PYGAMMA19 SUMMARY & DISCUSSION

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https://indico.cern.ch/event/783425/

MAX-PLANCK-INSTITUT FÜR KERNPHYSIK HEIDELBERG

OVERVIEW

➤ PyGamma19 summary & discussion close-out session

➤ Overview: thanks, summary, discussion, next steps

➤ Idea: trigger plenary discussion / not a talk (we have 1.5 hours).
The slides are just my notes … for sure incomplete and biased.
Interrupt and share your thoughts any time, don't wait until the end!

➤ After this, will end PyGamma19 with lunch together.
You can stay at MPIK as long as you like.
If you still need anything (e.g. ticket printout, taxi, …), let us know!

THANK YOU!

PYGAMMA19 FUNDING – THANK YOU!

Werner Hofmann

Giovanni Lamanna

Jim Hinton

Catherine Boisson

PYGAMMA19 SOC – THANK YOU!

Jeremy Perkins

Petra Hüntemeyer

Thomas Robitaille

Kay Graf

Catherine Boisson

Christoph Deil

Florian Gaté

PYGAMMA19 LOC – THANK YOU!

Jason Watson

Jayesh Wagh (LAPP, Annecy)
ASTERICS support with Florian

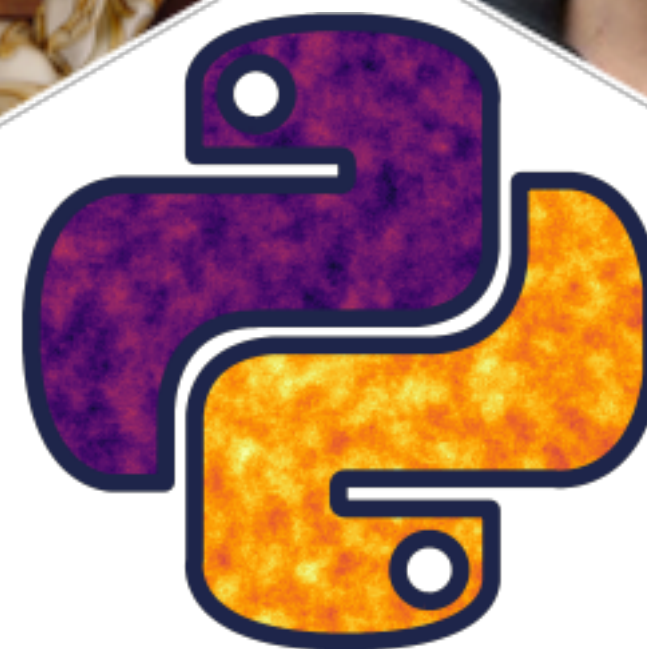*Roberta Zanin*

Ruth Crespo
All organisation at MPIK

Axel Donath

Axel - thanks for making a logo!

Christoph Deil

PYGAMMA19 SPEAKERS – THANK YOU!

See contact & short bio for speakers: https://indico.cern.ch/event/783425/page/16570-speakers
Thank you all for your time to prepare and give very high quality presentations!

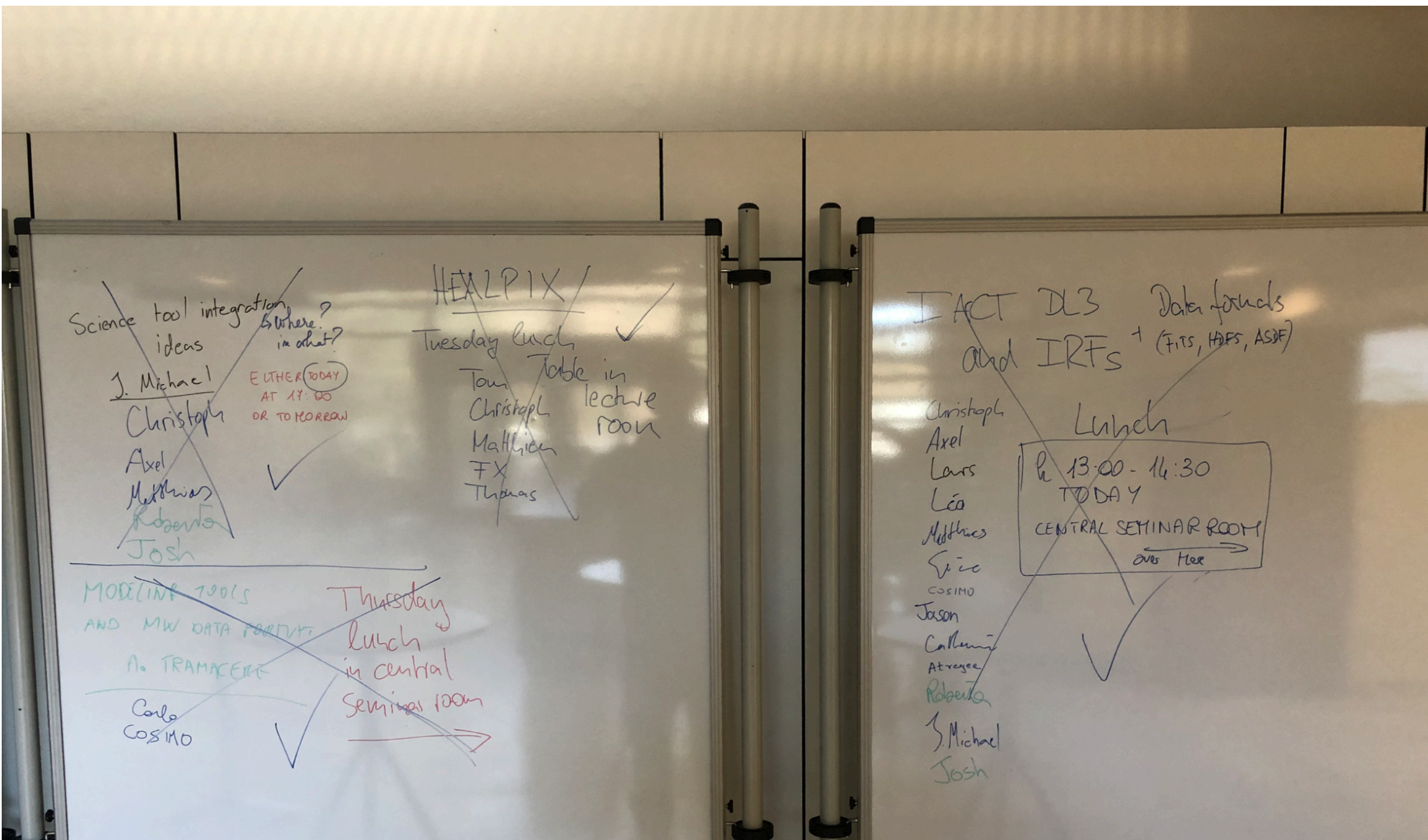PYGAMMA19 PARTICIPANTS – THANK YOU!

SUMMARY & DISCUSSION

PRESENTATIONS

➤ All slides available on Indico: https://indico.cern.ch/event/783425/

➤ ~ 30 presentations (5 remote) + 10 lightning talks + 3 posters

➤ Topics cover gamma-ray code & data + experience from similar projects
  (e.g. neutrinos, radio, HEP, JWST, …)

➤ No scientific Python stack devs at PyGamma19 (Numba, Dask, pytest, …)
  To learn more, go to a Scipy, PyData, PyCon or Python in astronomy meeting,
  or use online resources (https://pyvideo.org/, blogs, mailing lists, …)

➤ Will write a summary with an overview and links to all presentations next week

DISCUSSIONS

➤ Many good discussions!

➤ Plenary discussion, after talks

➤ Coffee breaks, lunch, dinner

➤ A few topics discussed in larger groups:

➤ Science tools / analysis packages

➤ Astrophysical modelling codes

➤ Data model & format

➤ astropy-healpix

➤ Will write summary and send it to you for comments next week

DISCUSSION – DATA

➤ We have https://gamma-astro-data-formats.readthedocs.io and https://lists.nasa.gov/mailman/listinfo/open-gamma-ray-astro (thanks Jeremy!) and summary of this community effort in 2016arXiv161001884D.

➤ We have very advanced fully open Fermi-LAT data model, formats & tools
- Directly usable for slewing telescopes (HAWC, KM3Net, future space telescopes)?
- Usable with some extensions for CTA and all IACTs or too different?

➤ The data model & format we have for IACTs is a primitive prototype for CTA.
- Mostly good enough for current IACTs though.
- Extend and polish?
- Or create something better for CTA based on the experience we have gathered!?
- Not clear how effort will continue, especially short-term (2019)

DISCUSSION – CODES

➤ Gamma-ray codes written by a few people. Already duplication of effort, all projects need more work and manpower. How to create high-quality, supported, sustainable projects?

➤ Merge existing projects? Long-term the best solution, but causes a lot of short-term pain for users and developers. Collaborate and be complementary as much as possible!?

➤ We heard CASA, JWST, ROOT as examples at PyGamma19 for big projects that are well-well-maintained and well-funded — how to get there for gamma-ray astronomy?

➤ Many good technical options now for scientific Python codes, but hard to choose: Python, Numpy, Numba, PyTorch, Tensorflow, … (C++, Julia, Rust)

➤ To build and ship, conda is the obvious solution. Some concern that it's not stable & good enough yet, and driven & hosted by a commercial company (Anaconda.inc)

QUO VADIS?

NEXT STEPS

➤ Fermitools & Fermipy is now easy to install and plans to add Python 3 support.
Calling them preferred over re-implementing for CTA & Fermi joint analysis?

➤ Gammapy, Gammalib/ctools, 3ML, Sherpa, …
will continue and improve mostly on their own for now?

➤ Open data model & formats effort not clear:
- wait for CTAO to drive the process and create a solution?
- continue now with community approach in 2019?
  (e.g. add event class support and IRF improvements to spec on Github, try ASDF?)

➤ HESS, MAGIC, VERITAS active, but IMO at low level, not clear what will be achieved.

➤ Astrophysics codes for gamma-ray astronomy: common core package? Benchmark
suite of verified results? Andrea & Catherine will organise a dedicated meeting soon!

"

Just do it!

Contribute to open data & tools, use it for analyses, write papers!
Waiting for decisions / approval / consensus often implies "do nothing" for now.

ORGANISE PYGAMMA20 OR PYGAMMA21?

➤ Another PyGamma meeting in 2020 or 2021?

➤ Useful given many other meetings?
  - http://openastronomy.org/pyastro/2019/
  - https://www.asterics2020.eu/event/third-asterics-obelics-international-school
  - Many astronomy & code meetings (now often on MWL / multi-messenger)

➤ Four days good or too long?

➤ Focus too large (data & code) or too small (multi-messenger)?

➤ Number of talks & plenary discussion too much?

➤ Add tutorials?

THOUGHTS?