

SWIFT-HEP

Introduction

2 Nov 2021

Welcome to the SWIFT-HEP workshop

First workshop since the project started

- We had a zoom meeting last February
- Run in “hybrid” mode
(remember, this is what we did pre-2020)
- Most of us got unused to meetings in a room
- I didn't meet many of the people I work with

Live notes, Indico agenda, ...

Raise hands on zoom and in the room

SwiftHep/ExcaliburHep workshop.



2 Nov 2021, 10:30 → 3 Nov 2021, 17:00 Europe/London

Description In-person/hybrid meeting hosted by Imperial College

If you plan to attend in person, please register *before* 22 October

Location:

Imperial College: Royal School of Mining. Room RSM 1.47

<https://www.imperial.ac.uk/media/imperial-college/faculty-of-engineering/bioengineering/public/directions/147.pdf>

Project timeline

WPs roughly on time

- WP3 started earlier (extra funding)
- WP2 just started
- WP5 yet to start
- WP4 possibly a bit late
- WP1 tracking on time

Oversight committee expected early in 2022

Project management

- Project manager not yet established
- We need to establish TDR contributions (LHCC review this week)
- Phase 2, comment later

WP0: Management

- Proj leader
- Dep proj leader
- D0.1: TDR Contributions
- D0.2: Define Phase-2

WP1: Data Management

- D1.1: Setup UK data lake
- D1.2: Implement QoS info
- D1.3: Rec on data access
- D1.4: Analysis Facility
- D1.5: Pilot log system
- D1.6: Middle size VOs
- D1.7: DIRAC load manag
- D1.7: DIRAC high lvl cmds

WP2: Event Generators

- D2.1: Profiling report
- D2.2: Optimise LHAPDF
- D2.3: Gen code optimisation
- D2.4: Pythia8 biased hadr
- D2.5: Pythia8 color recon
- D2.6: EvtGen modernisation

WP3: Simulation

- D3.1: EMCuda prototype
- D3.2: EMCuda validation
- D3.3: Geant4 Optiks exmpl

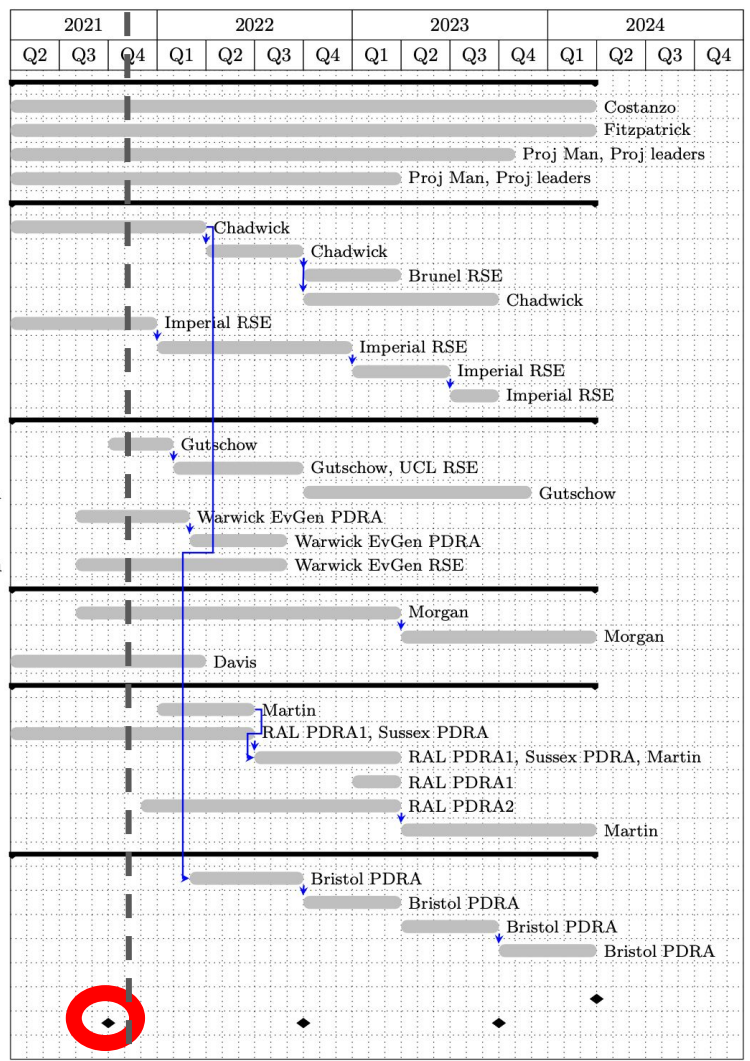
WP4: Reco Trigger

- D4.1: Report on benchm
- D4.2: FPGA prot deploy
- D4.3: FPGA prot benchm
- D4.4: OneAPI report
- D4.5: FasTras in OneAPI
- D4.6: FasTras benchm

WP5: Analysis Systems

- D5.1: Oper UK data lake
- D5.2: Caching mechanism
- D5.3: Per-site Optim
- D5.4: Workload schedule

Final report
Workshops



The big picture

	Entity	Scope	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
Infrastructure	LHC	Global	Run-2	LS2			Run-3			LS3		Run-4		
	WLCG	Global	Global coordination of requirements, resources, policies, networking, security, etc.											
	GridPP	UK	GridPP5			GridPP6			?					
	IRIS-UK	UK	UKTO	IRIS 4yr x £4m			Support of non-LHC STFC communities?							
Experiments	ATLAS-CMS	Global	S&C Conceptual Design			S&C Technical Design			S&C deployment		Operation			
	LHCb	Global	S&C TDR	S&C deployment		Operation and Upgrade 2 preparation								
	DUNE	Global	Protodune	S&C CDR	ProtoDUNE Comp model	DUNE implementation and deployment				Operation				
	Others	Global	Experiments common software infrastructure design and development (neutrino, dark matter, etc)											
Software	HSF	Global	HEP Software Forum: White Paper --> Working Groups --> Community Meetings --->											
	NSF	USA	S212	IRIS-HEP: 5yr x 5m USD					?					
	STFC	UK	£50k ECHEP											
	Excalibur	UK	£240k		Excalibur	?								
	STFC	UK					SWIFTHEP-1: 3 x £400k			SWIFTHEP-2				

← Review this Spring

STFC e-Infrastructure Advisory Group (SAEG) to start in 2021

← Good UK participation/leadership

← ExCALIBUR Phase 1b Review this week

LHCC review This week

OsC?

PPAP published its final roadmap [report](#) yesterday

development of novel instrumentation in other fields. Both HPC and HTC requirements exist for the PP community, and it is important appropriate levels of resource and expertise be maintained for both. The Excalibur strategic priority fund programme supports exascale computing developments in the UK, and the SWIFT-HEP project has focused efforts on developing new methods for efficient computing. The UK lacks the level of investment seen in some other countries, such as the US and its IRIS-HEP community hub programme. There is scope for an equivalent model of investment in the UK if the core funding for the programme were to increase.

Data processing and a wide range of Machine Learning (ML) and AI methods (including Deep Learning) are a core part of the toolkits required for PP analysis. These methods enhance PP scientific output in accelerator, experimental and theoretical areas. The community has a role to train new generations of experts in data science in concert with industry to the benefit of the UK economy. The rapid development of data science necessitates implementation of comprehensive

PPTAP to publish a report soon (Talk tomorrow)

STFC e-Infrastructure Advisory Group (SEAG) established. To meet in November

Government office document on [computing](#)

Transforming our world with AI [document](#)

Clearly an area of “expected growth”. We need to capitalize on it for the benefit of the PP community

Things we need to do

Website technically available

- Uses Jekyll, similar to HSF <https://swift-hep.github.io/>
- Initial simple site, landing page.
- Register as swift-hep.ac.uk
- People are asking about it...

Logo: Any better ideas?



Communications

- Keep track of work and contributions at HSF, WLCG, etc (show how good we are!)
- Continue with (roughly) monthly meetings to keep the community on board
- Make sure we are not too LHC-centric

Hackathons, Collaborative work, etc.

A note on funding

SWIFT-HEP funds

- About 4 FTE of effort at various institutes
- A travel budget (£20k/year) -- Invoiced to RAL as for experimental travel
- A training budget (£30k overall)

We need to decide what to do with the training budget

- Organise training events
- Contribute to HSF/SIDIS general work
- More on this tomorrow

Additional funding

Important to leverage additional funding from other sources

- Sometimes small chunks of money (e.g. 6 months of effort)
- We need to be ready with ideas for small projects (innovative, additional scope, delivered at short notice)
- Examples:
 - STFC funding in FY2020 (head start for WP3)
 - IRIS funding for 6 months in FY2021 (FPGA work, ML jet reconstruction, analysis)

ExCALIBUR

- Phase 1a great to get us started and fill the gap between ECHEP and SWIFT-HEP
- Phase 1b under review. Joint bid with the Lattice Field Theory team (will know next week...)

Other initiatives:

- COST initiative (Stefan to talk about it tomorrow)
- CDT applications (due next week). SWIFT-HEP projects?
 - We said in the proposal that we needed them
- Fellowships
-

A few things we learned so far

There is a lot of interest across the community in the UK

- A lot of work happened in the past year, despite the pandemic difficulties
- We need to make sure we capture all this work
- Community building is important to make sure we work together and present a common message to funding agencies (HSF demonstrates that!)

We worked with a rather small budget. Prioritised basic deliverables

For the next phase it would be nice to have

- Funding for WP leaders
- A dedicated training WP with dedicated effort
- Someone in charge of communications, impact, KE, ...
- Admin support
- More project management
- And, of course, a larger science case (e.g. ML support, blue sky, ...)

Today and tomorrow's agenda

There is no perfect way to plan an agenda...

Report from WPs

- Give more time to WP4 (Reco), since we missed the monthly meetings
 - Some discussion on ML techniques
- WP5 (analysis) discussion linked with WP1 (data management)

External guests

- IRIS-HEP, to discuss analysis challenges and joint activities
- Use of FPGAs and Intel talk on OneAPI
- Progress on OptiX and talk from NVIDIA
- Training discussion - SIDIS initiative

Space for discussion and collaborative work

- Coffee, lunches, etc.
- Notes

Let the workshop begin