Me, MONA & August

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Outline

- What have I been doing over the last few years (part I)?

- What am I doing/going to do over the next two months (part II)?

- What is going to happen after that (part III)?

- Epilogue

Part I: MONA

- MONA (Mass ordering Nikhef Analysis) is a set of two c++ libraries, based on ROOT and RooFit, that aims to accommodate a wide set of oscillation analyses.

- (Some of the) key features:
  - Modular
  - Carefully documented (doxygen & readme files)
  - Designed for both MC and real data analyses
  - Version control & continuous integration & test suite

- Users: Nikhef (me, Lodewijk, Iris), Valencia (Jerzy), ECAP (interest from M. Moser)

- I will have a dedicated presentation about MONA in Nantes in comp&soft

Part II-1: now

- We (me & Jerzy) have been working on an event-by-event detector response

- Basics: for a bin at [E_reco][ct_reco][by_reco], save a vector with all the MC events with true info that ended up in this bin

Part II-1: now (sorry for this plot)
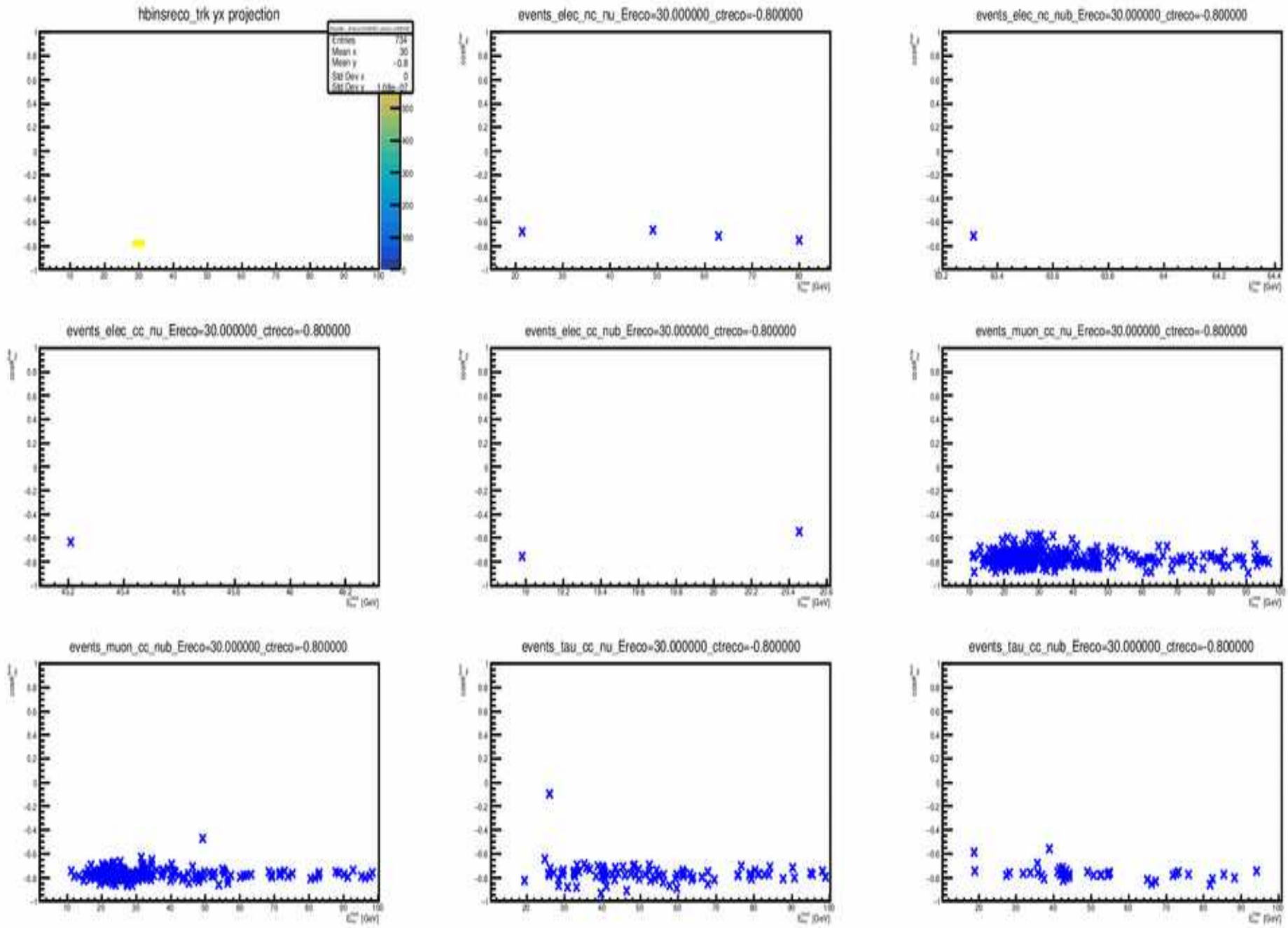
Part II-1: now

- Sounds CPU intensive. Why bother?

    – Originally: (political) merge Valencia's EvtRate to MONA (instead of Swim), allows propagation of xsec systematics from GENIE

    – Realised later (important): Eliminates the need for effective mass calculation (part of weight-2)

    – Realised later (important): Most up-to-date xsec calculation from GENIE (part of weight-2)

    – Realised later (important): Simplifies data quality control significantly.

Part II-2: the next 2 months

- Prepare MONA format files for existing ORCA MC productions for iRODS (~1 week)
- Update fitter to accommodate EvtResponse with systematics (1-3 days)
- New version of MONA (0.5 days)
- Add converter aanet $\rightarrow$ MONA format (1-3 days)
- ICRC proceedings (~1-2 weeks for writing)
- Mass productions documentation revision (1-3 days) & bug reports from step 1
- MONA documentation revision (1-3 days)
- Dorothea: effective masses with lowered PMT efficiencies
- Maarten: JoscProb (see epilogue)

Part III: what will happen next?

- I will start as a senior data scientist in Starship Technologies in Tallinn from the 19th of August 2019 → cannot maintain MONA in the long run

- Short term: Lodewijk will continue working with it towards his PhD
- Long term (say ~5 years)?

Epilogue: JOscProb

JOscProb (interpolation) can significantly speed up oscillation calculation. Points of discussion:

- Depending on the detector response, oscillation calculation may not be the bottleneck (e.g. < 50% of the CPU time)

- Depending on the analysis (e.g. th23, dm31 contour), interpolation range will be an issue

- I may be able to integrate this to MONA in a separate branch in (<1 week), but testing, configuration and exception handling will take ~month(s).

- Consideration of work vs reward.