

# A First Look at Reproducibility and Non-Determinism in CMS Software and ROOT Data

- Reproducibility is an essential concern in scientific computing, but is surprisingly hard.
- Even a straightforward attempt to get *the same* result *twice* with basic CMS codes fails!
- Analysis: Time, environment, provenance, randomness, concurrency, and more.
- Tools can help: Need to define (and compute equivalence) between complex ROOT files. Parrot can help to eliminate undesired noise.