Creating Collaborative Biogeography Maps Using ArcGIS StoryMaps

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Department: XE: Experimental Humanities and Social Engagement
Course Title: Foregrounding the Underground: Microbial Cultures and Ecologies (CEH-GA 1018 004) AND Studies of Symbioses (CEH-GA 1018 005)
Number of Students: <15

Project Description

I teach graduate seminars for XE: Experimental Humanities and Social Engagement on topics related to the environmental sciences and environmental humanities. In each of my courses, I pair assigned readings from across disciplines with exercises in which students are asked to closely observe, visualize, collaborate, experiment, or otherwise engage with some component of the environment. Students are encouraged to creatively adapt methods used in the natural sciences — including microbial culturing, microscopy, soil sampling, and other modes of environmental observation — to investigate interdisciplinary questions situated in ecosystems accessible to them. They then submit images of their samples or observations alongside written or audio reflections, which we combine into a collective biogeography using ArcGIS StoryMaps. These exercises and the resulting maps (well-suited for hybrid and virtual courses) allow students to integrate theory with material engagement with the environment, explore connections across their projects, and visualize manifestations of their readings in their surroundings.

Helpful Documentation

Access to NYU ArcGIS StoryMaps and Tutorials are available at https://guides.nyu.edu/gis/storymaps
A collaborative map from Fall 2022 is available to view at https://arcg.is/1yeyqG0

Process

In the Fall, I teach a seminar titled *Foregrounding the Underground: Microbial Cultures and Ecologies* (CEH-GA 1018 004). In this course, students developed a final project consisting of written and visual engagement with a particular microbial organism, community, interaction, or biological process situated in an ecosystem accessible to them. This project allowed students to engage with literature on biogeography, relationships between microbes and sense of place, and deepen their understanding of particular microbial processes. Early in the semester, they were asked to draw from course readings and discussions to generate a set of interdisciplinary questions to investigate in their proposed setting. While developing their written projects, they also inoculated fungi from these sampling locations on malt extract agar in the form of individual culture plates and a combined collaborative culture. Students submitted latitude and longitude coordinates along with images of their samples, and we created a collaborative biogeography map using ArcGIS StoryMaps to facilitate discussion across projects (https://arcg.is/1yeyqG0). During our final class session, we navigated a projection of the map together,

while each student briefly shared their work in relation to points on the map. The instructional goals of this exercise were for students to identify examples of course topics in their surroundings, demonstrate an understanding of core texts in the syllabus through their written reflections, and develop a novel implementation of visualizing microbial organisms in the environment.

This semester, in *Studies of Symbioses* (CEH-GA 1018 005), many of our course readings and discussions explore the root-fungal interface as a site of multispecies interactions. Paired with these readings, students each collected an individual root sample from the environment, traced the root morphology, and cultured fungi from the root sample. Each student submitted a reflection engaging with texts from the syllabus and proposed discussion questions to invite others to consider while viewing the submitted sample images, and location coordinates. These were combined in a StoryMap format as described above to facilitate discussion across student projects. The instructional goals of this exercise were for students to identify and engage with symbioses in their surroundings, demonstrate an understanding of core questions related to classification and identification of symbioses through their written reflections, and to create a novel visualization and written reflection combining methods across disciplines.

Advice for Colleagues/Notes

I found it helpful to have students enter their latitude and longitude data into a shared spreadsheet and submit their files in a standardized format. I also found it useful to budget time for students to review the draft storymap to allow for revisions. In some cases, students were interested in exploring a topic that was more difficult to situate directly in a single location, and I encouraged them to propose figurative ways of situating their work.

As I continue to develop these exercises, I hope to improve the efficiency and workflow for developing collaborative biogeography maps and to acquire additional materials to facilitate sample collection. I also hope to develop more detailed instruction sheets for students in future iterations of these exercises.

If you have any questions, feel free to email me at mustafa.s@nyu.edu