

May 4, 2022 Education Working Group Call

Attendees: Olivia Tabares, Alyssa Willson, Jason McLachlan, Abby Lewis, Julien Brun, Antoinette Abeyta, Jody Peters

Agenda/Notes:

1. Poll to find time for calls in June-August
2. Ethics in Forecasting Project - Overview from Abby
 - a. See links and previous notes below
 - b. Broad idea - developing case studies related to ethics in forecasting.
 - c. This will be useful for forecasting class and broader data science classe - intro data science classes since people are familiar with weather forecasts.
 - d. Also useful for general ecology students
 - e. Plan to have 3 case studies
 - i. 1st case studies - flying fox forecasting. Goal is to explore uncertainty in forecasting.
 - Flying foxes are sensitive to temp. If temp goes above 42C there is massive deaths. But there is a range of uncertainty - you won't know exactly what the temp will be and it isn't 100% of bats that will die.
 - Want to get students to think about the sources of uncertainty reflected in the forecasts
 - Ask questions - discuss with a neighbor the ethical considration
 - What sources of ucnertainty and why does it matter
 - What happens if you predict a mortality event an there isn't one vs if you don't predict a mortality event and there is one (so not a symmetrical outcome)
 - All in think-pair-share style discussions
 - Ends with thinking about how uncertainty influences differen stakeholders
 - Give option for instructure to have a short assessment (essay)
 - This case study is fairly well developed, but hasn't been reviewed by anyone
 - ii. Would like help with developing 2 more case studies
 - Tuna forecasts - develop forecast of tuna locations for fishing, then what ethical consideration do you need to make for oerfishing and conservation vs economic benefit - intended to explore unintended consequences.
 - Drinking water - get at sins of omission vs commission. How do you weigh providnig and inaccurate forecast vs stopping a forecast and having something happen that you could have predicted. Inspiration came from italian earthquake forecasters

that did not provide earthquake forecast and people got injured/died in an earthquake and the people went to court for being responsible for deaths

- iii. Developed this with the goal of publishing in an ecology education journal - they have figure sets. So each case study is supposed to include a figure or table from a real-world example to help them understand scientific figures
 - iv. Olivia is excited to help out. She could test out the flying foxes with her course now. She can also help with the Tuna section - connects well with her fishing section of her population ecology course. She has been talking about matrix models influencing conservation strategies. This is coming soon and will be teaching this in a month.
 - v. Think this set up is flexible for class size.
 - vi. Antoinette is a geoscientist so connects to the earthquake ideas. Forecast vs prediction definition in geoscience. Antoinette has a whole module that talks about prediction vs forecasting and uncertainty. Is a role playing opportunity where half the class acts as the lawyers and the other half people affected by the earthquake. Brings up how science is communicated.
 - vii. Focus on discrete publication example, but think there are a number of examples of additional ethical dilemma or context. Wonder if in addition to focusing on the paper if in parallel we could set something up where we can have additional versions as an online repository. Which will allow for other examples and allow for modifications.
 - viii. Don't have to be encyclopedic with the examples. But there are examples of equity and social justice that could be added - it could be one of the three or could be a fourth case study
 - ix. JMc: If we add an environmental justice example, we might think about modifying Georgia's SKC exercise on indigenous values and water quality.
 - x. [LTER datasets](#) from Julien - there are 8 now. These may be could be used for this. Potential advanced level version where you think about datasets. If it was an analysis class, could bring up ethical issues and run analyses
 - xi. This project developed in the theory group in response to [this post](#) on COVID.
3. Looking for a volunteer to provide an update about the EFI WG for the May Conference. This will be a <5 min pre-recorded talk
 - a. Alyssa will share a Google slide that people can contribute to
 - b. Alyssa, Olivia, and Jason will work on the presentation
4. Updates
 - a. Olivia's Population Ecology Class

- i. Used some of the tick datasets for learning about exponential growth. Working to doing an integrated exercise and including environmental drivers by the end of the semester
 - ii. Will also look into the Tuna example for the fisheries part of the course.
- b. Anna - Forecasting, Prediction, Projection Manuscript
- c. Alyssa - Ecoforecasting Educational Resources and Gaps Manuscript
 - i. Talking to instructors about teaching ecoforecasting in the US to see if there was anything missing from the manuscript.
- d. Jason - Sloan-funded education activities.
 - i. Put in a Letter of Intent proposal with Antoinette, Nievita Bueno Watts, Georgia Smies, Diana Dalbotten, and Melissa Kenney to Sloan Foundation to promote students in MSIs into graduate programs
- e. Antoinette - course material. Trying to make data science materials accessible. Looking at resources to see if they are accessible to students working on their phones. Identified the core ideas of data science. What are the things people need to do. What the learning goals and is currently working on finding the case studies to apply to the concepts.
 - i. As Antoinette is thinking about examples - if there are concepts she is thinking about the group can identify potential case studies
 - ii. Next meeting will share the learning goals and the assessment
- f. Julien - new R package `lterdatasampler` which leverage LTER data. Use this to provide another set of datasets that people could use for teaching R so people are not limited to the iris or mtcars datasets.
 - i. Also provide some examples of how people can use the datasets for teaching R.
 - ii. Examples for data wrangling. None of them are about forecasting. If anyone knows of LTER data that is used for forecasting that would be nice to use for the package
 - iii. So often when using data for courses, it is important to know about the data you are having students analyze. Context based learning is important for stats and data science.
 - iv. At the bottom of each LTER example, they provide the code that they used to clean the data so this could be useful for students to learn about data wrangling
 - v. Explore opportunities of connection with NEON/LTER
 - vi. https://twitter.com/allison_horst/status/1513546784005521412
 - vii. <https://lter.github.io/lterdatasampler/>
 - viii. Dataset samples currently included in the package are summarized below; see individual Articles for data and source details. Note: the three letter prefix for each dataset indicates the LTER site (see full list of site abbreviations [here](#)).

- ix. **and_vertebrates**: Records for aquatic vertebrates (cutthroat trout and salamanders) in Mack Creek, Andrews Experimental Forest, Oregon (1987 - present)
- x. **arc_weather**: Daily meteorological (e.g. air temperature, precipitation) records from Toolik Field Station, Alaska (1988 - present)
- xi. **hbr_maples**: Sugar maple seedlings at Hubbard Brook Experimental Forest (New Hampshire) in calcium-treated and reference watersheds in August 2003 and June 2004
- xii. **knz_bison**: Bison masses recorded for the herd at Konza Prairie Biological Station LTER
- xiii. **luq_streamchem**: stream chemistry data for the Quebrada Sonadora (QS) location part of the Luquillo tropical forest LTER site
- xiv. **ntl_icecover**: Ice freeze and thaw dates for Madison, Wisconsin Area lakes (1853 - 2019), North Temperate Lakes LTER
- xv. **ntl_airtemp**: Daily average air temperature data for Madison, Wisconsin (1869 - 2019), North Temperate Lakes LTER
- xvi. **nwt_pikas**: Pika observations for habitat and stress analysis at Niwot Ridge LTER, Colorado
- xvii. **pie_crab**: Fiddler crab body size recorded summer 2016 in salt marshes from Florida to Massachusetts including Plum Island Ecosystem LTER, Virginia Coast LTER, and NOAA's National Estuarine Research Reserve System

5. Forecasting Ethics material

- a. Here is an overview of what was developed: start with a think-pair-share to discuss the [Ecological Forecasting Ethics: Lessons from Covid-19](#) post in Dynamic Ecology. This would then be followed by 3 topics presented in the post, 1) uncertainty, 2) unintended consequences and conflict of interest, and 3) sins of omission vs commission. The material provides a hypothetical ecological example with questions and real-world examples/news stories. There are also a couple of examples of further readings and suggestions for the next steps forward.
- b. Idea from Mike on Slack: One other thing we always talk about in my class when we cover forecast ethics (and which might build well off the "sins" example in the slide deck) is the question of which forecasts should be public goods and which are appropriate for private investment. If all forecasts have to be public goods, there will be a lot less forecasting and possibly less innovation than if the private sector invests, but on the flip side there may be forecasts where there's a moral obligation to disclose the prediction to everyone.
- c. Update from Abby: I actually put a bit of work into this last semester and drafted the start of a formal resource that we could publish:

- d. The core group that worked on this project (Abby, Sydne, Ryan, Quinn) were potentially interested in trying to publish it at Teaching Issues in Ecology and Evolution. Sydne had suggested this journal, but Abby is open to others. Think about putting it up on QUBES to get DOI, but make sure that uploading to QUBES won't affect submission to a journal.
 - i. Looking for people to help write one of the examples. If there are 1-2 people who are motivated this can be helpful. Abby can't work on this for the next 2 weeks
 - ii. If anyone is teaching an interested in trying this out, or reviewing it from a pedagogical perspective
 - iii. Short workshop during EFI meeting to walk through as a group as an activity or collaboratively write one of the case studies. Is there anyone in the education group willing to lead this?
 - Talk about discussion questions for each case study
 - iv. Sydne is happy to provide some rubrics for assessment of student learning to this document once the examples are nailed down
 - v. Jason willing to include in his course next fall
 - e. Is there a model that was connected to the example?
 - f. Put in context about decisions people are making about the model have ethical challenges that people need to consider
 - g. Could talk to Georgia about the drinking water example and check in with Abby to see. Would be a nice one to emphasize that the communities affected by environmental decisions - how are they involved with the decisions that are made.
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6. Open Book Project to keep in mind and mash up of notes from previous calls
 - a. There is potential to use the educational materials developed for the Sloan grant or with Olivia's class to start providing content for this that other EFI members could contribute to.
 - i. This is a book you would read before you read Mike's Forecasting book
 - ii. If we start to develop modular materials they could be included in such a book
 - iii. Can start to develop a list of the components that would be useful to include in a book and think about how to make it applicable to a wide range of students from many different backgrounds
 - iv. Think about developing slides/materials that provide context
 - v. Running list of who has expressed interest at one time or another
 - Jason McLachlan, Shannon LaDeau, Elva Escobar
 - vi. Has anyone seen the [Open Forecasting Textbook](#) (does exist as a [paperback](#) as well)

- In the Preface this is for a 3rd year undergrad intro master's course
 - Interesting template. Success in part due to free online and R packages are nicely user friendly
 - This is a bookdown format where R code is integrated and is a living document
 - Wouldn't get the credit of something like an AGU Monograph, but would be more broadly available.
 - Could do something that are RMarkdowns that could be combined as a book
 - Loop John Zobitz into this. He is also writing a book for his courses. Mike has used some of his chapters in his 300 level course.
 - Do this in the context of NEON data and walking through all the steps of forecasting. Could get long, but would be a nice resource.
 - A self-contained book to walk through. Could reference other books.
- vii. This sounds like a strong potential for a proposal for NSF Education Directorates, especially if we could bring in an education evaluator who evaluates the open source, collaborative textbook.
- If we structured it well it could have a strong educational research component