

# CPAD RDC 5: Trigger and DAQ



Zeynep Demiragli (Boston University)

Jinlong Zhang (Argonne National Lab)

# CPAD Community Meeting: Highlights

**A Reminder:** At time of writing, there is no new funding available to the HEP budget for generic detector R&D. This means that new proposals for CPAD R&D collaborations (RDC's) that are to be submitted to the [comparative review FOA](#) need to be limited in number, structure, and scope.

- Number: small; we expect that the RDCs and the community can converge on a few most suitable proposals for this year under these constraints
- Structure: These should be university lead, multi-institutional proposals with a light-weight collaboration structure (**not a structure like the very formal DRD collaborations**)
  - These teams can include national labs
  - Where appropriate the multi-institutional teams should designate one lead institution with all other team members proposed as subrecipients.
- Scope: The proposals should focus on generic R&D (as opposed to project specific), "blue-sky" (having a high-risk high-reward outcome), and have **limited but growing budget profile**
  - The most important point is to develop the proposals with a strong and coherent technical scope
  - Very likely the most competitive proposals would have components that live in multiple RDC's and are coordinated by multiple RDC groups

## CPAD Community Meeting: Highlights

- **Timeline**: The FOA already lays out the timeline for submission for this round

### **Applications submitted for the annual HEP comparative review process:**

2. FY 2025 HEP Comparative Review: HEP expects to convene merit review panels in November 2024 for research areas (a) through (g) below. Research applications, as described above, that are aligned with one or more of those research areas and are received **before September 5, 2024**, will be considered for merit review by those panels. Applicants are strongly encouraged to submit **pre-applications prior to August 1, 2024**.

**The RDCs will work with the community to converge on a few multi-institution proposals (only in 2024) from across the RDC's to submit to the comparative review FOA**

# Expectations

We should expect limit ourselves to a few proposals across 11 RDC's for this year submission.

- Prioritize work packages which cross many RDC areas and are blue sky proposals would be a good fit for this year's proposals.

We should be aware of the budget expectations:

- Likely minimal budgets in year 1 & 2 and ramp up in 3+ years.

# Proposed Timeline for RDC Activities (reverse chronological order)

- **09/04/24:** Deadline for proposals to DOE (before Sept. 5th 2024)
  - [See FOA here](#) page 49
- **08/08/24:** CPAD Executive Committee and RDC coordinators put forward “≤5” (handful) collaborative proposals to be identified as “high priority” RDC proposals
  - These proposals will get letters of collaboration from CPAD and the RDCs identifying that this work has been earmarked as important to the community and will have support from CPAD in helping in the structure and execution of the collaboration
    - Would be helpful if these proposals also had clear synergy with ECFA DRDs
  - **This does not stop any group of PI's from continuing to submit to the DOE FOA.**
    - Hopefully this process enhances the selected proposals and helps them in their formation of new collaborations by identifying synergies, forming collaboration with the CERN based DRDs, identifying common resources, and avoiding duplication of work
    - Hopefully we work to help find other packages opportunities to jump start their work in the coming year (SCGSR, LDRDs, SBIR's, etc...)
- **07/24:** RDC coordinators bring short whitepapers to for each collaborative proposal (Virtual Town Hall) where we try to get a sense of what is being proposed
  - We will need to define what these white papers should have in them
  - This will give the coordinators and the CPAD EC time to deliberate
- **06/24:** Virtual check-in with RDCs to see how the formation of collaborations and preparations for the white paper is going.
  - One last opportunity to solicit calls for these proposals and help identify
  - **The deadline for white paper submission is July 19**
- **04/24:** RDC Workshop to call to attention and highlight what CPAD is looking for in the RDC proposals
  - Will need time for parallel sessions to have people “workshop” their ideas

# May 3 Community Meeting

- **Submission opened for 2-3 page “white papers” from the community to ensure we gather input from any interested parties**
  - Many of the RDC’s have already started this process, we just need to collect this information in a “standard template” ([see example here](#))
  - Your ideas should be communicated through the RDC coordinators
  - These “white papers” will be posted to CPAD RDC webpage
  - Period of submission is two months (May and June 2024)
  - We anticipate RDC coordinators are holding meetings between May and June to both advertise this process and work with proponents articulate their research
- **Early July 2024 we will hold a meeting and invite a large number (all?) of the white paper submitters to present their idea to the community and RDC coordinators will collect feedback and synthesize the proposals**
- **Late July 2024 the RDC coordinators and the CPAD Executive Committee will convene to encourage a few of these proposals**
  - These results are then posted on the CPAD website and we will work with proponents for proposal preparation to the comparative review

# May - June 2024

- **Period of submission is two months (May and June 2024)**
  - We anticipate RDC coordinators are holding meetings during this period to both advertise this process and work with proponents articulate their research
  - We will collect the various whitepapers onto the CPAD webpage as they are submitted
- **RDC coordinators should be working with members of the community to “manage their expectations” and help identify links between the RDC’s which will enhance various proposals**
  - The RDCs should be working with proponents to form long-term collaborations as well as identifying possible proposals for 2024

## CPAD R&D Collaboration White Paper Template 2024

### **Title:**

(Put your title here)

### **Institutions:**

PI # 1 Name, Institution

PI # 2 Name, Institution

PI # 3 Name, Institution

...

### **Abstract:**

(Explain what your R&D is and what are the outcomes if successful.... 2-3 paragraphs)

### **Collaboration:**

(Outline the teams (who and where)

the collaboration structure (which institution is responsible for what),

and the links to the relevant CPAD RDC's (list the relevant RDC's and the match to their areas of research priorities))

### **Timelines:**

(Give a rough outline of the timeline for the R&D with any known milestones or deliverables during the proposed 3(4) year funding period 2025 - 2028(9) )



# Links on the CPAD Website

## 2024 RDC Collaborative Proposals

For the 2024 Comparative Review, CPAD and the RDC's aim to put forward a small number of university lead, multi-institutional proposals focused on generic "blue-sky" R&D

To this end, we are open to submission of community lead "White Papers" which outline proposals for such consortia. These white papers will be used to help CPAD coordinate and promote groups intending to submit to the DOE Comparative Review in September 2024

### Relevant Links:

- **Comparative Review FOA:**

<https://science.osti.gov/hep/-/media/grants/pdf/foas/2023/DE-FOA-0003177-000001.pdf>

- **2024 RDC White Paper Google Drive**

[https://drive.google.com/drive/folders/1b7HJZcH2vpf9Dj\\_HSyruxDAP-zgzDo8o?usp=sharing](https://drive.google.com/drive/folders/1b7HJZcH2vpf9Dj_HSyruxDAP-zgzDo8o?usp=sharing)

- **2024 RDC White Paper Template**

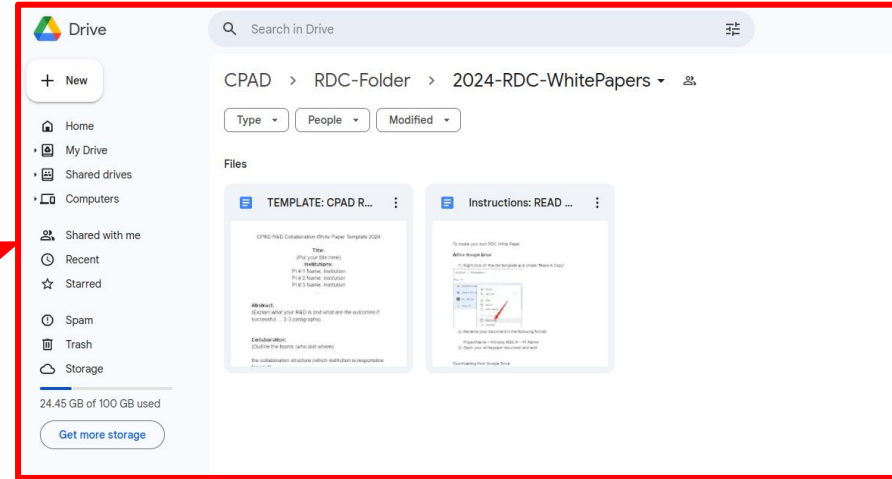
<https://docs.google.com/document/d/1cU7nccoCaFCvFRBffVfNVDLOSciNHgz0VR1ppNZmiRw/edit?usp=sharing>

## Link to CPAD RDC General Meetings

May 2024 RDC Community Meeting: [Indico Link](#)

July 2023 RDC Kickoff Meeting: [Indico Link](#)

[https://cpad-dpf.org/?page\\_id=1549](https://cpad-dpf.org/?page_id=1549)



The screenshot shows a Google Drive interface. The breadcrumb path is CPAD > RDC-Folder > 2024-RDC-WhitePapers. The folder contains two files: 'TEMPLATE: CPAD R...' and 'Instructions: READ ...'. A red arrow points from the Google Drive link in the text to the 'Instructions: READ ...' file in the screenshot.

# July Meeting

- **Early July 2024 we will hold a meeting and invite a large number (all?) of the white paper submitters to present their idea to the community**
  - This is a one day virtual workshop
  - We expect active community feedback on these ideas, which will be collected and synthesized by RDC coordinators
- **Late July 2024 the RDC coordinators and the CPAD EC will convene to deliberate**
  - These results are then posted on the CPAD website, communicated with the community and the funding agencies
  - We will work with proponents for proposal preparation to the comparative review

# Short-term action items

Take a look at the proposed white paper template and send comments or questions

a. Google Drive Folder:

[https://drive.google.com/drive/folders/1b7HJZcH2vpf9Di\\_HSyruxDAP-zgzDo8o?usp=sharing](https://drive.google.com/drive/folders/1b7HJZcH2vpf9Di_HSyruxDAP-zgzDo8o?usp=sharing)

i. Note: People can only add/edit (not delete)

ii. The drive folder is backed up automatically every 24 hrs

b. The goal is to have something light weight, which captures everything we will need to understand what the proposed collaborative research is without making people write a lot of text

*Note: will collect a series of Google Docs in a Google Drive folder (no fancy database) with proper access*

# Overview of Timeline

- **May 3:** Virtual Town Hall outlining RDC 2024 process
  - **We emphasize that this isn't the process for doing this in the future and instead is to get the ball rolling**
- **May - June:** RDC's are meeting and advertising and encouraging community to form proposals which match the constraints in number, structure, and scope.
  - A few, university lead, multi-institutional, generic "blue-sky" focused R&D with limited but growing budget profile
  - Proposal white papers are to be posted on CPAD website
- **Early July:** One day workshop where proponents can present their proposed collaborative research to the community
- **Late July:** CPAD RDC and EC meet to deliberate in line with key R&D priorities
- **July 31st:** LOI's submitted to DOE
- **Sept 4th:** Submission of proposals to DOE

# RDC 5: Trigger and DAQ

- Areas of R&D Priorities
  - Intelligent data reduction and processing (with RDC4)
    - Real-time / low-latency data reduction and feature extraction
    - Fast artificial intelligence and neuromorphic computing on real-time hardware
  - Link technology (with RDC4)
    - High-bandwidth, rad-hard, low-power optical link (>50Gbps)
    - Wireless readout
  - Integrating modern computing architecture and emerging technologies
  - Self-running DAQ system
  - Timing distribution with picosecond synchronization (1ps over 1 km) (with RDC4)
- Note that Higgs Factory related R&Ds will be treated as targeted R&Ds and have different funding line
  - Please see the announcement of US HFSC organization during FCC Week at San Francisco