

## June 24, 2024 Joint Methods & CI Working Group Call



Attendees: Mike Dietze, Carl Boettiger, Emma Mendelsohn, Jody Peters, David Durden

Regrets: Jake Zwart, John Smith

Agenda/Notes:

1. Article by Christopher Tate at Red Hat
  - a. [Moving Ecological Forecasting from Supercomputer to the Cloud: How and Why](#)
2. EFI2024 Conference updates - workshops on moving compute to the cloud and participating in/creating ecological forecasting challenges
3. John Smith - Update about the CDS&E/EAGER NSF grants
  - a. John is not available for today's call.
  - b. Here was the response he got from NSF program officer
  - c. Dear John,
  - d. Thank you for your interest in the CDS&E-MSS program. In principle, the topics you proposed are within the CDS&E-MSS portfolio. However, we try not to be too prescriptive and do not make judgments based on a summary. Please note that the program is unlikely to be supportive of data analysis or computational modeling projects that do not feature new or recently developed methodologies and their implementation. The program supports the development of algorithms and computational tools that lead to innovation within mathematics and statistics.
  - e. CDS&E-MSS typically does not comment on particular proposal concepts prior to submission. This helps ensure fairness throughout the process as well as allow reviewers to contribute to identifying trends and priorities in the field. We do advise you to use the NSF award search engine to browse projects funded by this program which can be found on our webpage: <https://new.nsf.gov/funding/opportunities/computational-data-enabled-science-engineering>.
  - f. Proposals are accepted at anytime. However, at this late stage in the NSF's fiscal year, proposals will be considered for fiscal year 2025.
  - g. Best,
  - h. jodi
  - i. On behalf of the CDS&E-MSS Management Team: Lisa Davis, Tapabrata Maiti, Jodi Mead, Chris Stark, and Yong Zeng
  - j. Sounds like it is up to John on how much to pitch about what will be the new algorithm or computational model. Think it can be sold this way. But if not and leans into this is built on things that already exist then it may be easier to press for a Biology call. Let John decide which way he wants to go.

- k. Encourage John to lead something. If he can put something down about the novelty of methodology for stats/computation, then go with that.
  - l. If prefer to go with novelty in the bio realm then we can make that pitch.
  - m. No one is doing this on either side - so it is a good proposal.
  - n. Mike has never been on a stats proposal - so doesn't know how to pitch to that community.
  - o. Nice that the CDS&E-MSS emphasizes the algorithm need rather than requiring pitch on theoretical ground.
4. Couple of updates from Slack:
- a. This package and accompanying book looks like it might be particularly relevant to the wildfire recovery / spatial forecasting? <https://github.com/e-sensing/sits> , <https://e-sensing.github.io/sitsbook/>
    - i. Carl took deeper look after sharing on Slack and not sure if it is ready for prime time, but the book is nice. But don't think we will benefit to switching over to that syntax and instead stick with what we have
  - b. Issue with the arrows package from CRAN: package no longer has pre-compiled S3 support.
    - i. The simplest work-around is to just install binaries directly from the arrow team instead:
    - ii. `install.packages('arrow', repos = 'https://apache.r-universe.dev')`
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
- c. Worth stepping back to consider what to do - grants first or plan B of working group model with no resources and continuing to plug along on setting up the spatial challenge forecast
  - i. One option for David to find time to work on it, is to present at AGU
  - ii. While the funding proposals plan plays out, it is worth thinking about the next year to get past the kind of prototype to a prototype that people can submit.
  - iii. David will check with people at NEON to confirm that this will work and will follow up about what he finds out on the next call.
  - iv. David took some of the functions created for this challenge and adapted them to grab data for NEON sites and added them to an EDDIE for R package. Added the group as co-authors on the package. David will add the link to that in Slack.
- d.  Going back to NASA funding - have we considered it?
  - i. Yes. Brittany was interested in applying for the wildfire, but deadline was too short 
  - ii. Also looked at the Biodiversity which has 2 levels - basic and applied
  - iii. For ROSES, there isn't much that is appropriate with what is coming up.
  - iv. We need 6 months to set up a proposal.
  - v. For ROSES the call comes out Feb 14 every year with the full list announced.
  - vi. But programs don't change much each year. So if we know what we want, then we can make small adaptations when the announcement comes out and the deadlines in April, May, June
  - vii. Terrestrial Ecology and Carbon Cycle have not been announced yet - after the switch of fiscal year, there could be a later due date
    - 1. Mike hasn't seen these two in a while, but it is worth keeping an eye out
  - viii. Carbon Cycle science says they intend to solicit this year  
<https://nspires.nasaprs.com/external/solicitations/summary.do?solId={C9E03D39-95C3-81BB-5875-3156AE1F7DA5}&path=&method=init>  
 Terrestrial Ecology says the same
  - ix. <https://nspires.nasaprs.com/external/solicitations/summary.do?solId={AD0010D0-5D24-9A3B-27CB-045E38F11CB2}&path=&method=init>
  - x. [Wildfires: Earth Action: Wildland Fires \(program element A.47\)](#);
  - xi. Think this could fit with Carbon or Terrestrial. For carbon would need to make a better connection between LAI and carbon. But need to see what the wording looks like when the
  - xii. If we go with ecosystem recovery doesn't need to be confined to fire - could be silviculture applications.
  - xiii. All we need is the polygon at this point. If we have polygons of other disturbance, we can do it. Silviculture and moth

- xiv. Only constraining thing with MODIS is that the scale is big - so would need big disturbance
  - xv. Could think about moving to Centennial or Harmonized LandSat Centennial
  - xvi. If using NDVI then taking carbon cycle out of the option.
  - xvii. The appeal of the infrastructure is that it can be modified depending on the question
  - xviii. If we want to target carbon cycle, there are other options from satellites with better resolution.
  - xix. If writing a grant - think about set up with MODIS LAI which is low hanging fruit (low latency, well derived product everyone know how to use), then move to zoom and could build additional infrastructure to do that. Then can move to something like GEDI which gives info about structure.
  - xx. Hyperspectral will be of interest to Terrestrial - we can anchor it to NASA's long standing platforms, but they want to spend money on what has just been launched or what is in the works since that is what they are excited about,
    - 1. There is way more info in the hyperspectral
  - xxi. There is planet cube sat stuff (spelling??) as well.
  - e. Would David want to lead a NASA grant? He is limited on time - doesn't have much time for external grants. Doesn't want to overcommit.
  - f. Emma can't participate in the proposal at this time, but has a colleague who has done spatial forecasting work and will encourage him to participate
    - i. NASA has a mechanism for adding agency personnel. It might be out of Emma's scope at EPA now, but she'll stay in the loop
  - g. Keep eye on the NASA calls and do a little bit of work to prep.
  - h. Circle back to Brittany to see if she wants to lead
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

7. Running list of potential proposals to keep in mind - we don't need to discuss this on the call.
- a. **NASA ROSES** -
    - i. Proposal due Apr 8 is related to wildland fires - this is when the letter of intent is required. The full proposal is due in May
    - ii. NASA target would be providing deliverables for managers
    - iii. Brittany and Emma are interested in this
  - b. Thinking about NSF timelines - could pitch to core programs. For Bio they are all rolling submissions
    - i. Target for NSF would be modeling and evaluating methods
    - ii. John is interested in this
  - c. Proof of principle grant - smaller budget to get a basic competition going and then come back to think about how to scale up
  - d. ESTCP - call for nature based solutions in arid landscapes
    - i. <https://www.serdp-estcp.mil/workingwithus/fundingprocess>
    - ii. scroll to the bottom for FY 2025 proposal guidance
    - iii. Implementation of the science
    - iv. Nature based solutions in arid landscapes, specific call: <https://serdp-estcp.mil/workingwithus/callforproposal?id=13b8ee7a-bba0-4d71-b257-11a1024464a4>
    - v. Really want justification on the benefit cost - you said you are doing this, how will it save DoD money. The way you calculate that needs to pass
    - vi. Andy Chubaty is willing to help with this
  - e. Seed Grant options
    - i. \$50K, rolling basis: <https://www.bwfund.org/funding-opportunities/climate-change-and-human-health/climate-change-and-human-health-seed-grants/>
    - ii. 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
      1. <https://new.nsf.gov/funding/early-career-researchers#early-concept-grants-for-exploratory-research-eager-c8f>
      2. Could start with Matt Kane who is the EFI RCN Program Officer
    - iii. ACED: <https://new.nsf.gov/funding/opportunities/aced-accelerating-computing-enabled-scientific>
      1. Calls specifically someone from CISE and someone from bio or mathematics. We have bio covered, so potentially a good fit
    - iv. If we think our application would fall under the umbrella of [Computational and Data-Enabled Science and Engineering \(CDS&E\)](#)
      1. John to reach out to a program officer that he knows at NSF and can check in about EAGER as well
  - f.

8. **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](#)