

ATLAS-event-generation: Modernising Event Generation in ATLAS Athena

Fellowship project proposal

- **Programme:** IRIS-HEP fellowship
- **Mentor:** Brij Kishor Jashal
- **Student:** *Bohdan Ivan Wynnickyj*
- **Duration:** 12 weeks (~3 months)
- **Start:** 22.06.2026
- **End:** 13.09.2026

Project summary

This project will focus on improving event generation workflows within the ATLAS Athena software framework. The project aims to make configuration and metadata handling more robust and less error-prone, reduce reliance on user-specific settings, and align event generation with modern configuration patterns used elsewhere in Athena. The student will also explore updates that improve compatibility with multi-threaded execution and provide clean, well-documented example configurations. The project offers hands-on experience with large-scale HEP software, production workflows, and collaborative development in a flagship LHC experiment, while delivering practical improvements with direct impact on simulation and analysis.

Timeline

Week	Planned Work	Expected deliverables
Week 1 - 2	Onboarding - since the project is about rewriting existing modules in a modern convention it is important to familiarize with ATLAS Athena development conventions by reading core documentation (Athena introduction, Git workflow, Gaudi framework basics), setting up a working container, and compiling/running examples to prepare for meaningful contributions.	Understanding of the software framework with development and testing environment setup and working.
Week 3 - 4	Will be done partially on the existing work . The aim is to survey the Generators/ sub-tree of atlas/athena and compile a relevant list of current configuration (jobOptions or Component Accumulator), hard-coded paths and environment variable references.	- List of current configuration and todo list - Designing prototype component accumulator

Week 5 - 6	ComponentAccumulator migration. Begin resolving audit issues, starting with the most straightforward: migrating configuration style to Component Accumulator.	Merge requests to main that migrate configuration style to Component Accumulator and update Jira task
Week 7 - 8	Understand generator integration in AthenaMT and code review for multithread execution and thread safety	Merge requests to improve thread-safety for generators.
Week 9 - 10	Generator Athena integration and tests for GPU based use cases	Possible use cases for utilizing GPUs for ATLAS generator jobs
Week 11 - 12	Understand and contribute to the implementation of GPU generation and simulation chain in Athena. Documentation, future work plan and results presentation.	MR followup, documentation and presentation.