Answers to IRIS-HEP questions from Cornell

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Who is actively working on the project from the group and what are they doing? What projects are connected with the institute’s grand challenges?

- Dan Riley, Steve Lantz, Tres Reid, Gavin Niendorf
- IA subject area
- Working on mkFit and LST

vWhat are contributions of those individuals in your group to the various area(s), i.e. AS, IA, DOMA, SSL, SSC, OSG-LHC?

All contributions are focused in IA and are contributing to tracking studies on modern compute architectures

mkFit: vectorized and parallelized Kalman Filter pattern recognition (Xeon CPUs)

LST: new algorithm for Phase-2 CMS tracker pattern recognition (Nvidia GPUs)

What specific collaborations has the group made with other groups within IRIS-HEP?

Longstanding collaboration with UCSD and Princeton on these subject areas.

What specific collaborations has the group made with other groups or individuals external to IRIS-HEP? What are plans to integrate the work with the wider HEP community?

mkFit has been integrated now for Run 3 in CMS and is replacing original tracking algorithm. GPU unpacking offshoot has also been integrated in CMS (PR pending)

We anticipate that LST will go the same route, if the performance is adequate.

mkFit's underlying matrix libraries are available on Github as a standalone package

Which contributions has the group made to the "Intellectual Hub" aspect of IRIS-HEP? (Including community building activities, training, outreach and broader impact.)

- Excellent training ground for students (McDermott, Reid, new student Niendorf)
- Extensive contributions to CODAS-HEP school (Riley, Lantz, now also Reid)

Please list any papers/presentations/software-repositories connected to the above.

mkFit: CMSSW

LST: https://github.com/SegmentLinking/TrackLooper

Talks at various conferences: HEP2022 (Greece), CTD 2022 (arXiv:2207.08207)

1. How is your project managed? How is progress measured? How are risks identified and mitigated?
2. Are metrics aligned with the project? Do metrics accurately reflect the progress, success or impact of the project?

Regular group meetings (3 weekly meetings); pre-covid: annual face-to-face meetings.

Regular check-ins to adjust roadmap.

What are the plans for next year?

Continue mkFit integration into CMSSW

Continue development of LST

Explore possible portable implementation of LST (alpaka, etc)

As noted in the review, we need to prepare a vision for sustainability of the various software projects. Do you have any initial thoughts for your projects?