

# JuliaHEP Planning Document

## Julia Native Packages to Develop

### JetReconstruction [Graeme, Atell?]

Promising enough results that we should continue to develop this (possibly also including interfaces to FastJet when Julia code is not yet ready).

<https://github.com/JuliaHEP/JetReconstruction.jl>

### Event Shapes (Thrust, Fox-Wolfram)

A basic implementation of event shapes, basically a translation from the pythia code. Needs documentation

<https://github.com/jstrube/EventShapes.jl>

## Interfaces to Current Codes

### Geant4 [Pere]

Interface to Geant4 simulation toolkit. <https://github.com/JuliaHEP/Geant4.jl>

First version is usable but still needs additional functionality such as magnetic field, more complex solids, etc. is needed.

### PODIO [Benedikt, Graeme]

Add Julia backend to PODIO data model generator (currently C++ and Python supported)

### LCIO [Jan]

Interface to the LCIO file format. Functioning, but poorly maintained.

<https://github.com/jstrube/LCIO.jl>

## FastJet [Jan]

Interface to the C++ FastJet package. Functioning, but poorly maintained.

<https://github.com/jstrube/FastJet.jl>

## Minuit2 [Jan]

Interface to the C++ Minuit2 package. Basic example works, but needs more testing, especially on the speed of the callbacks. Poorly maintained.

<https://github.com/jstrube/Minuit2.jl>

## Gaudi Algorithms in Julia

Enabling this would allow us to start making apples-apples comparisons of reco algorithms, particularly targeting future colliders (ILC, FCC, etc.). Needs PODIO.

## Analysis Grand Challenge ([AGC](#)) in Julia

We have a Ukrainian student under Iris-HEP umbrella to work on this over the summer, expect to polish rough edges in the analysis ecosystem. (the same student who did JetClustering.jl)

## Training

Think about a 2 day training module

- Day 1, general introduction to Julia as a language
- Day 2, HEP specific example, e.g., CMS open data, reading ROOT files to histograms

# <http://Juliahep.org> can be used to show simple tutorial, and pointer to pkgs in the ecosystem. (Jerry)

- Host it on github as a repo, use Franklin.jl (just like Julia's own website)
- Have a few "if you're a X user, see this work example" pages