

PyHEP.dev 2023 - "Python in HEP" Developer's Workshop

Tuesday 25 July 2023 - Friday 28 July 2023

Princeton University

Book of Abstracts

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Kick-off talks / 1**Introduction (Raghav Kansal)****Author:** Raghav Kansal¹¹ *Univ. of California San Diego (US)***Length of talk:**

5 minutes

Which topical group(s)?:

Fitting tools, combined fits, machine learning

Kick-off talks / 2**Instrument control library and server for detector construction and testing****Author:** Clemens Lange¹¹ *Paul Scherrer Institute (CH)***Length of talk:**

10 minutes

Which topical group(s)?:

Instrument control/lab work

Kick-off talks / 3**Self Presentation and Interests (Massimiliano Galli)****Author:** Massimiliano Galli¹¹ *ETH Zurich (CH)***Length of talk:**

5 minutes

Which topical group(s)?:

Fitting tools/Combined fits - Analysis Organisational Principles - Workflows/Reproducibility

Kick-off talks / 4

Self-documenting model building and improved fitting performance with a Computer Algebra System

Author: Remco De Boer^{None}

Co-authors: Miriam Fritsch ; Stefan Pflueger ; Wolfgang Gradl ¹

¹ *Uni Mainz, Inst.f.Kernphysik*

Length of talk:

10 minutes

Which topical group(s)?:

Fitting, amplitude analysis

Kick-off talks / 5

Using HDF5 as an alternative to ROOT files

Authors: Matthew Bellis¹; Noah Franz²

¹ *Cornell University/Siena College (US)*

² *Siena College/University of Arizona*

Length of talk:

10 minutes

Which topical group(s)?:

Data access and formats

Kick-off talks / 6

Automatic Interoperability Between C++ and Python

Authors: Baidyanath Kundu¹; Vassil Vasilev¹

¹ *Princeton University (US)*

Length of talk:

15 minutes

Which topical group(s)?:

Interoperability

Kick-off talks / 7

Analysis Grand Challenge & Coffea-Casa analysis facility as a test environment for packages and services

Author: Oksana Shadura¹

¹ *University of Nebraska Lincoln (US)*

Length of talk:

10 minutes

Which topical group(s)?:

AGC, devops

Kick-off talks / 8

Dask custom schedulers

Author: Benjamin Tovar Lopez¹

¹ *University of Notre Dame*

Length of talk:

10 minutes

Which topical group(s)?:

Using custom schedulers with dask #23; Data lifecycles in modern analysis and efficient tiered caching policies #20; User experience for physics data analysis tools #9;

Kick-off talks / 9

Statistical models, analysis workflows & automatic differentiation

Author: Alexander Held¹

¹ *University of Wisconsin Madison (US)*

Length of talk:

15 minutes

Which topical group(s)?:

fitting tools & ML (#5), analysis code readability (#3), workflows (#4), AGC (#11)

Kick-off talks / 11

Introduction (Ioana Ifrim)

Author: Ioana Ifrim¹

¹ *Princeton University (US)*

Length of talk:

5 minutes

Which topical group(s)?:

Analysis code readability and performance; Fitting tools, combined fits, partial wave analysis, and machine learning

Kick-off talks / 12

Intro Talk (Gordon W.)

Author: Gordon Watts¹

¹ *University of Washington (US)*

Length of talk:

5 minutes

Which topical group(s)?:

UX, Data Delivery

Kick-off talks / 13

Advancements and Challenges in Amplitude Analysis: A Rio Developer's Perspective

Author: Josue Molina¹

¹ *EAP Zamorano*

Length of talk:

10 minutes

Which topical group(s)?:

Fitting tools, Amplitude Analysis, Analysis code readability and performance

Kick-off talks / 14

Introduction (Angus Hollands)

Author: Angus Hollands¹

¹ *Princeton University*

Length of talk:

10 minutes

Which topical group(s)?:

Analysis code readability and performance; Teaching, training, documentation, and coordinating documentation; Data access and formats; Better packaging/devops; Doing open source

Kick-off talks / 15

Python-C++ JIT for better or worse?

Author: Ianna Osborne¹

¹ *Princeton University*

Length of talk:

5 minutes

Which topical group(s)?:

Analysis code readability and performance; User experience for physics data analysis tools; Automatic Interoperability Between C++ and Python; python bindings for rntuple, implementation of "uproot-cpp";

Kick-off talks / 16

Self Introduction and Interests (Manfred Peter Fackeldey)

Author: Manfred Peter Fackeldey¹

¹ *RWTH Aachen University (DE)*

Length of talk:

5 minutes

Which topical group(s)?:

fitting tools & ML (#5), analysis code readability (#3), workflows (#4), sharded histograms (#17), Dask/Luigi (#18)

17

Welcome slides

Kick-off talks / 18**Introduction (Lindsey) / "Lindsey-stuff"****Author:** Lindsey Gray¹¹ *Fermi National Accelerator Lab. (US)***Length of talk:**

15 minutes

Which topical group(s)?:

introductions

Kick-off talks / 19**Python, Pythia8, and Pythia8-Contrib****Author:** Philip Ilten¹**Co-authors:** Ahmed Youssef ²; Jure Zupan ²; Manuel Szewc ; Michael Kent Wilkinson ¹; Stephen Mrenna ³; Tony Menzo¹ *University of Cincinnati (US)*² *University of Cincinnati*³ *FERMILAB***Length of talk:**

15 minutes

Which topical group(s)?:

Automatic Interoperability Between C++ and Python; User experience for physics data analysis tools; Better packaging/devops

Kick-off talks / 20**Quantum Machine Learning Approach****Author:** Carlos Eduardo Cocha Toapaxi¹¹ *Ruprecht Karls Universitaet Heidelberg***Length of talk:**

5 minutes

Which topical group(s)?:

Fitting tools, combined fits, partial wave analysis, and machine learning (#5); analysis code readability and performance (#3); implementation of "uproot-cpp" (#15)

Kick-off talks / 21**Introduction / Working towards fully differentiable analysis (Matthew Feickert)**

Author: Matthew Feickert¹

¹ *University of Wisconsin Madison (US)*

Length of talk:

10 minutes

Which topical group(s)?:

Fitting tools, combined fits, partial wave analysis, and machine learning; User experience for physics data analysis tools; complete ML workflows in analysis: facilities capabilities and user interface

Kick-off talks / 22**Statistical inference landscape: variety, performance and interoperability**

Authors: Albert Puig Navarro¹; Jonas Eschle²; Matthieu Marinangeli³; Rafael Silva Coutinho⁴

¹ *Universität Zürich (CH)*

² *University of Zurich (CH)*

³ *EPFL - Ecole Polytechnique Federale Lausanne (CH)*

⁴ *Syracuse University (US)*

Length of talk:

15 minutes

Which topical group(s)?:

fitting

Kick-off talks / 23**Potential directions for coffea & scikit-hep**

Author: Nick Smith¹

¹ *Fermi National Accelerator Lab. (US)*

Length of talk:

15 minutes

Which topical group(s)?:

Doing open source / Packaging / Fitting

Kick-off talks / 24**Analysis@FCC****Author:** Juraj Smiesko¹¹ *CERN***Length of talk:**

10 minutes

Which topical group(s)?:

1,2,3,4,22

Kick-off talks / 25**Introduction (Nikolai Hartmann)****Author:** Nikolai Hartmann¹¹ *Ludwig Maximilians Universitat (DE)***Length of talk:**

5 minutes

Which topical group(s)?:

python bindings for rntuple, implementation of "uproot-cpp"; Fitting tools, combined fits, partial wave analysis, and machine learning; Multiple datasets, metadata, workflows, and reproducibility; Data access and formats

Kick-off talks / 26**Training machines, training people****Author:** Kilian Adriano Lieret¹¹ *Princeton University (US)***Length of talk:**

10 minutes

Which topical group(s)?:

Doing open source, teaching/training

Kick-off talks / 27

Optimizing data access with compute offloading, fast hardware-accelerated data transport, and modern query languages

Author: Jayjeet Chakraborty¹

¹ *UC Santa Cruz*

Length of talk:

15 minutes

Which topical group(s)?:

Data access and formats

Kick-off talks / 28

Introduction (Mason Proffitt)

Author: Mason Proffitt¹

¹ *University of Washington (US)*

Length of talk:

5 minutes

Which topical group(s)?:

3, #4, #9

Kick-off talks / 29

GooFit – an overview of the existing C++/CUDA functionality and its Python bindings

Author: Michael David Sokoloff¹

¹ *University of Cincinnati (US)*

Length of talk:

10 minutes

Which topical group(s)?:

Fitting tools, combined fits, partial wave analysis, and machine learning

Kick-off talks / 30

Introduction (Aman Goel)

Author: Aman Goel¹

¹ *The University of Manchester*

Length of talk:

10 minutes

Which topical group(s)?:

Teaching, training, documentation, and coordinating documentation; Doing open source

Kick-off talks / 31

Marcel Rieger - Introduction

Author: Marcel Rieger¹

¹ *Hamburg University (DE)*

Which topical group(s)?:

Length of talk: