

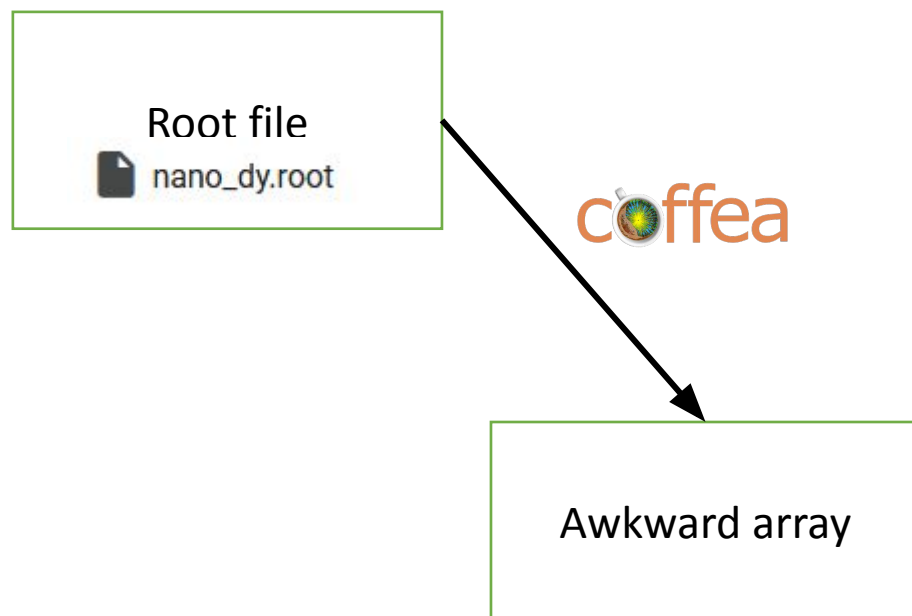
# The development of coffea schemas

This project was made by the support of the IRIS-HEP program

Fellow: Maxym Naumchyk

Mentors: Ianna Osborne, Peter Fackeldey, Iason Krommydas, Nick Smith  
(listing order is random)

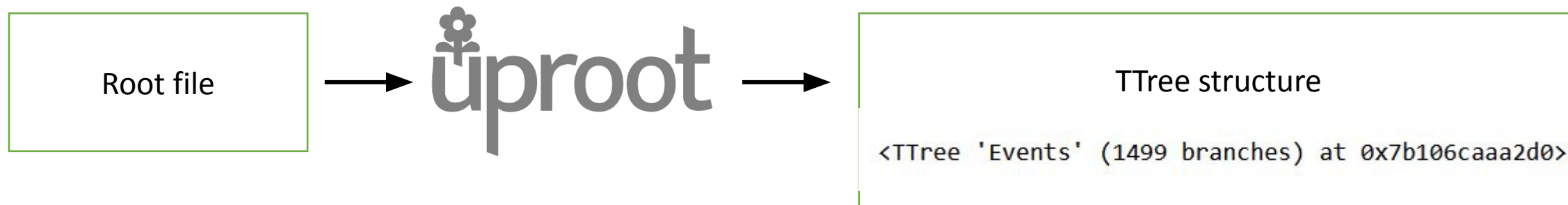
# HEP data analysis using coffea



```
[{PSWeight: [1.01, 1.26, 0.99, 0.791], SoftActivityJetNjets2: 5, ...},  
{PSWeight: [2.06, 0.872, ..., 0.962], SoftActivityJetNjets2: 5, ...},  
{PSWeight: [1.07, 0.887, 0.933, 1.02], SoftActivityJetNjets2: 7, ...},  
{PSWeight: [0.833, 0.827, 1.15, 1.1], SoftActivityJetNjets2: 4, ...},  
{PSWeight: [0.936, 0.622, 1.04, 1.17], SoftActivityJetNjets2: 16, ...},  
{PSWeight: [1.17, 1, 0.86, 0.978], SoftActivityJetNjets2: 6, ...},  
{PSWeight: [1.12, 1.59, 0.906, 0.688], SoftActivityJetNjets2: 4, ...},  
{PSWeight: [0.946, 0.922, ..., 0.997], SoftActivityJetNjets2: 12, ...},  
{PSWeight: [0.88, 0.855, 1.09, 0.811], SoftActivityJetNjets2: 3, ...},  
{PSWeight: [0.854, 0.518, 1.11, 1.16], SoftActivityJetNjets2: 20, ...},  
...,
```

```
-----  
backend: cpu  
nbytes: 243.3 kB  
type: 40 * event
```

# How ffea works



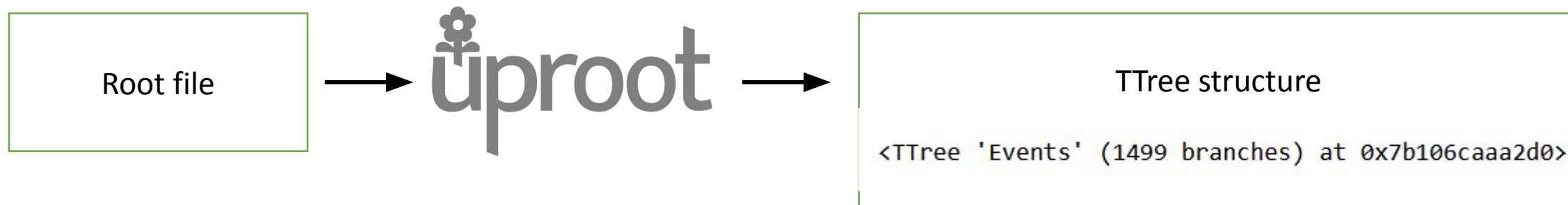
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[{PSWeight: [1.01, 1.26, 0.99, 0.791], SoftActivityJetNjets2: 5, ...},  
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...,
```

---

```
backend: cpu  
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```

Awkward array

# How ffea works



```
[{PSWeight: [1.01, 1.26, 0.99, 0.791], SoftActivityJetNjets2: 5, ...},  
{PSWeight: [2.06, 0.872, ..., 0.962], SoftActivityJetNjets2: 5, ...},  
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{PSWeight: [0.833, 0.827, 1.15, 1.1], SoftActivityJetNjets2: 4, ...},  
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{PSWeight: [0.946, 0.922, ..., 0.997], SoftActivityJetNjets2: 12, ...},  
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{PSWeight: [0.854, 0.518, 1.11, 1.16], SoftActivityJetNjets2: 20, ...},  
...,
```

---

```
backend: cpu  
nbytes: 243.3 kB  
type: 40 * event
```

# coffea schemas

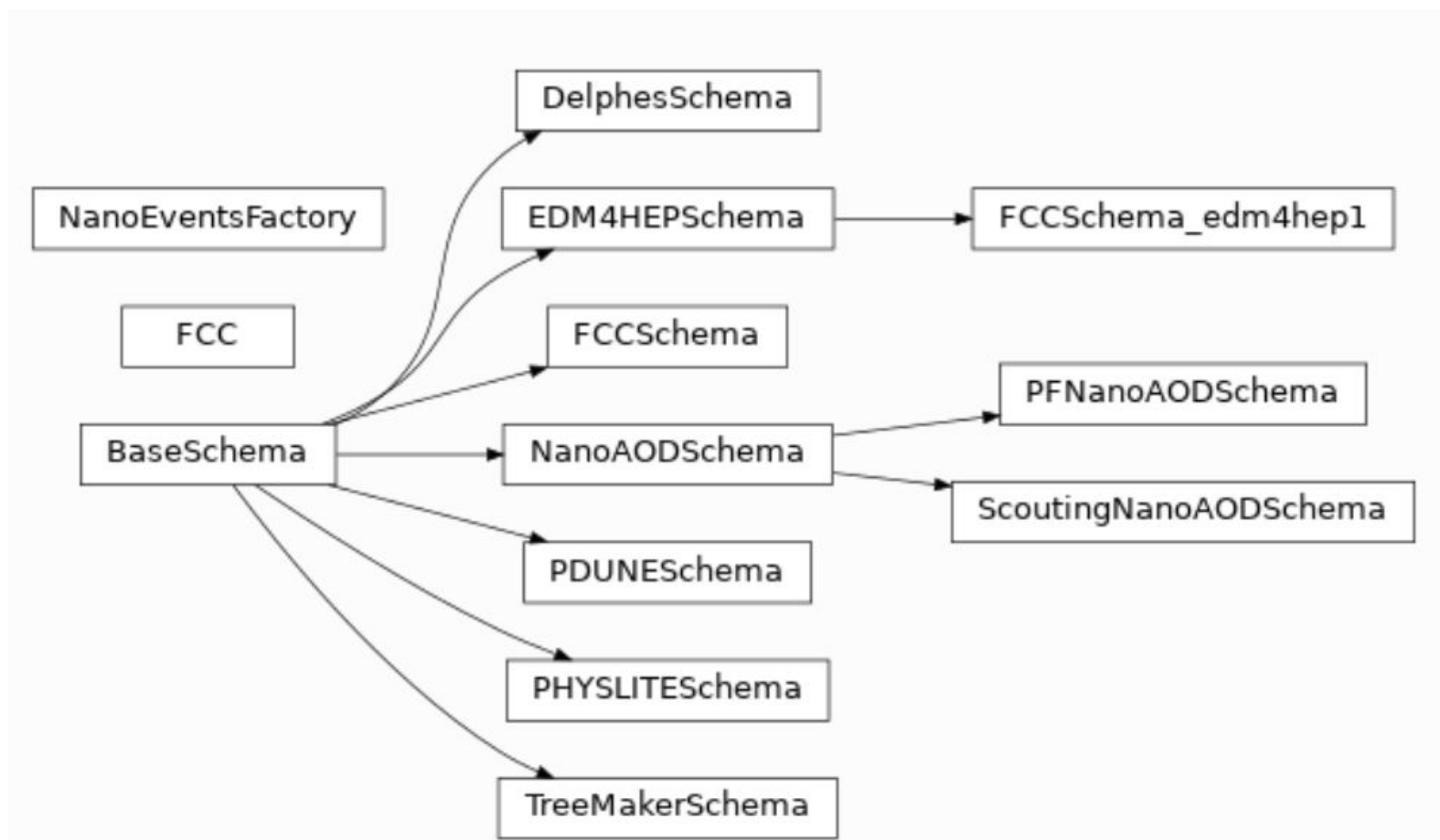


Image link: <https://coffea-hep.readthedocs.io/en/latest/modules/coffea.nanoevents.html#classes>

# Awkward-zipper

awkward-zipper Public

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| docs                    | add favicon and html page logo                              | 20 hours ago |
| src/awkward_zipper      | fix: handle collections that have underscore in their names | 3 weeks ago  |
| tests                   | style fix   | 3 weeks ago  |
| .gitignore              | initial commit  | 3 months ago |
| .pre-commit-config.yaml | add jupyter notebooks to documentation                      | yesterday    |
| LICENSE                 | Initial commit  | 3 months ago |
| README.md               | Update README.md  | 1 hour ago   |
| README.rst              | Update README.rst   | 19 hours ago |
| pyproject.toml          | feat: add tests   | 3 weeks ago  |

README BSD-3-Clause license



Link: <https://github.com/maxymnaumchyk/awkward-zipper>

About

Documentation page at the link below:

[maxymnaumchyk.github.io/awkward-zip...](https://maxymnaumchyk.github.io/awkward-zip...)

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- maxymnaumchyk
- pfackeldey Peter Fackeldey


Deployments 31

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# Documentation



Awkward zipper

DOCUMENTATION

Examples

How awkward\_zipper works

Quick start

How awkward-zipper works internally

Usage example of awkward\_zipper

Benchmarks

Documentation

[/](#) / [Examples](#) / Quick start

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## Quick start

*NOTE: You can find this whole page as a jupyter notebook and try it out yourself • ∞ • here:* [notebooks/Usage\\_example\\_of\\_awkward\\_zipper.ipynb](#)

Before even starting to work with awkward-zipper we have to use `uproot` library to load the data. First we load our root file:

```
# Create a TTree from root
tree = uproot.open("nano_dy.root")["Events"]
```

Then we use `TBranch.arrays` function to convert the TTree format we got from the root file into an awkward array:

```
# TTree -> awkward.Array[awkward.Record[str, awkward.Array]]
array = tree.arrays(ak_add_doc=True)
```

Finally we can pass the resulting array to awkward-zipper.

```
from awkward_zipper import NanoAOD
restructure = NanoAOD(version="latest")
result = restructure(array)
```

Link: [https://maxymnaumchyk.github.io/awkward-zipper/usage\\_example.html](https://maxymnaumchyk.github.io/awkward-zipper/usage_example.html)

# Advantages of a standalone package

- Smaller package
- Only a few dependencies
- Improvements(simplifications) in how the 'schemas' work internally (makes it easier for users to create their own 'schemas')



# Plans of development

- Nanoaod format works with eager (materialized) arrays
- Nanoaod format works with virtual (not materialized) arrays
- Eager and virtual modes are well tested and documented

Currently here ->

- First release
- Awkward-zipper supports all '*schemas*' from coffea
- Coffea uses awkward-zipper instead of its own '*schemas*'
- All the new schemas are developed on zipper directly

Thank you for your attention!