RooFit-AD Plan of Work
Progress so far…

● Built a proof of concept on how AD can be used to differentiate roofit models.
  ○ Got good results and some interesting feedback on our work (with a good sprinkling of doubt)!

● Went on to add a prototype of this to ROOT
  ○ Idea was to add the basic code squashing functionality to ROOT
  ○ Got some serious feedback on possible issues.
  ○ The biggest problem - we still touch ROOT classes => maintenance becomes difficult! (credit: Jonas R.)
  ○ Solve this by performing a function lookup instead => A standalone lib with our ‘translate’ functions.
What’s Next?

- Split current work into steps (each implemented as an individual PR)
  - Simplify the already existing PR (#11773) and cherry pick the class that wraps the RooFit model. Implement is as a separate RooFit class and come up with tests. [Merged #12050]
  - Create an interface for analytic gradients with clad in the previous class. [Merged #12219]
  - Add an interface for hessian support from clad.
  - How to get the code squashing to work - current vs lookup. Majorly involves design discussions and trying out the approach suggested by Jonas. [JonasR] Done
  - Interface with the minimizer. Involves hooking up the gradients back into MINUIT so that our class can used AD based derivatives end-to-end. [Merged #12381] Minimum work for it to be advertised
  - Investigative Profile likelihood calculations using AD.
  - Formally benchmark the efforts in ROOT. [Open #267]
  - Extending support for code gen…
What’s Else?

- Some literary work!
  - ACAT proceedings paper. Basic structure in, now have to flesh it out.  
  - Prepare presentation for talk at CHEP’23.  [May]
  - Prepare presentation for accepted paper at IPDPS’23.  [May]
End!

Thanks!