

# ATLAS OPEN DATA: DEVELOPING EDUCATION AND OUTREACH RESOURCES FROM RESEARCH DATA

R.Gonçalo on behalf of the ATLAS Collaboration

<http://opendata.atlas.cern>

## Why Open Data? And what is it?

In 2020 CERN approved a policy document to empower LHC collaborations to publish experimental data for open public access [1,2]

- Four levels of data-set uses are defined, including data and metadata from published results, dedicated subsets for outreach and education purposes, and reconstructed data for independent scientific analysis

What?

- Outreach data sets provided in simplified and self-contained formats suitable for educational and public understanding purposes
- Require lightweight analysis environments to allow easy data exploration

Why?

- Facilitate outreach and training – important resource to science **communicators** and **educators** at practically all levels
- Increases public understanding of science and research – leading to increased **trust** in science and scientists
- Promote citizen science and the public **interest** in scientific development

## ATLAS Open Data

Data

- Collision data: 1 fb<sup>-1</sup> (8 TeV) 10 fb<sup>-1</sup> (13 TeV)
- Simulation: 120 samples of various processes
- Around 100 variables, truth-level and reconstructed

Analysis frameworks

- Browser-based histogram analysis
- Examples based on Python or on ROOT
- Jupyter notebooks (Python/C++)
- Analysis examples: HWW/HZZ, tt, W/Z, Hγγ, etc
- Event visualizer

Documentation

- Ample instructions for software, examples, VM
- Documentation (secondary school) student tested

Community effort

- Major contributions from students: Postgraduate, qualification work, Summer students

Activities at all levels!

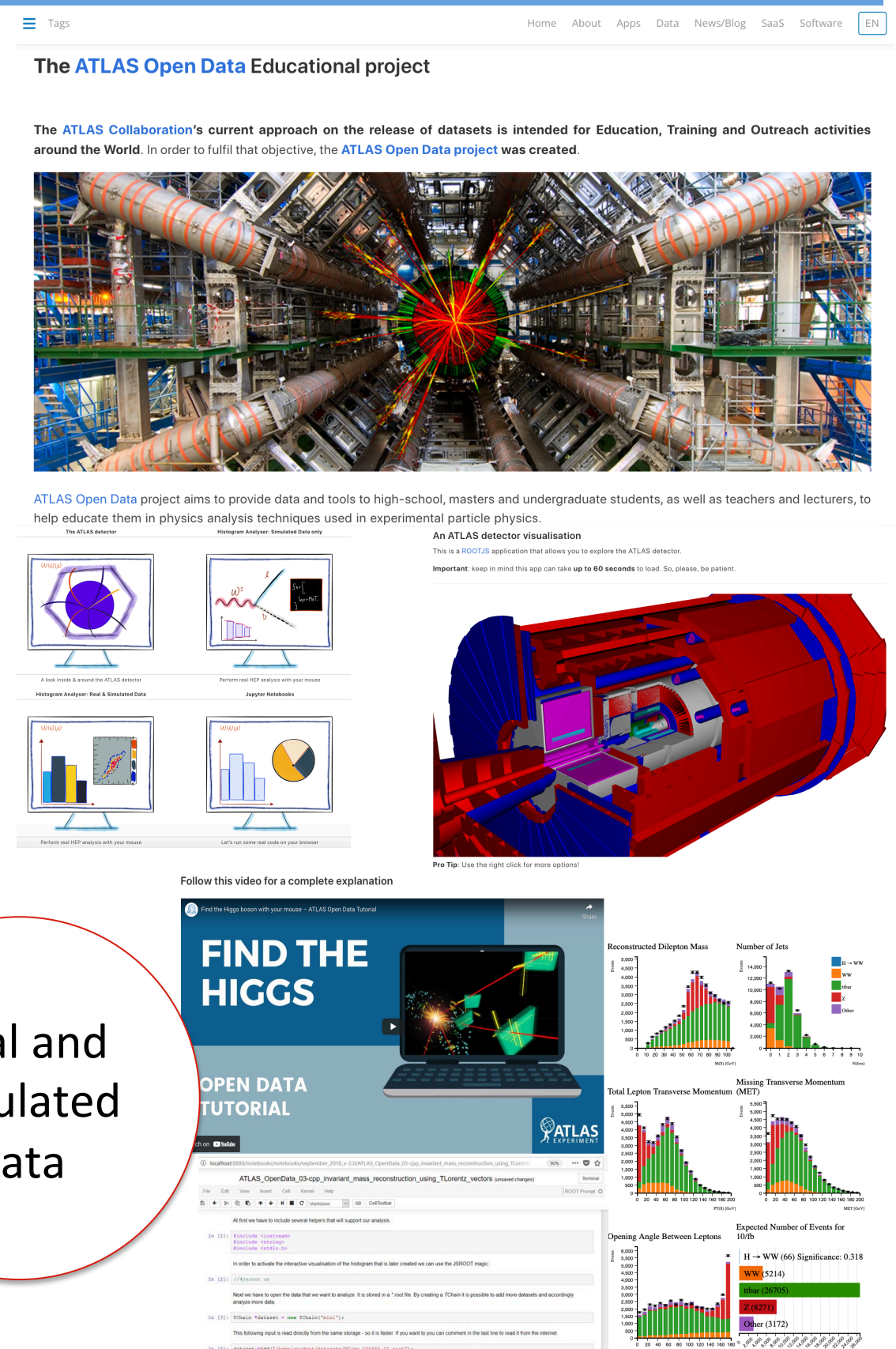
- Secondary school demonstrations
- Summer school introduction sessions
- Undergraduate lectures
- Seminars
- Outreach events

Analysis tools

Open Data

Documentation

Real and simulated data



## References:

- [1] Edgar Carrera Jarrin on behalf of the ALICE, ATLAS, CMS and LHCb collaborations, LHC experiments and their Open Data, PoS(LHCP2021)334, <https://cds.cern.ch/record/2802456?ln=en>
- [2] Data Preservation and Long Term Analysis in High Energy Physics (DPHEP) Study Group, CERN Open Data Policy for the LHC Experiments, CERN-OPEN-2020-013, <https://cds.cern.ch/record/2745133>
- [3] Meirin Oan Evans on behalf of the ATLAS Collaboration, ATLAS Open Data – a genuinely collaborative approach for the creation of educational resources, ATL-OREACH-PROC-2021-001, <https://cds.cern.ch/record/2783039>
- [4] The ATLAS Collaboration, Review of the 13 TeV ATLAS Open Data release, ATL-OREACH-PUB-2020-001, <https://cds.cern.ch/record/2707171?ln=en>
- [5] Arturo Sánchez Pineda and Giovanni Guerrieri on behalf of ATLAS Software and Computing, A proposal for Open Access data and tools multi-user deployment using ATLAS Open Data for Education, ATL-SOFT-PROC-2021-008, <https://cds.cern.ch/record/2772504>

