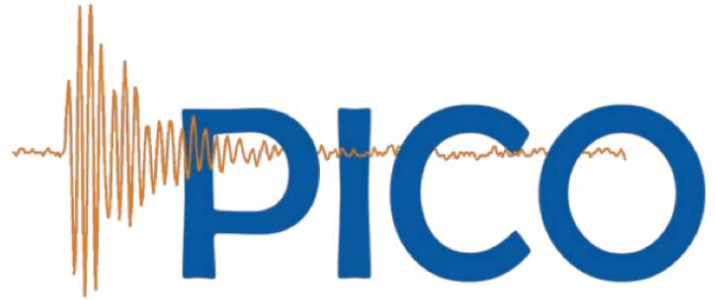


GitHub Projects and Analysis Code Structure

Derek Cranshaw

PICO Collaboration Meeting

SNOLAB

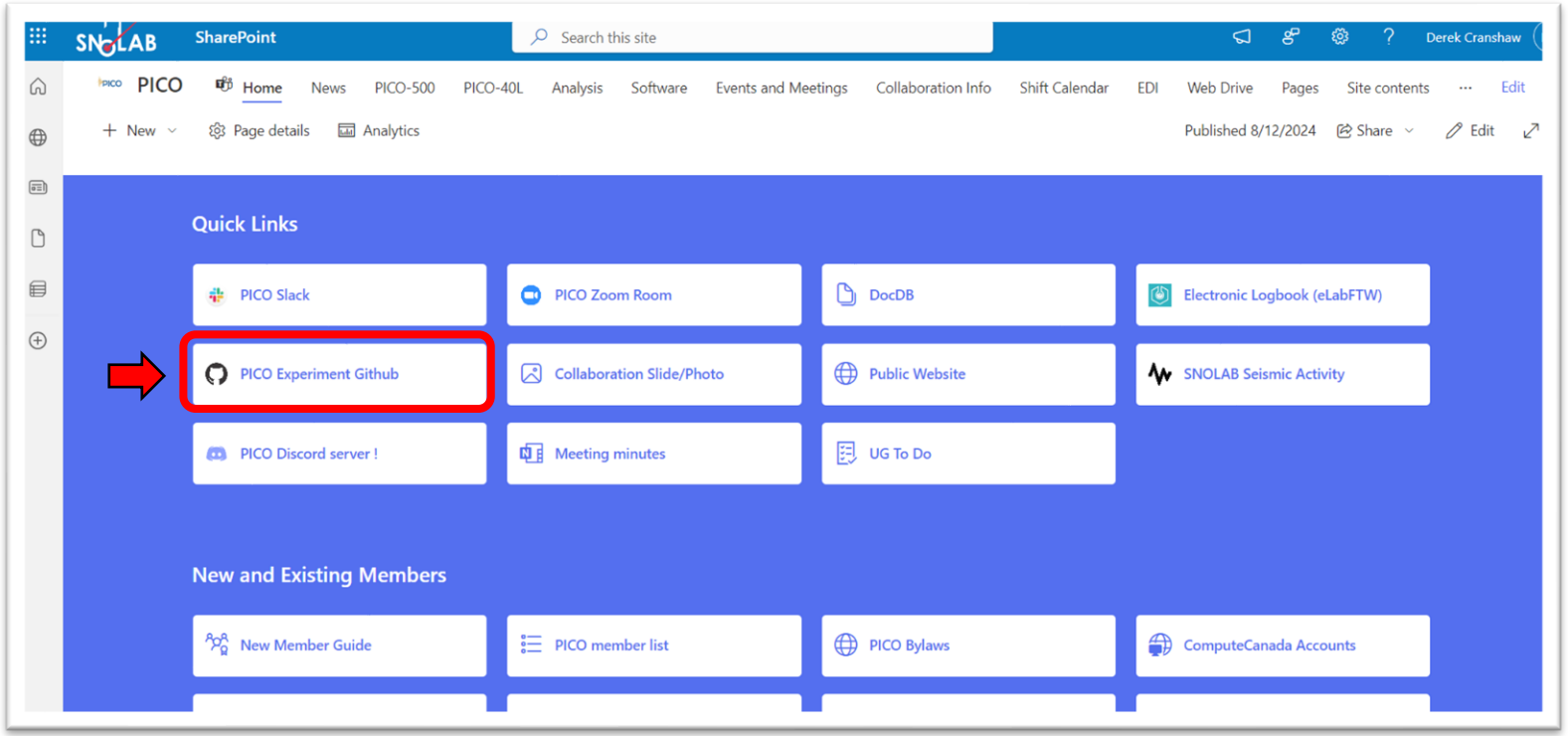
August 22, 2024

A Vision for Github Projects

- Single landing point where ongoing software and analysis efforts can be seen at a glance.
  - New members can see what's being done and who's doing what, so they know where to reach out for questions.
  - Brief description of analysis or software ideas with no personnel assigned.

- Attached to Github, where the code for all analyses should be kept.
  - Any tasks associated to a repository issue is synced between the project and the issue tracker.
  - Priority broadly reflects how soon the output of an analysis affects operational decisions.

Where to find it



https://github.com/orgs/picoexperiment/projects/2

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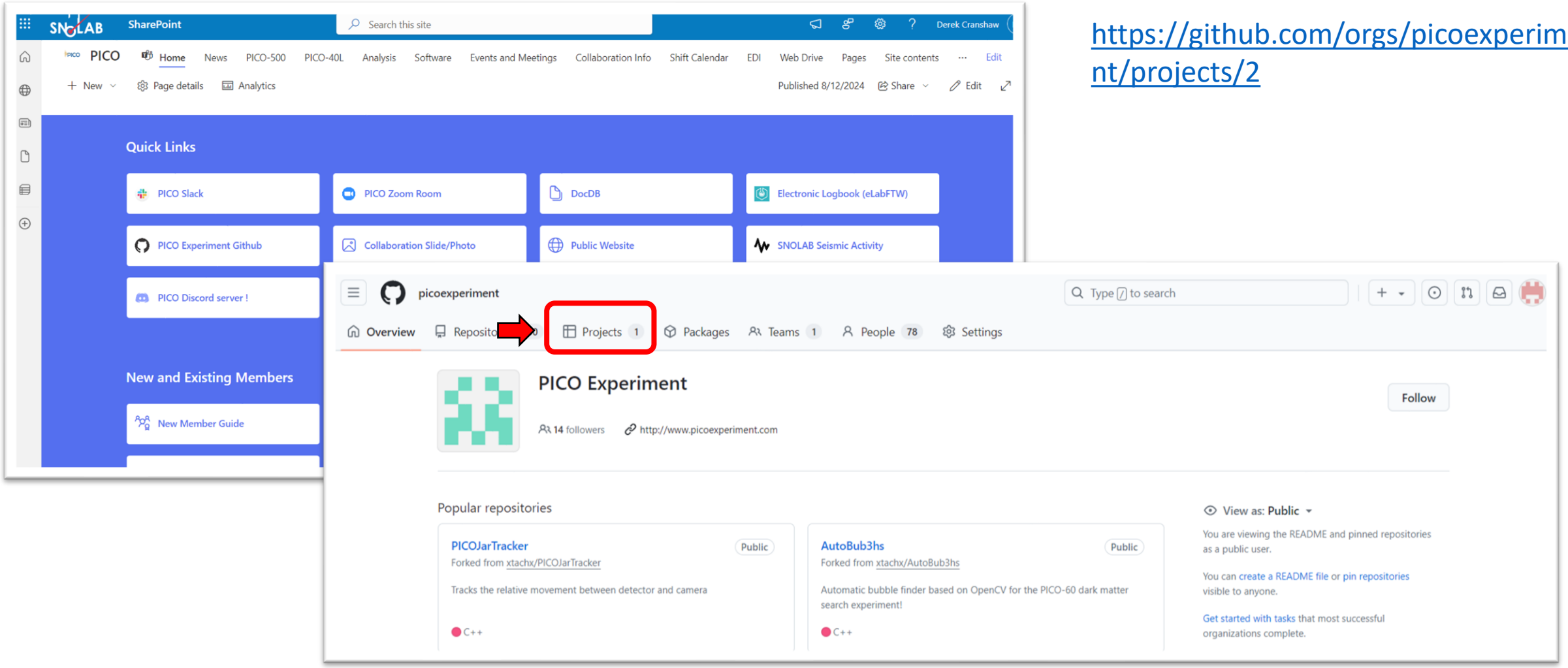

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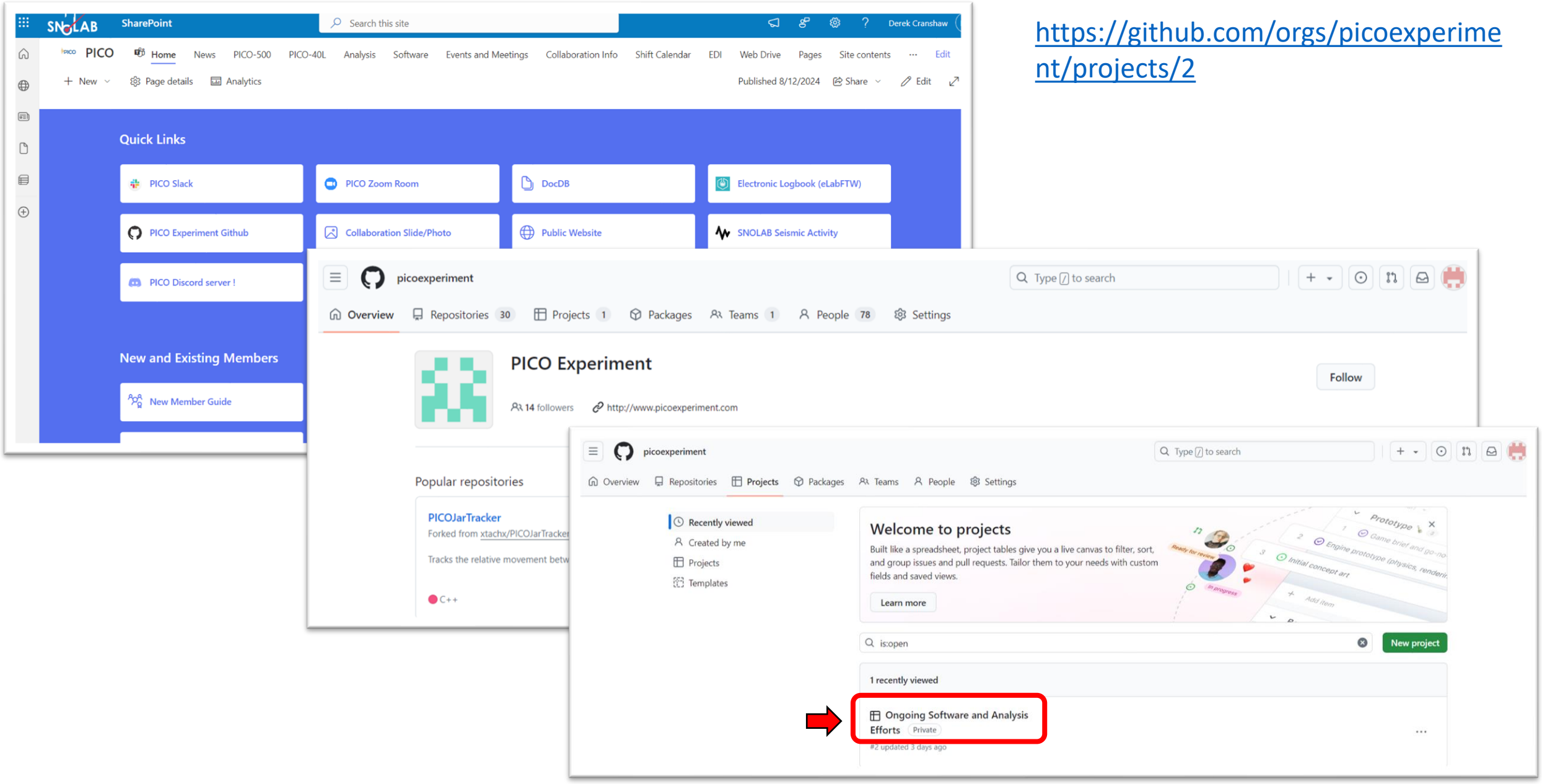
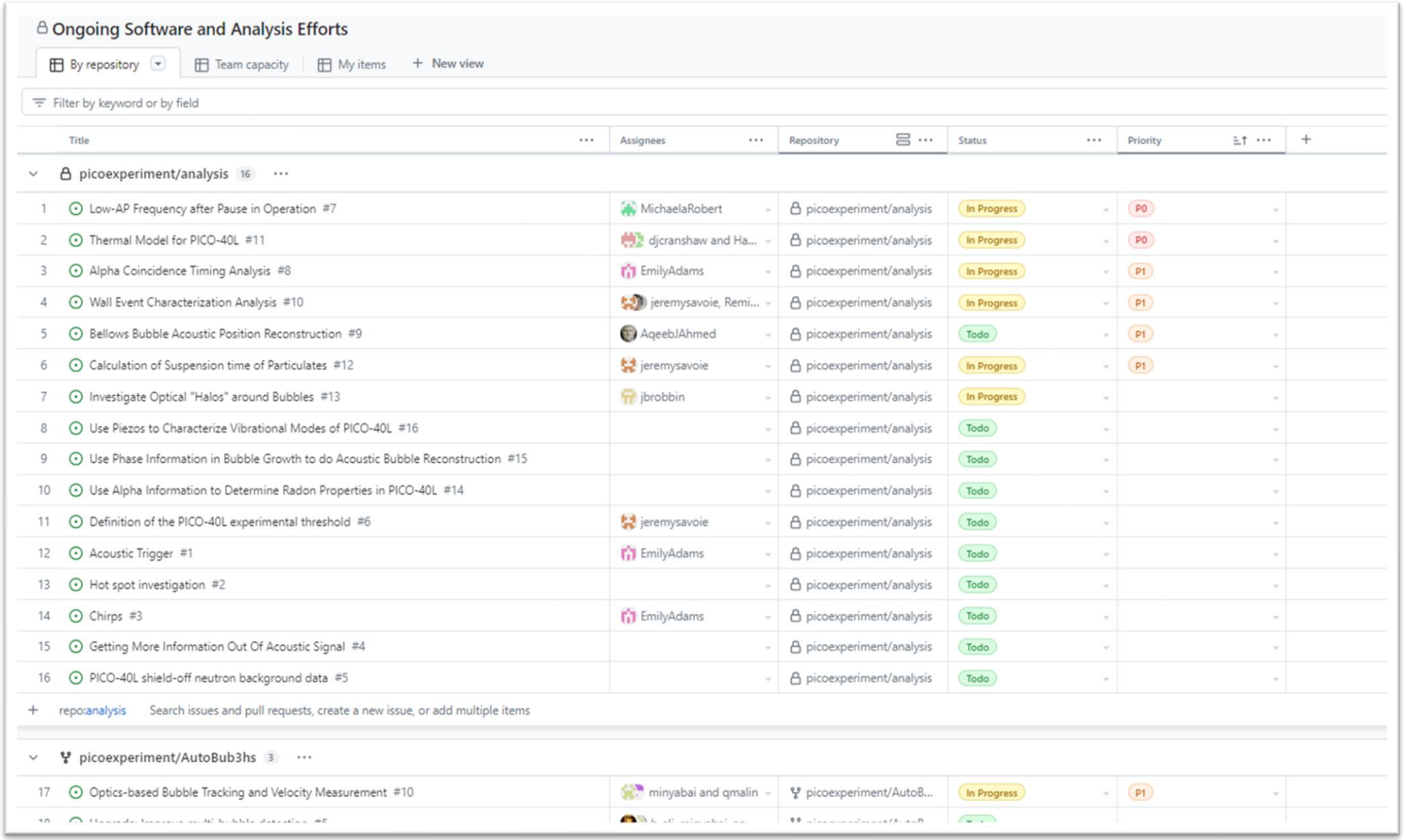


Views – By repository

Views

Sorted by Repo



Ongoing Software and Analysis Efforts

By repository | Team capacity | My items | + New view

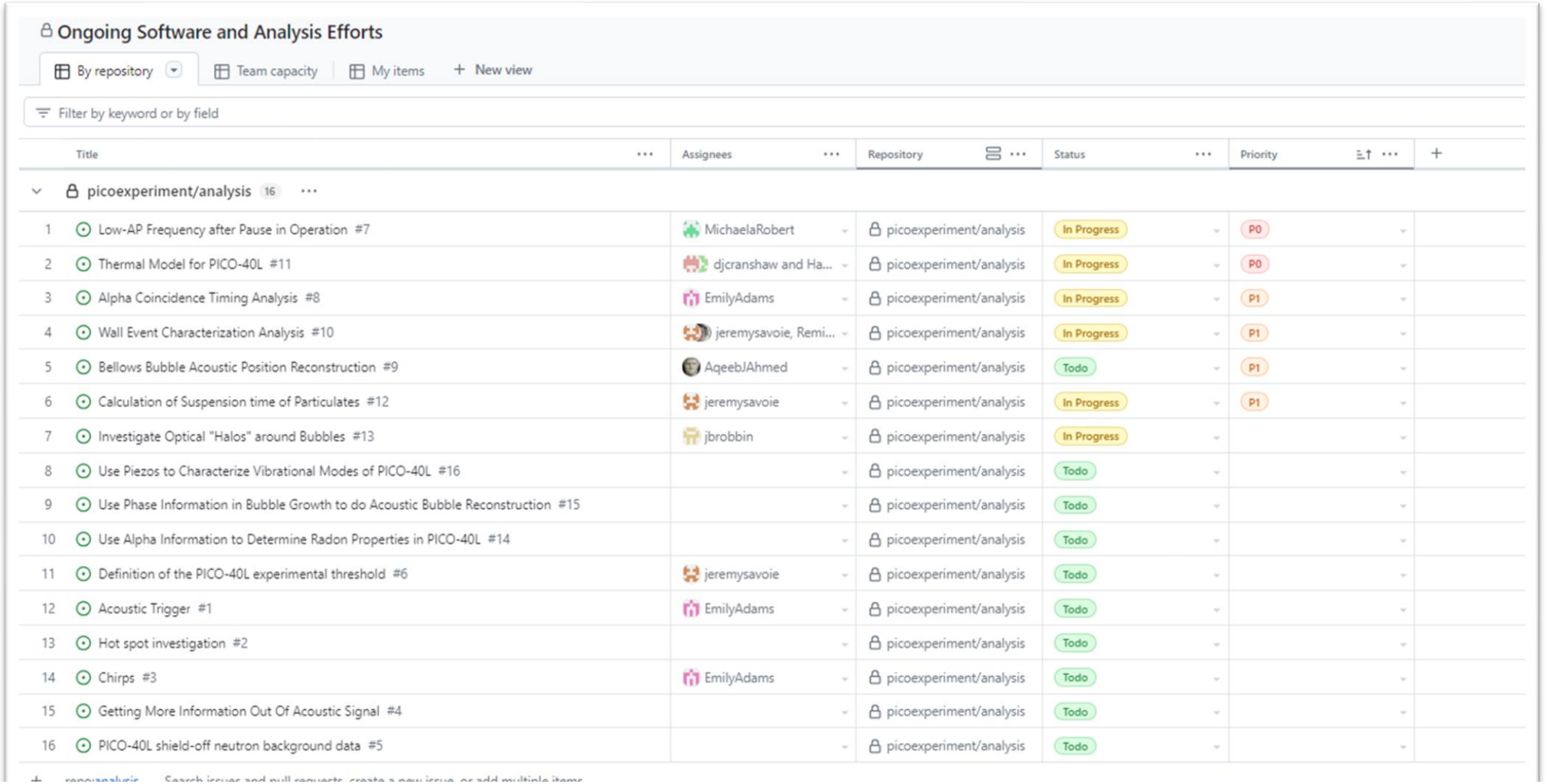
Filter by keyword or by field

	Title	Assignees	Repository	Status	Priority
	picoexperiment/analysis 16				
1	Low-AP Frequency after Pause in Operation #7	MichaelaRobert	picoexperiment/analysis	In Progress	P0
2	Thermal Model for PICO-40L #11	djcranshaw and Ha...	picoexperiment/analysis	In Progress	P0
3	Alpha Coincidence Timing Analysis #8	EmilyAdams	picoexperiment/analysis	In Progress	P1
4	Wall Event Characterization Analysis #10	jeremysavoie, Remi...	picoexperiment/analysis	In Progress	P1
5	Bellows Bubble Acoustic Position Reconstruction #9	AqeebJAhmed	picoexperiment/analysis	Todo	P1
6	Calculation of Suspension time of Particulates #12	jeremysavoie	picoexperiment/analysis	In Progress	P1
7	Investigate Optical "Halos" around Bubbles #13	jbrobbin	picoexperiment/analysis	In Progress	
8	Use Piezos to Characterize Vibrational Modes of PICO-40L #16		picoexperiment/analysis	Todo	
9	Use Phase Information in Bubble Growth to do Acoustic Bubble Reconstruction #15		picoexperiment/analysis	Todo	
10	Use Alpha Information to Determine Radon Properties in PICO-40L #14		picoexperiment/analysis	Todo	
11	Definition of the PICO-40L experimental threshold #6	jeremysavoie	picoexperiment/analysis	Todo	
12	Acoustic Trigger #1	EmilyAdams	picoexperiment/analysis	Todo	
13	Hot spot investigation #2		picoexperiment/analysis	Todo	
14	Chirps #3	EmilyAdams	picoexperiment/analysis	Todo	
15	Getting More Information Out Of Acoustic Signal #4		picoexperiment/analysis	Todo	
16	PICO-40L shield-off neutron background data #5		picoexperiment/analysis	Todo	
+	repo:analysis Search issues and pull requests, create a new issue, or add multiple items				
	picoexperiment/AutoBub3hs 3				
17	Optics-based Bubble Tracking and Velocity Measurement #10	minyabai and qmalin	picoexperiment/AutoB...	In Progress	P1

Views – By repository

Views

Sorted by Repo



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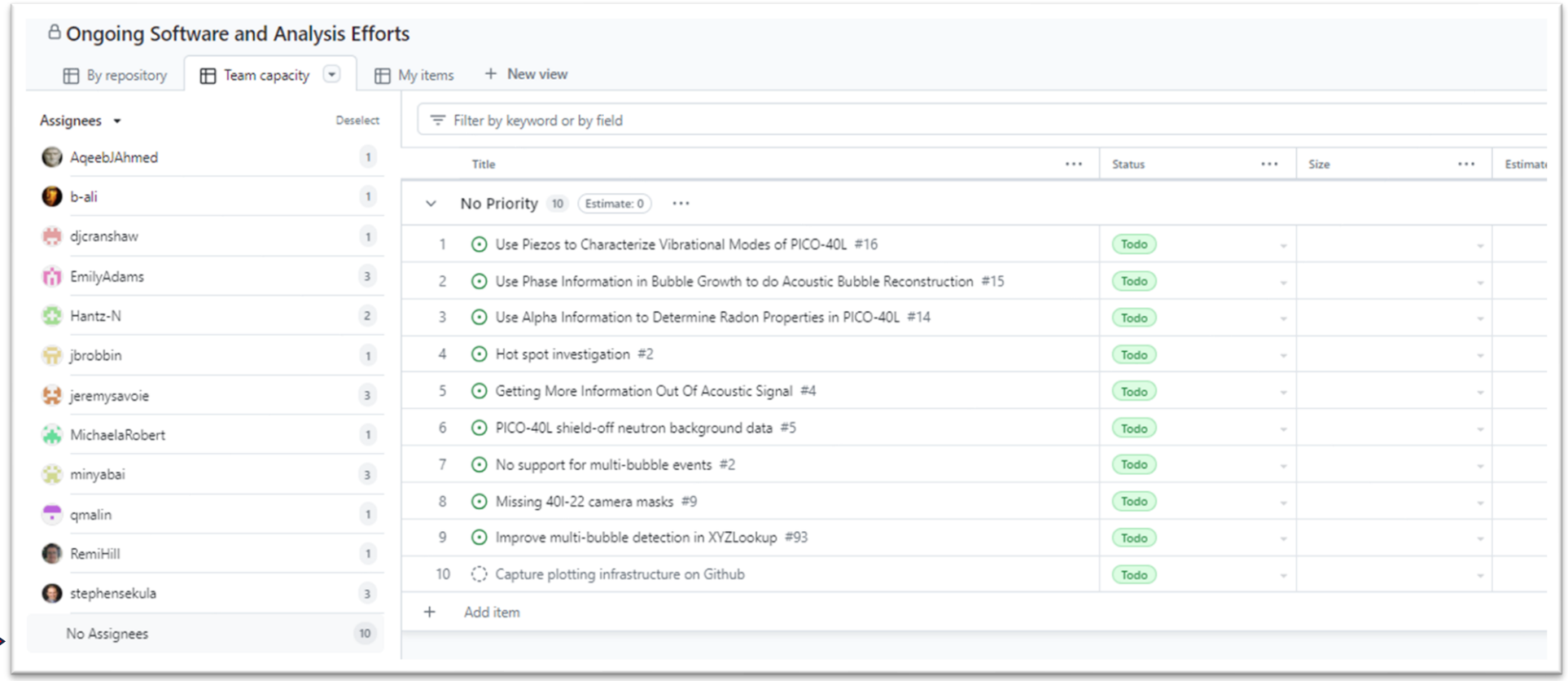
- Every task must be associated with a GitHub repository
  - Use the Analysis repository unless the task is associated to some other repository (e.g. Autobub improvements are associated to the Autobub3hs repository).

Views – Team capacity



- Easily find tasks with unassigned personnel, opportunities for new members.
- When someone leaves the collaboration, shows which tasks need to be picked up.

An Example

Ongoing Software and Analysis Efforts

Add status update

By repository | Team capacity | My items | + New view

Filter by keyword or by field — Discard — Save

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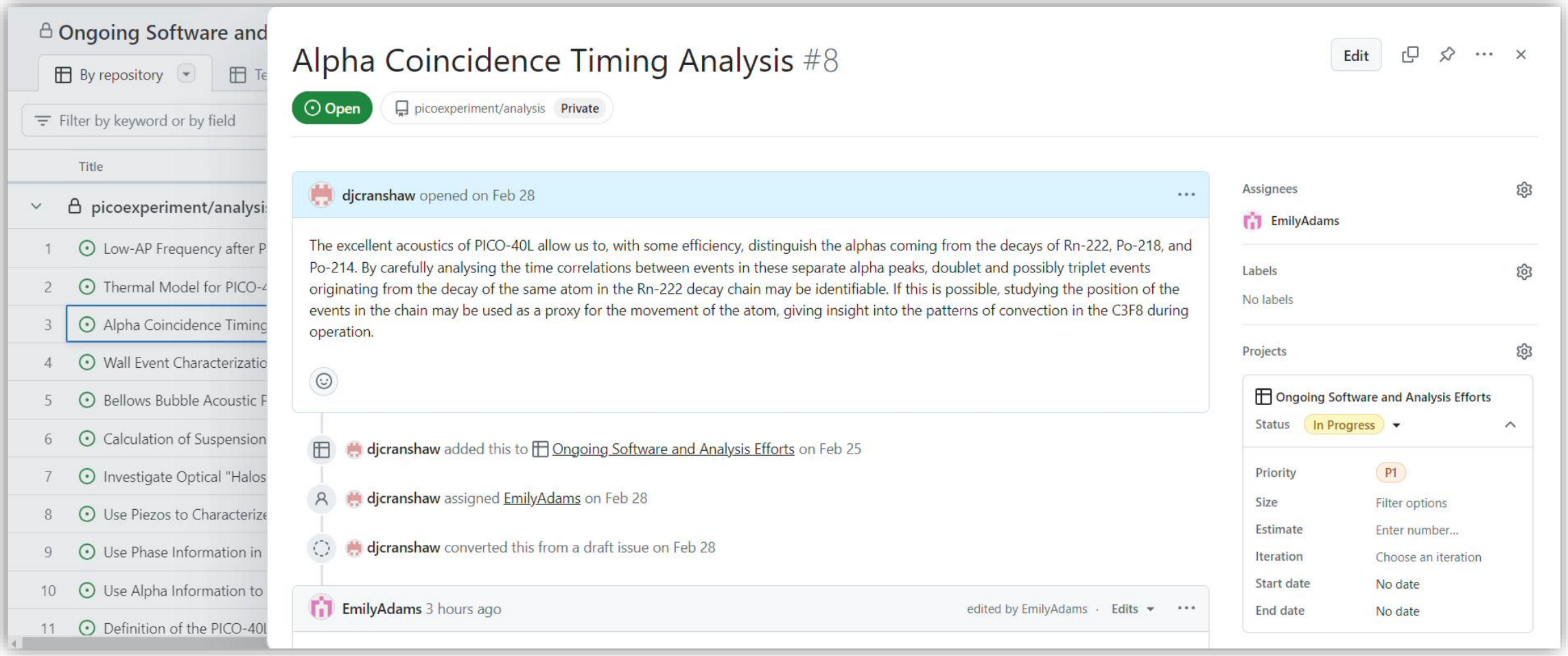
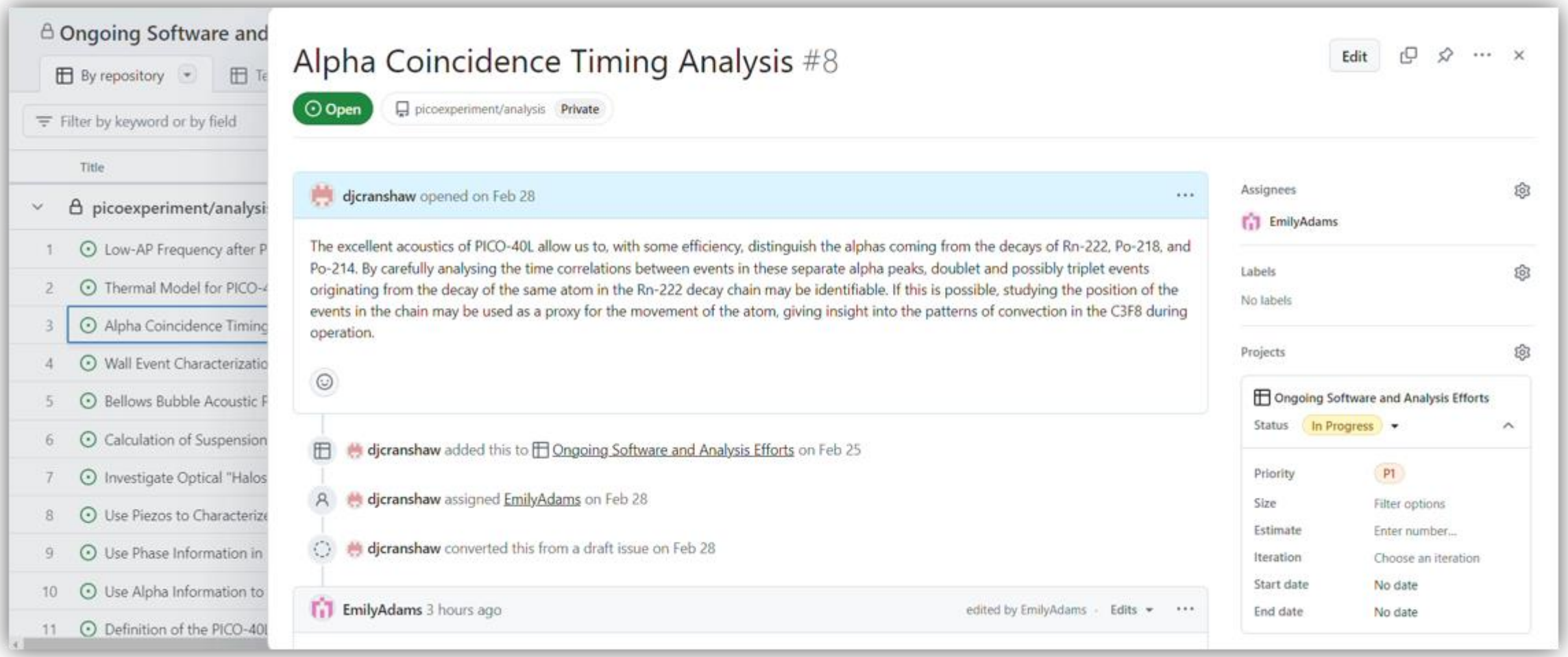

Ongoing Software and
By repository
Filter by keyword or by field
Title
picoexperiment/analysis
1 Low-AP Frequency after P
2 Thermal Model for PICO-4
3 Alpha Coincidence Timing
4 Wall Event Characterizatio
5 Bellows Bubble Acoustic F
6 Calculation of Suspension
7 Investigate Optical "Halos
8 Use Piezos to Characterize
9 Use Phase Information in
10 Use Alpha Information to
11 Definition of the PICO-40L
Alpha Coincidence Timing Analysis #8
Edit
Open
picoexperiment/analysis
Private
djcranshaw opened on Feb 28
The excellent acoustics of PICO-40L allow us to, with some efficiency, distinguish the alphas coming from the decays of Rn-222, Po-218, and Po-214. By carefully analysing the time correlations between events in these separate alpha peaks, doublet and possibly triplet events originating from the decay of the same atom in the Rn-222 decay chain may be identifiable. If this is possible, studying the position of the events in the chain may be used as a proxy for the movement of the atom, giving insight into the patterns of convection in the C3F8 during operation.
djcranshaw added this to Ongoing Software and Analysis Efforts on Feb 25
djcranshaw assigned EmilyAdams on Feb 28
djcranshaw converted this from a draft issue on Feb 28
EmilyAdams 3 hours ago
edited by EmilyAdams · Edits
Assignees
EmilyAdams
Labels
No labels
Projects
Ongoing Software and Analysis Efforts
Status In Progress
Priority P1
Size Filter options
Estimate Enter number...
Iteration Choose an iteration
Start date No date
End date No date

An Example



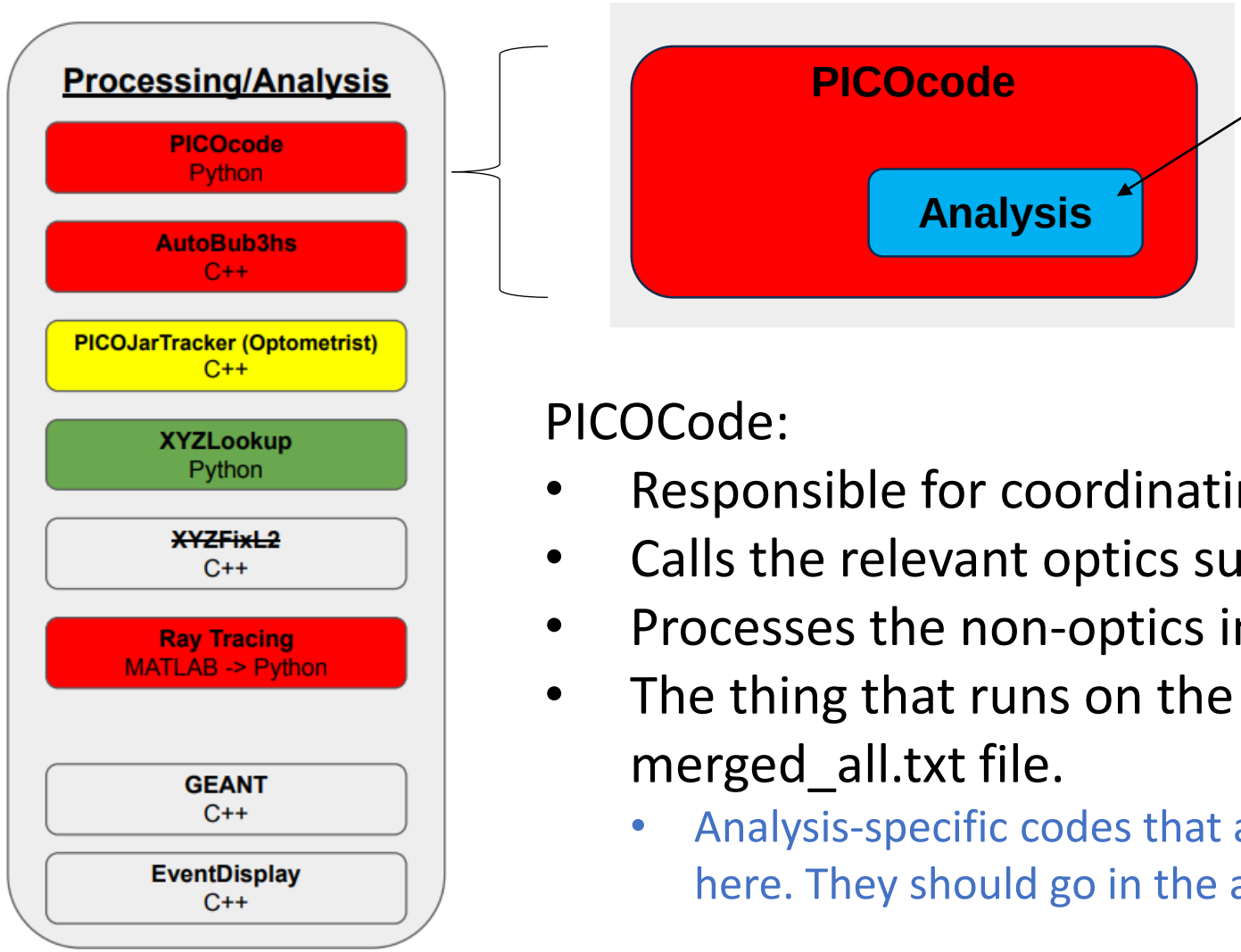
- Timeline of progress, and jump-off point for documentation.

Keeping up to Date

- The more people use the system, the more useful the system will be, which will encourage more use.
  - Don’t want to make this a burden or time-sink, but it should be just a few extra minutes of work each week.
  - Can be as simple as a sentence or two describing a progress update, or a link to some slides on DocDB (or both).

- Not a place for long, detailed write-ups, but a great place to link to them.
- Once a task is complete, final comment can link to a thesis, paper, or some other write-up, then marked as closed.
- The project should be up to date as of this week. Please check that your assignments reflect reality, and for the tasks you’re working on, see if I’ve missed anything.

Processing and Analysis Code

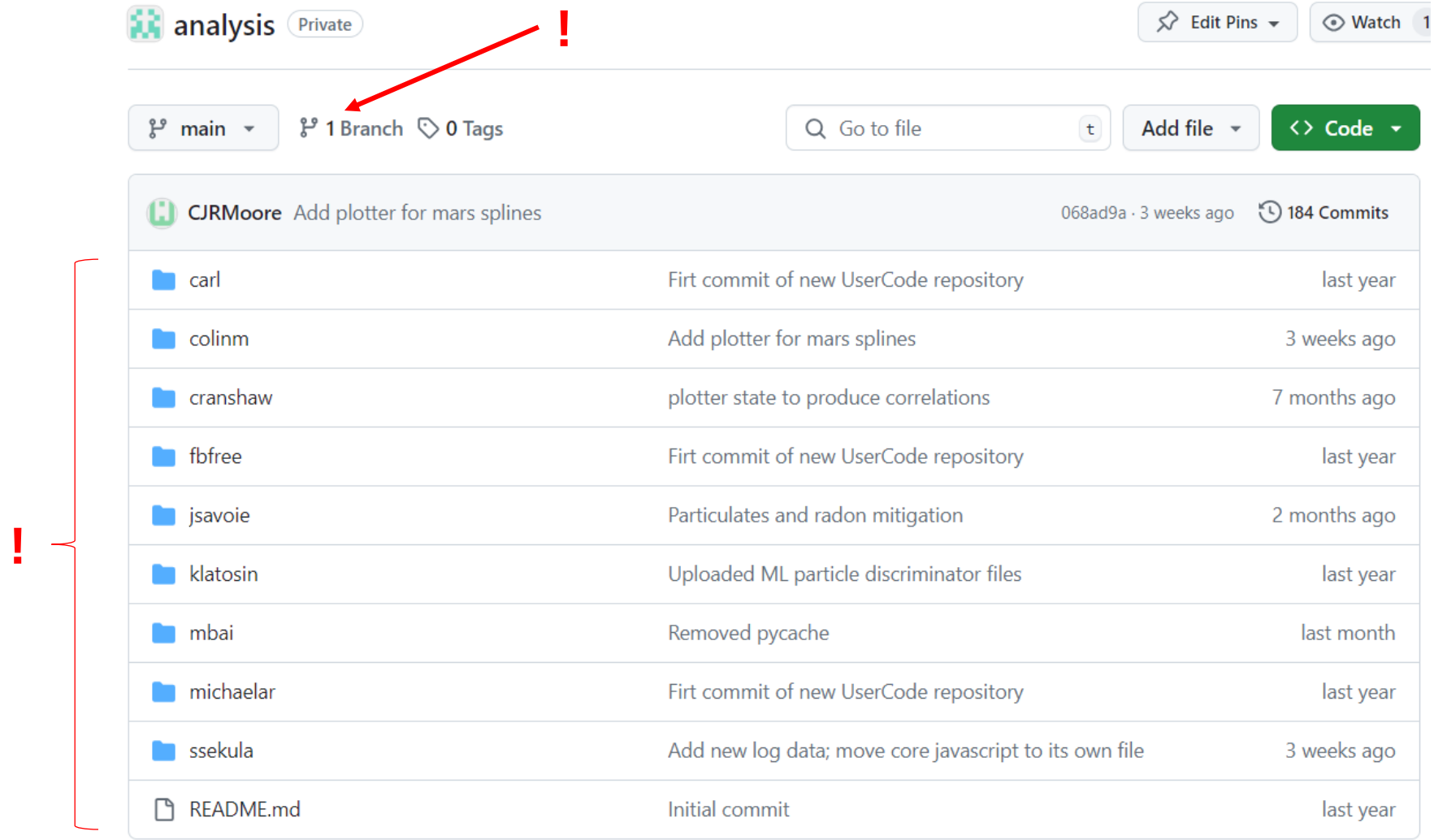


Git submodule of PICOcode
(often called “UserCode” when checked out according to the readme instructions).

PICOCode:

- Responsible for coordinating the analysis chain.
- Calls the relevant optics submodules (autobub, etc.).
- Processes the non-optics instrumentation data.
- The thing that runs on the raw data to produce recon files like the merged_all.txt file.
  - Analysis-specific codes that aren’t required for processing don’t really belong here. They should go in the analysis repository (a.k.a. UserCode)

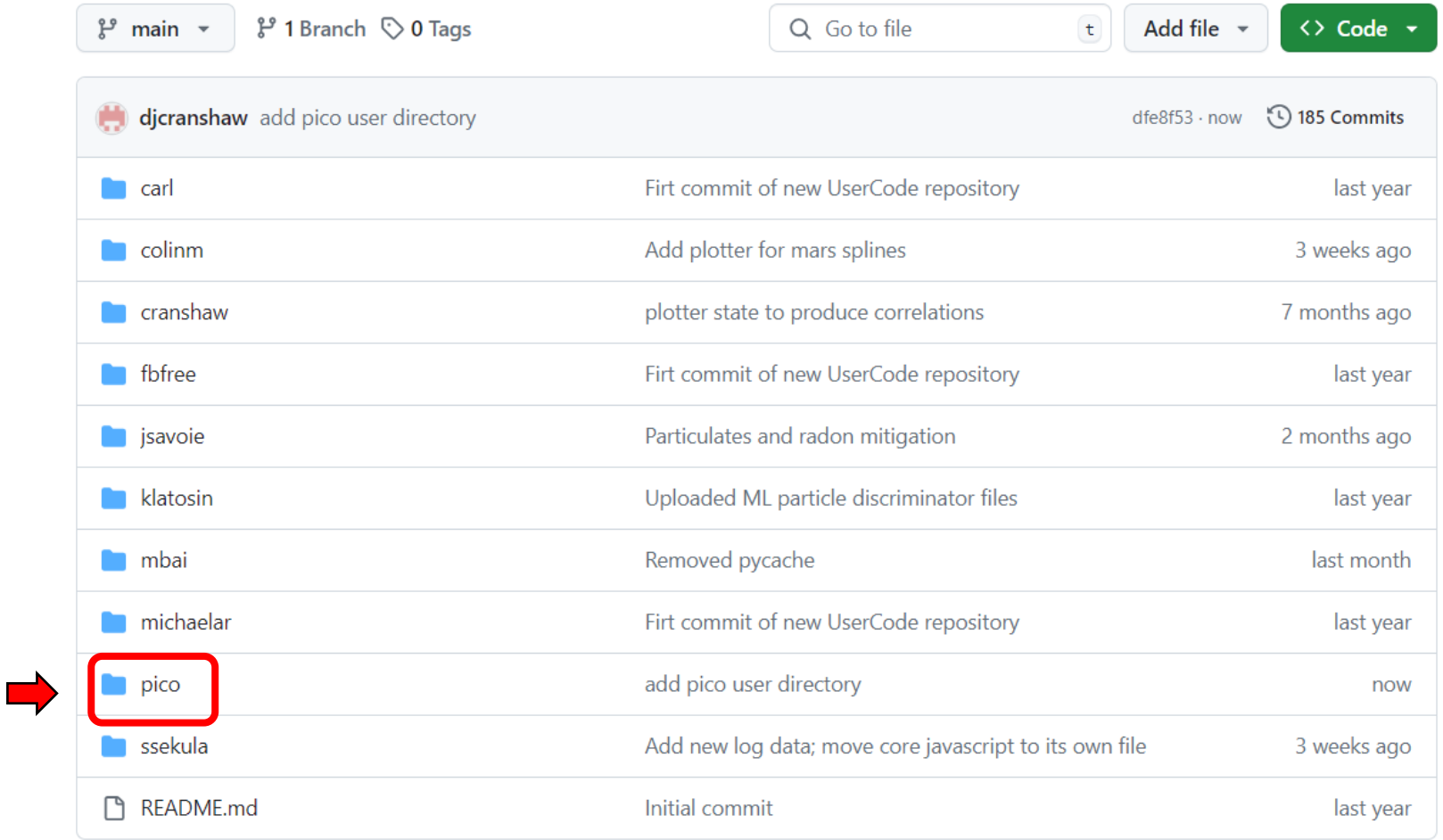
Analysis Repository Structure



- This is … quite un-gitlike. But it's the model we've been using without confusion, so probably it's fine for us.

Code Quality

- Want to encourage code sharing – commit early, commit often.
  - Requiring beautiful code discourages committing and makes sharing more difficult.
- But… messy, undocumented code is much harder to use (though often better than nothing).
- Proposal…



The Model

- Your user directory is yours to version and store all your analysis code, in whatever state it's in.
  - It needn't be fully complete or documented – can be useful to point others to just to show how to do some simple analysis task (like instantiate a ReconFile or Event object, etc.)
  - We trust each other not to push over top of each other's directories.

- The pico directory is to store well-documented, structured pieces of code which produce some specific result (like produce plots, compute rates, etc.).
  - Should follow "PICO golden rules" (Colin is currently adapting these COUPP golden rules).
  - Allows anyone in the collaboration to reproduce plots or results.
  - Ideally, any plots or results shown in papers or at conferences, and important plots in theses, should have some code that allows it to be reproduced.
    - This also ensures we're all showing the same thing at conferences etc.

Adding to pico

- pico is currently empty.
  - Will add a copy of the PICO golden rules once they're ready.
  - Will add a simple calculation which will also serve as an example for how the code could be structured.

- Ideally, would be nice to have code reviewed before going into pico by using a PR from a separate branch, as is currently being done for PICOcode.
  - Is this overkill? I like the idea but what do the other analysers thing?
  - Can't enforce this via branch protection rules, can just trust each other to do this.
  - Review can be quasi-enforceable for individual folders (via git pre-commit hooks, ask me if you're interested). Very easy to spin up, but this might be overkill as well.

- The goal is that this will make everyone's lives a little easier - Let's try this.