with Disabilities): A255 Murphy Hall: (310) 825-1501, TDD (310) 206-6083; http://www.cae.ucla.edu/***
- ***College Tutorials at Covel Commons: (310) 825-9315 free tutoring for ESL/math & science/composition/and more! www.college.ucla.edu/up/ct/***
- ***Counseling and Psychological Services Wooden Center West: (310) 825-0768 www.caps.ucla.edu***
- ***Dashew Center for International Students and Scholars 106 Bradley Hall: (310) 825-1681 www.internationalcenter.ucla.edu***
- ***Dean of Students Office; 1206 Murphy Hall: (310) 825-3871; www.deanofstudents.ucla.edu***
- ***Gender Inclusive Restroom: There is a new GIRR on the 6th floor of Boelter, room 6754, in the southwest corner. There is a second GIRR on the 9th floor in Boelter which you can only access from the northeast corner, near the Engineering library.***
- ***Lesbian, Gay, Bisexual and Transgender Resource Center Student Activities Center, B36: (310) 206-3628 www.lgbt.ucla.edu***
- ***Letters & Science Counseling Service: A316 Murphy Hall: (310) 825-1965 www.college.ucla.edu***
- ***Library: Get help with your research, find study spaces, attend a workshop, rent a laptop, and more. Learn more: http://www.library.ucla.edu/***
- ***Students in Crisis: From the Office of the Dean of Students: Faculty and Staff 911 Guide for Students, commonly known as the "Red Folder." This tool is intended to provide you with quick access to important resources.***
- ***Student Legal Services; A239 Murphy Hall: (310) 825-9894; www.studentlegal.ucla.edu***

UCLAONE.com: UCLA ONE is UCLA's interactive, online gateway for mentorship, professional networking, peer driven career advice and exclusive job leads. (Similar to LinkedIn for the UCLA community.)