

## May 10, 2021 Education Working Group Call

Attendees: Alyssa Willson, Jody Peters, Jason McLachlan, Mike Dietze, Diana Dalbotten, Anna Sjodin

Regrets: Shannon LaDeau, Tadgh Moore

Agenda/Notes:

1. Reminder: Braiding Sweetgrass Book Group will start in June, I'll send out a poll the week of May 24 to find time for weekly calls for the book group
  - a. Invite Diana's REU students
  - b. Invite Nievita's summer students
  - c. Can invite grad students from Manoomin group
  - d. If there was a place for undergrads in EFI that they feel they are making contributions that would be great
2. Jody will send out a poll for our next call the week between June 16-22. We'll use that same day/time option for calls in July and August
3. Inclusive Pedagogy workshop Update and Feedback from the Group
  - a. Alyssa meeting with Kira this week to get feedback on how to make the meeting structured to get feedback to go
4. EFI-NEON video assessment by HSU students (Alyssa)
  - a. Side note: Jason/Alyssa are helping with an HSU project with Nievita's LSAMP students for the summer. This will be good for the Sloan work
  - b. Video assessment is winding down for this semester. Most students got through all 24 videos in the series. Some ended before the adaptive management but everyone got through the DA videos. Alyssa was really impressed with how the students got the big picture out and understand putting data together with the model can inform both of the separate pieces. Also impressed with how the students understand how uncertainty goes through the whole process. Had expected uncertainty would be a major sticking point, but that does not seem to be the case.
  - c. Main thing Alyssa learned from the students - not enough concrete examples available online to give them examples of the concepts. Alyssa has relied heavily on VT to give some examples and used NEON. There are not enough digestible little pieces. So students can learn the concept and immediately see how it is applied.
  - d. From JMc - make these for biostatistics all the time. Give example and then have R code available. If we come up with a list of priorities for what has the most demand or what is the conceptual piece that is most needed. Doesn't have to be highly produced. But would give us material. Could crowd source it.
  - e. Alyssa to check with Tadgh about the ecoforecasting module Macrosystems EDDIE. From EDDIE website this seems like it is in alignment with what Alyssa

is looking for. Want to see if Tadgh is ready for Nievita's students to beta test the module this summer.

- f. For working with HSU students this summer will also want to encourage the students to think about grad school and work with them if they need help with their grad school application materials. Nievita is really good at this part from working with REU students.
  - g. Diana has a Director of Grad Studies that will be presenting to her REU students this summer. Jason could be a good person to give a presentation about this as well and could work to get people from ND to participate on a panel.
    - i. Are there other programs that we could have an EFI-wide panel to talk about going to grad school?
    - ii. If we can identify a handful of summer programs with students from multiple backgrounds, we can invite them.
      - Check with Sydne Record for HF REU
      - Nievita's LSAMP Students
      - Diana's REU
      - Lala's Summer Program at ND
      - Antoinette REU
      - BU BRITE
  - h. Co-sponsor as an EFI/GA panel
5. Forecasting, Prediction, Projection Manuscript Update (Anna and Gretchen)
    - a. Get update on next call
  6. Olivia's R infographic for students learning biostatistics with R Updates
    - a. Get update on next call
  7. RCN Education Workshop Update (Jason, Alyssa) - save this for the June call to synthesize what came from the June 7 Inclusive Pedagogy meeting and prep for the June 28-29 Education meeting
  8. Document for Guidance Counselors and Instructors working with students interested in ecological forecasting
    - a. The version sent to instructors et al for input
    - b. Jody's revised version to include text boxes and course lists
      - i. Background in coding section. "Typically R or Python are commonly used by ecological forecasters." There is increasing use of Python in earth system science in remote sensing. There are a few advantages or big data to use Python. But for operation workflows the ones we know about are R based.
      - ii. These are long lists. Is there a way to streamline? E.g., on Math and Stats - what is really core and what is bonus. Note core courses vs electives.

- iii. On pg 1 - emphasize that there are diverse ways that people get into eco forecasting
  - iv. Don't think any of these courses are necessary.
  - v. JMc and Mike: Most helpful courses: mathematical stats with distributions, background in coding, one of the social science courses
  - vi. Anna's most useful courses as she has created forecasts have been - applied stats with family of distributions and ecological modeling course worked in R and used bayes and frequentist linear modeling
  - vii. Mike - wish he had taken decision science course
  - viii. Look at undergrad major requirements for instructors in EFI to see what you could get done in the existing major, what you could do with courses not for credit, what could be done with your tracks. What does a major look like compared to this? How much extra would students need to do with their extra credits they have.
  - ix. In the future Alyssa will look at course availability and course offerings and how that fits into ecoforecasting.
  - x. Worry a bit about the list. The main thing want to do is to emphasize domain science and questions/exploring options.
  - xi. What would count as an elective? E.g., from BU Linear algebra wouldn't count for a major. How common are those sorts of things.
  - xii. Next steps for document: Get it out and send it to undergrad advisors we know to see what they think about it.
    - Note at the top - say that we recommend students pay attention that ecoforecasting crosses disciplines. Math, Data Science, Social Science, and Discipline specific courses.
    - Make note to highlight the 3 main things that will be useful to have stats with distributions, background in coding, a social science course.
    - Alyssa to add list of careers/jobs with ecoforecasting
    - Jody to reformat so all the fonts are the same.
  - xiii. Something to think about adding is a list of things that are not already covered in courses yet. E.g., forecast ethics. What is good behavior, what is bad behavior where should or should not be forecasting. Identify niches where EFI needs to do workshops because there isn't a course in those things.
- c. Venues for sharing: Ecolog, Career counselors, QUBES
- d. QUBES community options from Hayley Orndorf April 23, 2021
- i. We would be happy to share this resource on QUBES, sounds like fantastic information that the QUBES community would be interested in! There are several ways we could share the resource, outlined below:
  - ii. As a [QUBES Open Educational Resource](#). Materials published on QUBES range from instructional material to reference material like posters and workshops, and this material would be a great resource. All QUBES

resources receive a permanent URL, DOI, and citation. Authors may choose a Creative Commons license that communicates how others can use the material. In this case, you could publish it from the EFI RCN group to generate an automatic connection to the work. For example, [NEON has many of their educational materials published as QUBES resources.](#)

- iii. If this were something you all are interested in, the group should be sure to discuss authorship and how the material will be licensed, considering things like adaptations and commercial use. Also, you should ensure that everyone is comfortable with the material having a DOI for its instance on QUBES.
  - iv. The content of QUBES resources is flexible and could include the PDFs, electronic versions, or both.
  - v. I'm including two resources on publishing on QUBES, but we will soon be publishing updated versions of these materials. I will send them along as soon as they are available. Don't hesitate to reach out with questions.
    - [Using Publications to Post Resources on QUBES](#)
    - [Information for Authors and Submitters](#)
  - vi. In the QUBES newsletter - whether the material is published as a QUBES resource or not, we can certainly share it in the newsletter. If you have electronic versions that will be easy to point to from a story in the newsletter.
  - vii. Those are the two best options for sharing the material with the community. Let me know if you have questions or want to chat more about publishing,
9. Suggestion that came in after the April 19 call from Environmental Science academic advisor at Notre Dame, Dom Chaloner (a) and Karen Manier at ND Career Services (b):
- a. Most immediately and off the top of my head, if you had a condensed version (such as what might be added to an email flyer with embedded links) for sure I would be happy to include it in our weekly newsletter to ES majors; other relevant majors/minors might also be willing to share with their students, such as in the Sustainability minor. The other thing would be to share this information with instructors of relevant courses, such as Stuart Jones 'Intro to Biocomputing', David Medvigys 'Intro to Dynamic Models in Biology' or General Ecology class.
  - b. I agree with your thought that adding concrete info on jobs and organizations would be effective. Even something similar to What Can I Do With This Major? would be good. I could see having this on our Career Paths page and would think departments with relevant majors/minor would be interested in doing that too. Perhaps all the member universities would want to have them posted on relevant pages too? More broadly, I would think any school with related programs would be glad for this insightful document. It sort of marries academic and career

advising by listing relevant courses. And, lastly, professional organizations in related fields could add it to their careers sections.

10. Format: Summarize ecological forecasting (1 page), Suggested courses (1 page)

11. Individuals that the draft was sent to for feedback:

- a. Forecasting instructors: Carl Boettiger, Quinn Thomas, Cayelan Carey, Mike Dietze, Peter Adler, Ethan White
- b. EFISA co-chairs: Whitney Woelmer, Millie Chapman, Dave Klinges - who shared with EFISA group for feedback
- c. Social Science WG members: Jaime Ashander, Melissa Kenney, and previous draft to Kira Sullivan-Wiley
- d. Theory co-chairs: Amanda Gallinat, Abby Lewis
- e. ND Career Advisors: Karen Manier, Ryan Willerton, ND Undergrad Advisor: Dom Chaloner

12. Task for the future. Jody is leaving this on as a reminder.

- a. What kind of biostats do students need to know to set them up for being able to take a forecasting course?
  - i. Jason - provide update on ideas from RCN Steering Committee Call
  - ii. From Feb 2021 call: How do we make those materials available? Don't want to create a textbook, but could think about an [AGU Monograph](#) style resources. 10 chapters that build on each other.
  - iii. Go back to the notes from Feb 2021 call for details about this conversation.
  - iv. Elva Escobar is interested in participating on this project
  - v. Here are some ideas that came from a separate call with the RCN Steering Committee.
    - Quinn is trying to think about how to put some of his course materials together. Thinking of perhaps a How To Guide for the forecasting challenge
    - 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 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.
- 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
- vi. Disciplinary expertise - think we are downplaying the empirical researchers who are providing data/data collection. Don't want to leave those people out
  - Ecological methods course
- vii. Also don't want to leave out people more interested in the social science/partners side of things. But this is where the note up at the top of page 2 will be important to convey that not all courses are necessary.