

May 17, 2024 Joint Methods & CI Working Group Call

Attendees: John Smith, Quinn Thomas, Jake Zwart, Brittany Barker, Jody Peters

Regrets: Emma Mendelsohn

Agenda/Notes:

1. Jody will send a poll for finding times to meet over the summer
2. Jake Zwart about the EFI CI Workshop held at NERACOOS
 - a. April 10-12, 2024
 - b. 41 participants from U.S. Federal Agencies, International Federal Agencies, Academia, NGO's, and Private Industry
 - c. Themes and activities:
 - i. Applying Design Justice Principles to forecast cyberinfrastructure design challenges
 - ii. Identifying and proposing best practices for forecasting cyberinfrastructure across a variety of forecasting problems
 - iii. Synthesizing barriers, gaps, and other challenges to developing community-developed forecast cyberinfrastructure
 - iv. Strategies for overcoming barriers and implementing common design principles across organizations
 - d. Living doc (still to be added to) - <https://github.com/eco4cast/efi-ci-workshop-2024>
 - e. Have 75-80% of workshop synthesized. After that is done will condense down for the living doc.
 - f. Plan to have an article describing the workshop that also points to the living document. There may also be a white paper pointing to the recommendations from the workshop
 - g. There is the possibility of having a second workshop focused on research to operations that can consider the recommendations from the CI workshop
 - h. Here are some of the recommendations (which will be expanded on in the living document)
 - i. The group agreed on the importance of having standards and operability
 - ii. Training and workforce development is a need. Expertise in CI may not exist as much as we need it
 - iii. Co-development of a product with an end user was highlighted as important
 1. This revolved around the [Design Justice Principles](#)
 - iv. Cataloging and archiving forecasts for reuse is important - e.g., having the same column names to allow for comparisons
 - v. Scalable and flexible architecture
 - vi. Using open source technologies
 - vii. Coming up with funding and key partnerships.

1. Argument for pushing industry where we want them to go instead of the other way around
 - i. CASC in NW has a faculty fellowship that requires the co-production of forecasting tools - potential for funding for the group to consider. Brittany is looking into apply for this
 - i. <https://nwcasc.uw.edu/about/funding-opportunities/applying-for-the-faculty-fellowship-program/>
 - ii. Are there potential resource managers that would be interested in co-developing the spatial forecast tool?
 1. Perhaps there is someone at the USGS Rockies station - John will think about this and if there is anyone there.
 2. It needs to be someone at the Tribal land or state managers - problem has to be focused on the northwest so for developing forest recovery forecasts for the northwest
 3. Jake will reach out to some contacts to see if there are any connections
 4. Jody will check with Jason about
 - j. The workshop was at a higher level discussion than when the workshop was originally being planned. So there is still the nitty gritty CI details to work on
 - k. Another goal was to make additional connections with the ocean forecasting community - IOS and NERACOOS hadn't been involved and they were able to learn more about EFI and make connections
 - l. 2 groups of people were represented in the group - 1) people who are running operational forecasts where the design principles won't be changed by this meeting and 2) groups that are coming on board that are more adaptable to working with new standards
 - m. It was long game meeting for building foundations and building relationships
 - n. Quick win - USGS people at the workshop went back and changed column names for a forecast product
 - o. Future invitations will come to this group for contributing to the living documentation
3. John Smith - Update about the CDS&E/EAGER NSF grants
 - a. [CDES&S Call description](#)
 - b. Large-scale simulations and the ability to accumulate massive amounts of data have revolutionized science and engineering. The goal of the Computational and Data-enabled Science and Engineering (CDS&E) meta-program is to identify and capitalize on opportunities for major scientific and engineering breakthroughs through new computational and data-analysis approaches and best practices. The CDS&E meta-program supports projects that harness computation and data to advance knowledge and accelerate discovery above and beyond the goals of the participating individual programs. The intellectual drivers may be in an individual discipline or cut across more than one discipline in various Divisions

and Directorates. A CDS&E proposal should enable and/or utilize the development and adaptation of advances in research and infrastructure in computational and data science.

- c. A question to ask - there isn't a Biology or Geo directorate included in the list of directorates, so the forecasting challenge which is a biology application may not be appropriate
- d. Previous awards look related to chemistry and physics

e. Draft Email

f. Dear Dr. Davis,

I am inquiring about the potential suitability of a proposal to be submitted to the "Computational and Data-Enabled Science and Engineering (CDS&E)" NSF program. Below I have included an overview of our proposed project, which is being collaboratively developed by the "EFI Cyberinfrastructure and Statistical Methods and Tools" working group at the Ecological Forecasting Initiative (EFI). I am currently a co-PI on an NSF AI Institute in Dynamic Systems sub-award from University of Washington, but I am still very new to the NSF proposal world. I would greatly appreciate any feedback on the appropriateness of the project. If you do not think that the project is suitable for this call in its current form, I would be open to hearing about any calls that you think may be a better fit.

Briefly, the EFI working group is developing a prototype of a forecasting challenge for the NEON Ecological Forecasting Challenge (neon4cast.org) that will compile, score, and visualize forecasts of post-burn fire recovery using NASA-derived remotely sensed data such as the MODIS Leaf Area Index (LAI) datasets.

Here are ways that we think our proposed project would meet the themes of the call:

- Development of cyberinfrastructure and computational models to better understand post burn fire recovery and response. Ebel et al 2023 outline future directions for post-wildfire simulation models for hydrology and note that "to achieve continued advancement of the accuracy of post-wildfire hydrologic modeling, it may be helpful to develop new models from the ground up to simulate processes [...]". The development and dissemination of new models is crucial to a better understanding of post-burn recovery as the number of acres affected by wildfires each year continues to trend upward.
- Supporting collaboration to improve partner involvement at every scale: All forecasting workflows for EFI are open source and involve extensive collaborations. Any person can set up a forecasting workflow, develop code, contribute datasets, develop different types of model products, and submit forecasts. This open source common task framework challenge facilitates rapid advancement of knowledge.
- Modernizing tools for informed decision-making to better leverage available technology and information: The prototype will capitalize on NASA-developed

data, starting with particularly MODIS-derived estimates of LAI, but set up to easily add new data products, in a novel way that has the potential to inform decision-making on a large scale. Innovative approaches contributed by the community will help improve forecasts, quantify and convey model uncertainty.

Do you have time in the next few weeks for a short call to discuss your thoughts regarding the potential suitability of this work? I have availability Tuesday, Thursday, and Friday next week and I am flexible in the following week.

Cheers,
John W. Smith

4. Seed Grant options - notes from the last call, that Jody is leaving in for reference
 - a. \$50K, rolling basis: <https://www.bwfund.org/funding-opportunities/climate-change-and-human-health/climate-change-and-human-health-seed-grants/>
 - b. Could be worth pinging NSF - EAGER opportunity where NSF officer can sign off on small grant. NSF program officer like to use that to give an early career researcher funds. They are for projects that don't fit in any current call
 - i. <https://new.nsf.gov/funding/early-career-researchers#early-concept-grants-for-exploratory-research-eager-c8f>
 - ii. Could start with Matt Kane who is the EFI RCN Program Officer
 - c. ACED: <https://new.nsf.gov/funding/opportunities/aced-accelerating-computing-enabled-scientific>
 - i. Calls specifically someone from CISE and someone from bio or mathematics. We have bio covered, so potentially a good fit
 - d. If we think our application would fall under the umbrella of [Computational and Data-Enabled Science and Engineering \(CDS&E\)](#)
 - i. John to reach out to a program officer that he knows at NSF and can check in about EAGER as well

5. Project Overview and resources: Forecasting Wildfire Recovery Using MODIS Leaf Area Index (LAI)
 - a. Background of the project - the goal is to develop a spatially explicit forecast that could be used with the NEON Forecast Challenge cyberinfrastructure. This project was started at the EFI Unconference (summer 2023).
 - i. GitHub repo: <https://github.com/eco4cast/modis-lai-forecast/>
 - ii. This is a prototype for working with spatial data and for managing large datasets in geotiff format instead of the csv/netcdf format that had already been developed for the Forecast Challenge

- iii. Here is the example of the standard Forecast Challenge CI: <https://github.com/eco4cast/neon4cast-ci> wanted to replicate this and apply to a spatial example for this project. This repo has workflows with GitHub actions that do tasks automatically - it gives a modular way to see what actions need to take place which we can use to check off what is done for the modis-lai spatial forecast example
 - iv. We are using the [STAC](#) framework - spatial temporal assets catalog - this allows for the Challenges to be discoverable
 - v. TERN example to use as reference: <https://projects.ecoforecast.org/tern4cast/>
 - b. Updates
- 6. For reference here is the list of Tasks to set up GitHub Action Workflow <https://github.com/eco4cast/modis-lai-forecast/issues/10>
 - a. Targets generation
 - b. Benchmark forecast generation
 - c. Scores
 - d. Submissions/validation
 - i. Jody is leaving in a placeholder that Brittany is willing to look at the fire dataset from Justin Welty to find other fires to add to the targets
 - e. Generate Dashboard/visualizations
 - f. Generate STAC collections for forecasts, targets, scores tifs
 - g. Think that the stats side of things are pretty much done. Jody will post to check in with Carl about next steps that Will can help with
- 7. **This is for reference, not necessarily needed for today's call:** Resources from Justin Welty's visit on the November call (see full list of notes from the call in the link to the Nov calls above)
 - a. Databases and tools mentioned
 - i. [Geodatabase of wildfires](#)
 - ii. [Wildfire Fire Trends Tool](#)
 - iii. [Land Treatment Exploration Tool](#)
 - iv. [RAD framework](#)