SWIFT-HEP Introduction
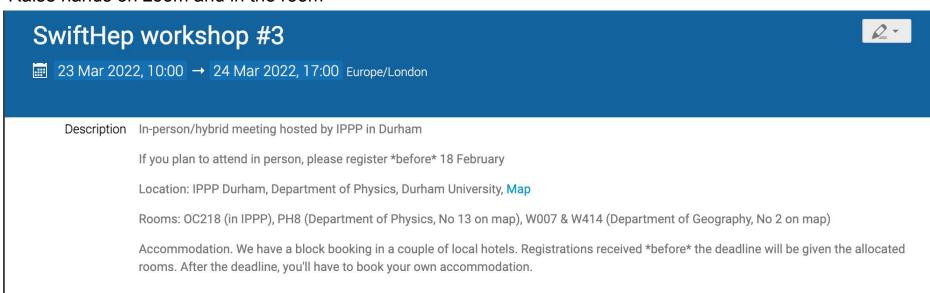
23 March 2022

Welcome to the SWIFT-HEP workshop

Third workshop since the project started
- Second time in person. After a meeting at Imperial College in November
- Joint session with GridPP tomorrow on analysis facilities

Live notes, Indico agenda, …
Raise hands on zoom and in the room

SwiftHep workshop #3

📅 23 Mar 2022, 10:00 → 24 Mar 2022, 17:00 Europe/London

Description   In-person/hybrid meeting hosted by IPPP in Durham

If you plan to attend in person, please register *before* 18 February

Location: IPPP Durham, Department of Physics, Durham University, Map

Rooms: OC218 (in IPPP), PH8 (Department of Physics, No 13 on map), W007 & W414 (Department of Geography, No 2 on map)

Accommodation. We have a block booking in a couple of local hotels. Registrations received *before* the deadline will be given the allocated rooms. After the deadline, you'll have to book your own accommodation.

Project timeline

WPs roughly on time
- WP3 started earlier
- WP2 just started
- WP5 to start in a few weeks
- WP4 late (1 post recruited)
- WP1 tracking on time

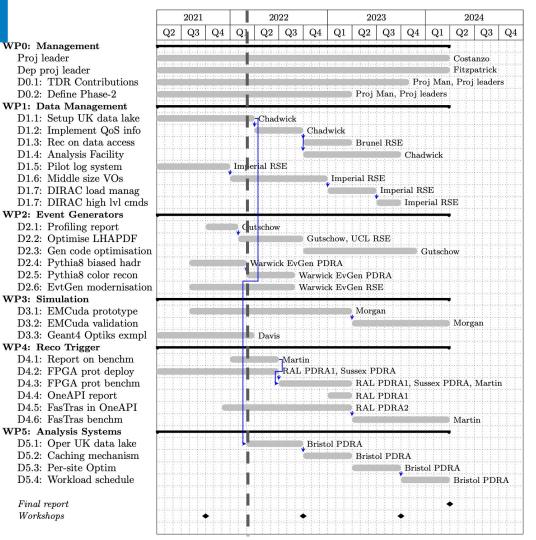(job opening at RAL - deadline 31 March)

Oversight committee expected later in 2022
- Report due on 10 June
- We will need a few "topical" meetings

Project management
- Project manager not yet established
- We need to review the Gantt chart
- Update the risk/opportunity register

SWIFT-HEP #2 will need to be prepared
- No information from STFC, yet

	2021			2022				2023				2024			
	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4

WP0: Management
- Proj leader — Costanzo
- Dep proj leader — Fitzpatrick
- D0.1: TDR Contributions — Proj Man, Proj leaders
- D0.2: Define Phase-2 — Proj Man, Proj leaders

WP1: Data Management
- D1.1: Setup UK data lake — Chadwick
- D1.2: Implement QoS info — Chadwick
- D1.3: Rec on data access — Brunel RSE
- D1.4: Analysis Facility — Chadwick
- D1.5: Pilot log system — Imperial RSE
- D1.6: Middle size VOs — Imperial RSE
- D1.7: DIRAC load manag — Imperial RSE
- D1.7: DIRAC high lvl cmds — Imperial RSE

WP2: Event Generators
- D2.1: Profiling report — Gutschow
- D2.2: Optimise LHAPDF — Gutschow, UCL RSE
- D2.3: Gen code optimisation — Gutschow
- D2.4: Pythia8 biased hadr — Warwick EvGen PDRA
- D2.5: Pythia8 color recon — Warwick EvGen PDRA
- D2.6: EvtGen modernisation — Warwick EvGen RSE

WP3: Simulation
- D3.1: EMCuda prototype — Morgan
- D3.2: EMCuda validation — Morgan
- D3.3: Geant4 Optiks exmpl — Davis

WP4: Reco Trigger
- D4.1: Report on benchm — Martin
- D4.2: FPGA prot deploy — RAL PDRA1, Sussex PDRA
- D4.3: FPGA prot benchm — RAL PDRA1, Sussex PDRA, Martin
- D4.4: OneAPI report — RAL PDRA1
- D4.5: FasTras in OneAPI — RAL PDRA2
- D4.6: FasTras benchm — Martin

WP5: Analysis Systems
- D5.1: Oper UK data lake — Bristol PDRA
- D5.2: Caching mechanism — Bristol PDRA
- D5.3: Per-site Optim — Bristol PDRA
- D5.4: Workload schedule — Bristol PDRA

Final report
Workshops

PPAP published its final roadmap [report](#)

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

STFC e-Infrastructure Advisory Group (SEAG) established.
We had a couple of meetings. Not yet up to speed.

Government office document on [computing](#), Transforming our world with AI [document](#)

CDT on "data intensive science" awarded.
Encourage people to come forward and collaborate with SWIFT-HEP

ExCALIBUR

A joint bid with the Lattice Field Theory group submitted last Autumn (Phase-1b)
- ExaTEPP (Exascale for Theoretical and Experimental Particle Physics)
- About £2M over 3 years.
- Not funded - Almost no feedback received (officially). Not "innovative" enough (??)
- A lot of interesting ideas and points were raised. (see next slide)

A second call is now open (Phase-2)
- Smaller programme. ~500k£ over 2 years
- A statement in the call:

We encourage projects to apply in the areas of particle physics and artificial intelligence (AI) given UK strengths and the strategic importance of this area for exascale software development.
- Any thoughts?
  - Work again as ExaTEPP? (e.g. collaborate with DIRAC)
  - Propose a collaboration with EPC at Oak Ridge?
  - Community manager/community building
  - AI? I don't understand how AI would use HPC for HEP

Website

Website http://swift.hep.ac.uk/
- Uses Hugo (Thanks Luke for setting it up!)
- Based on github
- WP coordinators and everyone else **should** fill content and submit pull-requests

SWIFT HEP   Home   Overview   Work Packages ▾   Organisation   Meetings   Jobs   Links

SoftWare and InFrastruture Technology for High Energy Physics

News and announcements

Upcoming: Mar 7, 2022 The simulation Opticks team to participate in the UK Hackathon 2022

Communications
- Keep track of work and contributions at HSF, WLCG, etc (show how good we are!)
- And post them on the website
- Make sure we are not too LHC-centric (or ATLAS/CMS centric)

Community engagement

We are growing in size
- Engagement with HSF is also growing
- Make sure you mention "swift-hep" in interactions with collaborators
  (and that Excalibur is over if asked)
- We need to be ready with ideas for small projects
  (innovative, additional scope, delivered at short notice)
- Example: IRIS funding for 6 months in FY2021 (FPGA work, ML jet reconstruction, analysis)

Other engagement
- Work with ExaTEPP was useful to connect with the DIRAC community
- Common goals (heterogeneous programming, training, …)
- Bigger team when discussing with industry
- RSE forum within the STFC area?

RSE in the UK:
- Large and growing community - dominated by researchers in the EPSRC area
- STFC has awarded only 1 fellowship so far.
- We should bring our use cases to the table by e.g. attending RSE conferences
  (https://rsecon2022.society-rse.org/ in September)

Today and tomorrow's agenda

Report from WPs
- WP5 (analysis) discussion linked with WP1 (data management)
- Joint session with GridPP
- Graeme is here as our "external" guest
- Reports on interactions with NVidia (Hackathon) and Intel (FPGA)

Space for discussion and collaborative work
- Coffee, lunches, etc.
- Notes

Let the workshop begin